92079	Sintering Furnace - Simplified
92080	Slash Burning - Simplified
92081	Sludge Combustion - Simplified
92082	Solid Waste Combustion - Simplified
92083	Steel Desulfurization - Simplified
92084	SubBituminousCombustion - Simplified
92085	Surface Coating - Simplified
92086	Tire Burning - Simplified
92087	Tire Dust - Simplified
92088	Unpaved Road Dust - Simplified
92089	Urea Fertilizer - Simplified
92090	Wildfires - Simplified
92091	Wood Fired Boiler - Simplified
92092	Wood Product Drying - Simplified
92093	Wood Product Sanding - Simplified
92094	Wood Product Sawing - Simplified
92095	BituminousCoalCombustion - Simplified

Note that OC weight percent in each PM-simplified profile corresponds only to the carbon mass, per the Workgroup's decision. It is not corrected to account for other carbon bounded elements like nitrogen, oxygen, hydrogen, etc., since there are no universal accepted correction factors for all emission sources. Users should apply correction factors where appropriate.

N. SCC-SPECIATION PROFILE CROSS-REFERENCE TABLE

Air quality modelers and emission inventory preparers rely on the SCC-Speciation Profile Cross-Reference Table to convert bulk emission inventories of VOC and $PM_{2.5}$ into speciated inventories. Applications of the cross-reference table are wide and essential, from the development of photochemical modeling inputs to characterization of speciated emissions (e.g.,

TAPs) and global warming pollutants such as methane and EC. To facilitate use of the new speciation profiles, the cross-reference table was updated using the latest speciation profiles available in the new SPECIATE database. The starting points for these updates were the latest cross-reference tables from EPA (Houyoux, 2005).

We reviewed the assigned organic gases speciation profiles covering the SCCs that account for 80% of the draft 2002 NEI VOC emissions. The SCCs were prioritized by VOC emissions; 146 VOC SCCs were identified. After assessing the assigned speciation profiles in Sparse Matrix Operator Kernel Emissions (SMOKE) and those available in SPECIATE, we applied new speciation profile assignments for 135 SCCs, which account for 72% of the draft 2002 NEI VOC emissions. The remaining SCCs for VOC emissions (the 11 in the top 80% of VOC emissions and all of the rest) retained the existing profile assignment. Note that EPA expects to complete updates to the cross-reference table to cover all SCCs in the final 2002 NEI by the end of calendar year 2006.

$PM_{2.5}$ speciation profiles for all SCCs were reviewed and updated by the Workgroup, which provided 95 simplified profiles – some new, some revised, and some based on data in SPECIATE 3.2. No profile was identical to any old EPA profiles because the new profiles do not use a 1.2 multiplier to increase the OC fraction to primary organic aerosol (POA) and decrease the PM Other fraction. Most of these profiles were assigned to SCCs with $PM_{2.5}$ emissions in the 1999 and 2001 NEI. The EPA has updated this cross reference for all SCCs with $PM_{2.5}$ emissions in the 2002 NEI.

Some composite profiles were created but not assigned because they were not appropriate for a default SCC-only assignment. The profiles that have not been used could be used by SPECIATE 4.0 users by adding to the cross-reference location-specific profile assignments to certain counties or facilities, to support the particular needs of users. For example, the profile "Residential Wood Combustion: Eucalyptus" is not used in any default profile assignments, but could be used in counties where Eucalyptus is a primary source of emissions from residential wood combustion sources. A list of the profiles is tabulated below:

Profile Name	Profile Number
Cigarette Smoke	92018
Geothermal Background	92032
PMControlledLigniteCombustion	92056
Residential Wood Combustion: Almond	92064
Residential Wood Combustion: Cedar	92065
Residential Wood Combustion: Eucalyptus	92066
Residential Wood Combustion: Hard	92067
Residential Wood Combustion: HardSoftN/A	92069
Residential Wood Combustion: Soft	92070
Residential Wood Combustion: Synthetic	92071

Through this process, EPA made the following major improvements to the available $PM_{2.5}$ profiles and assignments.

