Memorandum

To: **Jocelyn Mellberg, TNRCC**
Greg Yarwood, ENVIRON

From: **William Hodan, PES**

Date: **February 15, 2002**

Subject: **Point Source Emission Profiles Based on 2000 PSDB**

2000 PSDB REVIEW:

PES has reviewed the 2000 Texas Natural Resources Conservation Council (TNRCC) Point Source Database (PSDB) as provided by TNRCC on January 16, 2002. The data was provided as an ACCESS™ file containing 39,352 data records representing 1,713 accounts or facilities in 10 Texas areas.

The PSDB was examined to assess the presence of known chemical compounds and generic chemicals in the data. A list of non-reactive chemicals to be removed before evaluating the data was supplied by TNRCC. This list of 33 unique "contam-codes" and synonyms are included in the ACCESS™ deliverable in the table titled "Chemical List (Removed)". The remaining list of valid chemicals consisted of 483 unique chemical entries (See the table titled "Chemical List Master"). The PSDB contained a total of 458.22460 tons of VOC, of which 164.40510 tons were classified as "Nonmethane VOC-U", and 63.96460 tons were characterized as generic chemicals. The list of 90 generic chemicals was evaluated to determine the number of occurrences in the PSDB, and the amount of each generic chemical in the data. Based on the amount of each generic chemical in the data and the number of occurrences, the generic chemicals were evaluated to determine a speciation profile that could be used to define the chemical. Speciation profiles were used to replace 33 of the 90 generic chemicals resulting in resolution of 46.07610 of the 63.96460 tons of generic chemicals (72%). Following resolution of the 33 chemicals, only 3.9% of the PSDB remained generic. The 164.40510 tons of Nonmethane VOC-U could not be resolved using speciation profiles directly.

The speciation profiles used to resolve the generic chemicals are included in the ACCESS™ file as the following tables:

- Spec Crude Oil
- Spec Gasoline
- Spec Naphthas
- Spec Refinery
- Spec Stoddard Solvents

These speciation profiles have been incorporated into the final 2000 PSDB profiles, and are attached for your review only. The generic species "Crude Oil" with contam-cod "59001"

occurred in the PSDB 449 times and represented nearly 14 tons of reported VOC (the highest amount of all the generic species). An examination of the sources associated with the reported emissions of crude oil consisted mostly of large crude oil storage tanks and pipelines. SPECIATE profile number 2487 titled "Composite of 7 Emission Profiles from Crude Oil Storage Tanks – 1993" was used to resolve all the occurrences of crude oil in the PSDB.

The second highest representation by a generic species was by "Gasoline" – contam-cod "59003" which occurred in the PSDB 476 times and represented 10 tons of reported VOC. A speciation profile for Houston area gasoline from the summer of 2000 was supplied by ENVIRON to resolve the occurrences of "gasoline" in the PSDB. The profiles were supplied by ENVIRON in three formats: 1. Liquid gasoline, 2. Gasoline vapor, 3. Tunnel emissions. The profile for gasoline vapor was used, since the PSDB represents actual emissions from point sources and emissions of gasoline would be in the form of vapor.

Several generic species could be characterized as napthas, and were resolved using a profile for naphthas supplied in the ENVIRON report – "Speciated VOC Emissions for the Dallas/Fort Worth Nonattainment Area", October 1997.

Several generic species could be characterized as stoddard solvents/mineral spirits, and were resolved using SPECIATE profile number 1193 titled "Drycleaning", which was developed from a composite of the headspace from 5 mineral spirit samples.

An evaluation of the remaining generic species in the PSDB showed that most could be described as refinery by-products, in-process refinery feedstocks, and general emissions from refinery processes or storage tanks. Generally, most of these generic chemicals are not defined well enough to speciate individually, but could be speciated effectively as a group – all associated as refinery emissions. Therefore a number of the generic species were resolved using SPECIATE profile number 2457 titled "Composite of 10 Emission Profiles - Misc. Chemical and Refining Plants in Houston – 1993".

An examination of the table "2000 Unspecified Chemical Summary" in the ACCESS™ database shows the analysis of the generic chemical list from the 2000 PSDB. The "Spec_code" entry shows which speciation profile the generic chemical was assigned to. "Mass_spec" shows the mass in tons of the generic chemical in the PSDB. "Pct_tmass" shows the percentage of the generic chemical in the PSDB. "Occurrence" shows the number of times the generic chemical appears in the PSDB.

