



**Characterizing Hourly Emissions and Permit
Data (Emissions Authorizations) from
Selected Point Sources through a
Special Emissions Inventory Collection**

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Executive Summary

This project was designed to develop, test, and implement a new software tool for acquiring hourly emissions inventory (EI) data from point sources in Texas and to examine the relationships between hourly emissions estimates and authorized (permitted) emissions. One part of this report describes the design, development, and testing of the new hourly emissions inventory software. Hourly EI data are essential model inputs for testing ozone control strategies in Texas. The new Hourly EI Reporting System (HEIRS) makes it easier for companies to report hourly EI data to TCEQ by providing options for online data entry and electronic upload of data files to an hourly EI database. The new software also makes it easier for TCEQ staff to incorporate the hourly EI data into the files used as model input by enabling the direct transfer of the hourly EI database contents to STARS. Another part of this report describes the relationships found between reported hourly emissions estimates and authorized emissions. Average hourly emissions estimates were within 55% to 114% for vents and wastewater sources but generally not nearly as good for flares, cooling towers, and other source types.

TCEQ invited about 30 EI account holders from Harris County to participate in a voluntary pilot scale test of HEIRS during May-June 2005. Feedback from pilot project participants indicated that the new software simplifies the process of reporting hourly EI data compared with previous approaches but room for additional improvements exist. The main concern expressed by several of the HEIRS testers, pertaining to both manual data entry and electronic file upload, was that the software system ran too slow. The slow data processing speed was probably caused by a combination of factors including increased server load as the deadline for data entry approached and the processing time needed for validation of the reported data with respect to STARS data acceptance criteria. Processing of data entered manually was also slowed by a system design feature that automatically copied data from one day to the next. This feature was programmed into HEIRS to eliminate the need for repetitive data entry when emissions remained constant over multiple days.

Data upload and manual data entry speeds can be improved for future applications with a few relatively minor changes to the HEIRS programming code. Most importantly, perhaps, we recommend that HEIRS be reprogrammed to delay data validation for STARS acceptance until after the data have been successfully uploaded to a temporary storage location (an FTP site, for example). With the existing system, data are automatically validated for STARS acceptance during file upload (and manual data entry) and a validation report is returned to the system user immediately after the file upload (or manual data entry) is complete. To improve online system performance, data validation for STARS acceptance should be conducted offline after the data

have been successfully uploaded (or manually entered) to a temporary storage location. A validation report would then be sent by email to the EI account holder verifying successful data transfer to the hourly EI database or notifying him or her of corrective actions that are required. This recommendation and others are discussed in this report.

In addition to testing HEIRS performance and functionality, the May-June 2005 pilot project generated a dataset of hourly emissions estimates that could be used to support photochemical modeling for the Houston-Galveston-Brazoria (HGB) Area. Twenty-two facilities from Harris County participated in the pilot project by submitting a combined total of almost 800,000 hourly data records. The volatile organic compound (VOC) and oxides of nitrogen (NO_x) emissions sources that TCEQ asked companies to report on for the pilot project were ones that were expected, based on previous EI reports or source types, to have comparatively high emissions or emissions variability.

Hourly EI data generated by the HEIRS Pilot Project also provided a unique opportunity for comparing hourly emissions and emissions variability with authorized short-term emission limits. This was done to assess the level of confidence with which authorized emission limits can substitute for hourly emissions estimates when actual hourly emissions are unknown. For this comparison, authorized emission limits were obtained from the HARC H022.2003 Authorized Emissions Database. The HARC database, which was compiled in 2003 from a TCEQ permit file search, lists authorized emissions for more than 2500 emissions sources at 60 of the top HRVOC-emitting facilities in the Houston-Galveston-Brazoria Area. Fifty-two of the sources reporting hourly EI data during the HEIRS Pilot project are listed in the Authorized Emissions Database.

The best agreements between reported and authorized emissions were generally found for fugitives, vents, and wastewater sources. The reported emissions from these source types, which were constant most of the time, ranged between 55% and 114% of the authorized emissions. The reported emissions from flares were much more variable over time and appeared to have little relationship to authorized emissions. The average and maximum hourly emissions reported from flares during the HEIRS pilot program ranged from 1% to 90% and 4% to 170% of the authorized emissions, respectively. The reported emissions from cooling towers, loading, and other source types, also, did not agree well with authorized emissions.