Outline

• Pesticide Management Plan Program & NPS
• Groundwater Monitoring Data, Investigations and Immunoassay (Innovative) Technology
• Cooperation
• Management Impacts
• Conclusions

PESTICIDE APPLICATION

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Texas Groundwater Protection Committee & Agricultural Chemicals Subcommittee

- TGPC
- Interagency Group
- Subcommittees
- http://www.tgpc.state.tx.us/

ACS
- Interagency Group
- Task Forces
- http://www.tgpc.state.tx.us/AgChemSubcommittee.html

NPS & the Pesticide Management Plan

- Texas NPS Mgmt. Program (SFR-068/04, 12/05)
  - GW protection/coordination through TGPC
  - Ch. 6, GW Plans (p.89), PMP (p.118), Aquifer Protection (p. 137)
  - PMP – Flow Chart on how to address NPS contamination by pesticides (p. 60-63)

Pesticide Management Plan Program

- EPA FIFRA Grant
  - Program Initiated 1987
  - Protection of Groundwater from Pesticides
  - Initial Focus on Nonpoint Sources from Agricultural Application of Pesticides
  - Monitoring Component for Groundwater Resources
  - Requires Cooperation (through the ACS)
  - Also includes 106 GW, SDWA, CWA, FQPA
  - Recent Focus on Urban Pesticides (screen metros)
Objectives, Design, Methods, & Assessment

- **Objectives:** Protect GW from pesticides
- **Design:** Assess existing data (IPD), communicate/coordinate with stakeholders, monitoring, assessment and BMP components,
- **Investigation and Implementation of BMPs**
- **Assess results & management approach to see if objectives were attained**

Design Phase

- IPD or ambient monitoring verifies pesticides in groundwater
- Plan developed by TCEQ, reviewed by ACS/SSTF, for coordinated investigation
- Results reviewed by ACS/DEITF, action plan
- BMPs/education/ more frequent monitoring, and follow up activities planned/coordinated by ACS/BMPTF
- All phases communicated and coordinated with PWS or private well owner

Monitoring Data

- IPD (Pesticide analysis data in Texas Groundwater)
- Public Drinking Water Monitoring (POEs)
- Vulnerable Areas Monitoring
- Investigations
- Confirmation & On-Going Monitoring
- Cooperative Monitoring

Applications of IA in Texas

- Compilation/Assessment of available Pesticide Groundwater Monitoring Data
- Efficient way to Screen for 2 Primary Pesticides: Atrazine & Metolachlor
- Enables Quick Focus of Resources
- Prevents Minor problems from Developing into Serious Ones

IPD Data

- Data between 1927-2001
- 3,748 wells, >23,000 analytes
- Have added >1000 wells since 2002
- 234 pesticides detected
- 81 confirmed detections, 71 are for atrazine
- Mostly clustered in Central Panhandle

State IPD Coverage
IPD Well Coverage in the Panhandle

Active Ambient Groundwater Monitoring Programs in Texas
- TCEQ’s Public Drinking Water Section - 3-Year Cycle of Monitoring all Public Water Supply Systems
- Texas Water Development Board - 4-Year Cycle of Monitoring State Groundwater/Aquifers
- High Plains Underground Water Conservation District #1 - 3-Year Cycle for District Monitoring
- TCEQ’s GPAT application of Immunoassay Method in Groundwater Monitoring for Atrazine & Metolachlor
- AgChem Subcommittee - Cooperative
- Ambient Groundwater Monitoring for Atrazine & Metolachlor

PWS Investigations
- Detects by PDWS of TCEQ
- Friona was 1st, 1998-99, used as a test of PMP response mechanism
- Extent, PSOCs, PS/NPS, data, trends
- 5 conducted in Panhandle 1998-2003

Ways in Which PWSs and GCDs Help
- Provide Well Access
- Sample Wells
- Ship Samples to TCEQ for Immunoassays
- Locate Wells
- Provide Information on Potential Sources and Wells, including Historical Information for Area
- Saves the State (the Taxpayer – You) Lots of $ and Time
- Speeds up Groundwater Assessments for Pesticides

