

TERC Program Overview FY 2006-2007

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FY2006-2007 Funding

- TX HB 2481 allocates \$4.5 MM for AQ research from TERP for FY2006-2007.
- TAMU-TEES receives \$432K for investigating SIP credits for renewable energy.
- Carry-over of ~\$200K from FY2005.
- Remaining research budget after administrative expenses is ~\$3.2 MM.

Air Toxics Exposure

- \$125K allotted to exposure research.
- TERC contribution of \$50K to NUATRC's Houston Exposure to Air Toxics Study.
- Project H72.C examines exposure of children to air toxics in school buses.

SIP and TexAQS II

- ~\$1.1 MM allotted to projects in support of SIP development for DFW and HGB 8-hr ozone non-attainment areas.
- ~\$2.0 MM allotted to TexAQS II-2006.
- All funds for FY2006-2007 technically committed by TERC Board.

SIP Projects

- Active projects:
 - H51 Transfer and Storage Emissions
 - H54 Solvents Project
 - H72.A Updated TERP Analysis
 - H72.B LIRAP Program Analysis
 - H76 HRVOC Monitoring
- Pending projects:
 - H65 Emission Events, THOES, Reactivity
 - H66 Small Electric Generators
 - H73 HGB VOC Modeling
 - H77 CB4/SAPRC

TexAQS II Projects

- Active projects:
 - H45.D Real-time Meteorology Forecasting
 - H53 Solar Occultation Flux (SOF)
 - H59 STEM 4DVar Data Assimilation
 - H61 Analysis of NETPS Data
 - H74 PTR-MS/ID-CIMS Project
 - H75 Williams Tower
 - H78 TRAMP (Moody Tower)
- Pending projects:
 - H45.C East Texas Air Quality Forecasting Project
 - H62 Analysis of SETTTS (Tetroon Study) Data
 - H63 Aircraft Measurements

H60: Regional Transport

- Funded with FY2005 dollars from HB 1365.
- Phase I analyzed potential controls on compressor engines and EGUs in Texas using DFW 1999 and CENRAP 2002 episodes.
- Phase II will examine 2005 ozone episodes and inter-compare CAMx and CMAQ for:
 - Model performance
 - Source attribution (APCA, HDDM)
 - Robustness of control strategy impacts
- Phase II will also develop a conceptual model of transport that may guide future measurements.

Questions Posed to SAC

- How Do We Maximize Usefulness of TexAQS II?
 - How should H63 (Aircraft Measurements) be designed to exploit previous TERC-funded research?
 - What analyses should be conducted on data collected during TexAQS II-2005 and 2006?
- What Research Will Be Critical After 2006?
 - Should a 2012 assessment be conducted as part of pending modeling projects for HGB?
 - What new issues and corresponding research capabilities should be incorporated into TERC's research agenda?

Aircraft Measurements

- TERC Board approved \$495K for aircraft project with contractor to be determined.
- DOE G1 unavailable due to funding shortfall.
- Both Baylor and NOAA will be fielding small planes during summer 2006.
- NOAA Twin Otter equipped with ozone lidar to measure “curtains” of ozone.
- Baylor Aztec will fly for NETAC to measure ozone and precursors in September 2006.
- Possibility of tandem flights during first three weeks of August 2006 to study transport.

Meteorological Mechanisms

Mechanism	Importance to Air Quality
Sea Breeze	Slow wind rotation traps pollution over Houston. Stalled sea breeze front traps and uplifts pollution.
Nocturnal Jet	A fast night-time wind near the surface can spew pollution large distances downwind.
PBL Evolution	PBL height helps determine the concentration of O ₃ precursors and the efficiency of O ₃ formation.
Cumulus Convection	Cumulus towers rapidly vent pollution to free troposphere where it can be transported long distances. Slow subsidence around cumulus towers can also entrain pollution back into PBL.
Vertical Diffusion	Transfers pollution from surface to higher levels, raising O ₃ (high NO _x) or diluting O ₃ (low NO _x).
Stationary Front	Causes “dead zones” allowing O ₃ to “cook” longer or bring pollution down from free troposphere.

Value of Aircraft Project

- Small planes more flexible in responding to meteorological situations than NOAA P3 (more spirals and more choices of measurement location).
- Attempt to study stationary front in 2005 suffered from limited flight hours.
- NOAA Twin Otter already devoted to studying transport mechanisms. Project will expand number of scenarios.
- Baylor aircraft will provide supplementary chemical measurements.
- Opportunity to add dropsondes over Gulf.
- Maximize utility of H59, H60 and real-time forecasting by supporting development of flight plans.

Post-TexAQS II Analyses

- Scope of Work for H62 (tetraon study data analysis) to be submitted to SAC.
- How should H73 (HGB VOC Modeling) be designed to interpret 2005 and 2006 data?
 - Role of primary and secondary VOC species in determining O₃ productivity in Houston
 - Role of vertical mixing (Williams Tower)
 - LES-chem/LRPM + CAMx/CMAQ ?
- Other studies for future funding

2012 Assessment

- DFW county judges expressed unlikelihood of attainment in 2009 to EPA.
- May need to consider 2012 attainment for DFW and HGB simultaneously to see transport mitigation benefits.
- Should component be added to H73 or other modeling project to consider attainment in both 2009 and 2012?

Future Research Needs

- TERC to issue new RfQ to supplement capabilities of existing research teams.
- What new areas and capabilities should we consider? Examples for modeling:
 - Industrial process simulation
 - Regional energy and economic modeling
 - Advanced computational methods (AI, adaptive grids)
 - Neighborhood scale modeling
 - Human exposure modeling
 - Multi-media modeling