- New and separate profiles for western bituminous and subbituminous coal combustion and controlled lignite coal combustion are being used for appropriate processes.
- Different natural gas profiles for residential, natural gas as used by industry, and process gas.
- A revised profile for wildfires is being used.
- A new profile for prescribed burning is being used for prescribed burning, instead of the wildfire profile. Similarly, profiles are available for boric acid manufacturing, calcium carbide furnace, inorganic fertilizer, urea fertilizer, lime kiln, sludge combustion, potato frying, limestone dust, and autobody shredding.
- Household waste combustion is now using the agricultural burning profile instead of an incineration profile, to reflect the lower temperature burning and "smokier" profile that household waste combustion would be expected have.
- Meat frying is now using a profile that is specific to meat frying and not the same profile as for charbroiling.
- The default profile assignment for residential wood combustion is a composite profile based on hardwood and softwood profiles. However, more detailed simplified profiles are also available in SPECIATE 4.0 that are not being used because they are not appropriate for a national default.
- A new steel desulfurization profile is being used for steel desulfurization processes, instead of sintering furnace and open-hearth furnace profiles used previously.
- A tire burning profile is being used for tire burning, instead of a solid waste combustion profile used previously.
- A dairy soil profile is being used for dairy soil dust, instead of a generic soil dust profile. Other soil/dust profiles available in the database are coal, coke, construction, industrial, limestone, and paved/unpaved dust.

The new cross-reference table better characterizes source chemical compositions, which should result in improvements in inventories and air quality modeling. The new cross-reference table is available on the SPECIATE web site (http://www.epa.gov/ttn/chief/emch/speciation/). A memorandum documenting the development of the cross-reference table is also available at the web site.

Limitations of the cross-reference table include the following:

1. Spatial and temporal resolution – the SCC-to-profile cross reference is a one-to-one relationship (i.e., each SCC is assigned to one PM or one VOC/TOG/nonmethane organic gas (NMOG) profile). When there are differences in emission source compositions for different regions and/or time periods (e.g., monthly, quarterly), users may need to revise profile assignments with profiles that are more representative of emission sources for a specific region and/or time period. For example, the new ethanol gasoline liquid (Profile # 8733) and vapor (Profile # 8736) profiles are assigned in the cross-reference table because they are believed to be more representative of ethanol-blended gasoline nationwide. For geographic areas that do not require or use ethanol-blended gasoline, the ethanol blended gasoline profiles are not appropriate. For this instance, a list of other optional profiles (e.g., non-oxygenated and MTBE blended gasoline fuels) is included

with the cross-reference table for users to consider. Users of the cross-reference table should consult with local air quality management agencies for the type of fuels used.

2. Emission source coverage – Because of the lack of speciation data for many SCCs, same profiles were selected for similar emission characteristic sectors. For example, there are no pleasure craft exhaust (SCC 2282005010) speciation profiles available in the SPECIATE database; therefore, a light-duty gasoline vehicle exhaust profile (#4556) is assigned to this SCC. The same profile is also assigned to snowmobiles (SCC 2260001020), lawn and garden equipment (SCC 2260004026), and other nonroad emissions. This limitation can be improved by adding speciation data of those emission sources when they are available in the future. In addition, the Workgroup has identified the following categories as high priority for SPECIATION profile development:

    - Coal combustion - Eastern bituminous coal combustion and improved regional coverage for subbituminous coal combustion for both controlled and uncontrolled conditions. Efforts should be combined with research to also improve $PM_{2.5}$ emission factors and establish differences in emissions factors between filterable and condensible $PM_{2.5}$ for different coal and control technologies.
    - Nonroad diesel engines (e.g., construction equipment).
    - Gasoline-powered boats.
    - On-road gasoline exhaust under different conditions (e.g., temperatures/ seasons).
    - Updated process refinery gas outside of California, which would be more representative of other sources.
    - Controlled woodstoves.

3. PM profiles - The PM profiles assigned are all for the $PM_{2.5}$ size fraction. Many profiles for the same source sectors are available for different size fractions (PM_{10} and total PM). The compositions of different PM sizes can be different. In this case, when applying profiles to PM sizes other than 2.5 micrometers, users should consult the SPECIATE database to determine if profiles are available for different sizes.

O. MOLECULAR WEIGHTS

The SPECIATE database contains a SPECIE_PROPERTIES table that includes 1,902 unique