The master chemical table "Chemical List Master" was populated with SAROAD codes and CAS codes where those codes could be determined. PES contacted EPA personnel in an attempt to obtain a master list of SAROAD codes, but such a list is not being maintained by EPA at this time.

EMISSION PROFILE DESCRIPTIONS:

Point-Specific Speciation Profiles:

The data for the 2000 point-specific speciation profiles are contained in two tables. The table described as "2000 Point Profile ID" contains one record for each profile. In this table, each profile is identified by a unique number assembled from a combination of the account id + fac id + point id. The "2000 Point Profile ID" table also contains all other relevant information supplied in the PSDB, such as the facility id, point id, area, facility name, SCC, SIC, SIC class, and business. Several calculated fields are also provided to show additional relevant information about the profile. These fields include the total mass represented by the profile in the PSDB, the mass of Nonmethane VOC-U, unspeciated mass remaining after assignment of generic chemicals to speciation profiles, the effective mass used in determining the emission profile, and the percents of unspeciated mass, Nonmethane VOC-U, and known chemicals.

Point source emission profiles were generated for all the point sources that contained at least 75% total resolution following resolution of the generic chemicals in the data. Since it was not possible to speciate the 164 tons of Nonmethane VOC-U even after resolution of the generic chemicals many of the point sources in the PSDB did not contain enough resolved data to create a realistic point source profile. Due to resolution of most of the generic data in the PSDB, PES was able to generate emission profiles for 7,583 of the 20,272 points in the PSDB. The remaining sources in the PSDB can be effectively characterized by the SCC profiles discussed in this memorandum. In the work that was done previously to develop profiles from the 1999 PSDB, the 75% resolution criteria was used without attempting to speciate the generic chemicals, and therefore was not as effective.

The table described as "2000 Point Profile Data" contains one record for each chemical specie for each profile identified in "2000 Point Profile ID". As in "2000 Point Profile ID", the unique profile number is included in this table, and is the key connecting the two tables. The chemical specie is identified by a unique contam_code, SAROAD number where available, CAS number, and the chemical name. "2000 Point Profile Data" also includes the amount of each chemical species emitted described by the "Tonperday" field, and the percentage of the chemical in the profile described by the "Prof_pct" field.

SCC-Specific Speciation Profiles:

The data for the SCC-specific speciation profiles are contained in two tables. The table described as "2000 SCC Profile ID" contains one record for each profile. In this table, each profile is identified by SCC. The "2000 SCC Profile ID" table also contains the total mass of compounds in tons per day emitted by the process, the mass of Nonmethane VOC-U, and the mass of unspeciated VOC. Additionally, the percentages of Nonmethane VOC-U, unspeciated VOC, and known chemicals are provided for each profile.

The table described as "2000 SCC Profile Data" contains one record for each chemical specie for each profile identified in "2000 SCC Profile ID". As in "2000 SCC Profile ID", the SCC is included in this table, and is the key connecting the two tables. The chemical specie is

identified by a unique contam_code, SAROAD number where available, CAS number, and the chemical name. The amount of each chemical species emitted is described by the "Tonperday" field. There are three representations of each SCC profile in "2000 SCC Profile Data". The percentages of each chemical for each profile representation are in the fields "T_prof_tot", "S_prof_tot", and "K_prof_tot". "T_prof_tot" shows the SCC profile including all species. "S_prof_tot" shows the SCC profile including all species except Nonmethane VOC-U. "K-prof_tot" shows the SCC profile including only the resolved chemical species as supplied in the PSDB and derived using the speciation profiles.

For point sources that could not be sufficiently resolved, the SCC profile can be used in place of a point source profile to characterize that source.

1999/2000 PROFILE COMPARISON:

A comparison of the 1999 and 2000 data showed that many of the sources from the 1999 PSDB were also represented in the 2000 PSDB, but the chemical data supplied was different in most cases. See the table titled "PSDB 1999/2000 Comparison". A quality review of the 1999 profile data did not reveal any incorrect calculations, although the comparison of the profiles from 1999 and 2000 showed significant differences. The chemical list associated with the 1999 and 2000 data generally compares well, but the 1999 data contains more generic data. The speciation profiles that were used with the 2000 data to resolve generic species can be applied to the 1999 data to improve those profiles as well. However, since the 1999 data has undergone more review and quality assurance by TNRCC it is unclear at this time whether the 1999 or 2000 profiles should be given more precedence. After a review of the 2000 emission profiles has been completed, additional work can be completed regarding incorporation of data from the two inventories.