Investigations & Management Decisions
- Cooperative (state, local) and coordinated
- PWS provides access for monitoring, well info, input on historical perspective/PSOCs, nearby wells and owners
- IA analyses used to direct GW sampling for plume delineation and reduce the # of lab analyses
- Monitoring results used by PWS to take wells off-line
- Annual and semi-annual monitoring results used to put wells back into service
- Source determination used to change practices near impacted wells and to abandon/plug or install wells
Monitoring Results & Management

- Identify impacted wells in larger systems
- Long-Term On-Going monitoring used to determine if source still impacting well
- If concentration drops off significantly, can remove from schedule
- If concentration is erratic, keep monitoring
- Monitor effect of taking well off-line, precipitation, other nearby wells, BMPs
- Assessment of management decisions

Results - PWS Investigations

- 5 PWSs in Panhandle, HP Aquifer
- Similarities:
  - Nearby SW features
  - Old wells (>20 years)
  - No historical pesticide use data
- Differences:
  - Not all adjacent to croplands
  - Mixed PS/NPS
  - Well conditions vary
  - Presently no PWSs (GW) with atrazine >MCL
- PMP response mechanism works

Friona Atrazine Concentrations

- *Analysis by Immunoassay Method

Potential Sources of Contamination

- Former Aerial Applicator Yard
- Old Wells / Well Integrity Issues
- Spills from storage Facilities
- Mixing/Loading/Washing Areas Near Drainage
- Playas & Creeks as Tailwater Ponds
- Pesticide Storage in Well House

IMMUNOASSAY TESTING FOR PESTICIDES

Cooperative Screening for Atrazine & Metolachlor

- Who – TWDB, TCEQ, HPWCD#1, GCUWCD, PGCD, and NPGCD
- When – 2000 – 2007 (8-Years, 2 cycles)
- Where – Major & Minor Aquifers of Texas
- How – Others Collect Samples, TCEQ Analysis for Atrazine & Metolachlor by Immunoassay
TCEQ Immunoassay Coop Monitoring of Groundwater for Pesticides in the Panhandle

- Panhandle/High Plains Aquifer Cooperative
- Atrazine Ambient Screening: 2000 - 564 Wells
- Continuation of Atrazine & Metolachlor Ambient Screening: 2001 - 68 Wells
- Panhandle Screening-Round 2: 2004 - 452 Wells
- Total Coop Ambient Monitoring >3000

County Well Coverage Close-ups

Results of Cooperative Monitoring in the Panhandle

- 218 atrazine detects, with a high of 4.16 ppb
- 8 samples with atrazine > 1 ppb
- 14 metolachlor detects, all but 2 < 0.3 ppb
- 22 wells with the highest atrazine re-sampled
- Coop results match PWS investigations and IPD
- Correspond to high atrazine use areas
Atrazine High Use Areas

Cooperative Monitoring & Management

- Detects concentrations lower than lab
- Covers entire state quickly and less costly
- Identifies low detects and clustering in region,
  Sound, early management helps keep small problems from becoming more serious
- Enabled Texas to move on to urban pesticide monitoring

BMPs & EDUCATION/AWARENESS

- The IPO & GIS enabled Texas to assess existing data, plot areas of interest for pesticides
- Cooperative and confirmation monitoring indicated worst impacted sites, prompting investigations in Panhandle PWSs
- Development of regional BMPs/education and outreach, to correct improper uses and/or improve wellhead protection, abandoned well assessment and proper plugging, resulting in drop in atrazine levels
- Additional management include notifications, additional monitoring, removal or adding of well from/to service, changes to well fields/source removal, stop off-label pesticide use
Conclusions

- IPD detects verify regional atrazine detects in Panhandle, no significant detects elsewhere.
- Focus Education, investigations, BMPs in Panhandle.
- GIS mapping – spatial analysis, ID regional clusters.
- Pooling & compilation of data combined with cooperative monitoring and screening by immunoassay an efficient and effective approach to groundwater protection from pesticides.
- Fulfills basic components & philosophy of PMP.
- Drop in Atrazine concentrations, presently no PWS detects in groundwater above the MCL - GOALS MET.

Conclusions

- Quick detection and coordination led to educational BMPs, other management efforts, and reduction of atrazine concentrations.
- Screened state aquifers for atrazine and metolachlor in a 5-year period.
- Investigations indicate surface water and well age a factor in pesticide impact to groundwater.
- Low rainfall, deep water table, formation materials limit impact of pesticides to High Plains aquifer in Texas.

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