The Geology & Well Technology Section within the Kansas Department of Health and Environment (KDHE), Bureau of Water administers the Underground Injection Control (UIC), the Underground Hydrocarbon Storage and Associated Brine Storage Ponds (UHS), and Water Well Licensing, Water Well Construction and Abandonment programs. These programs are interrelated and support one another. Many projects are addressed as a team by the Geology & Well Technology Section since there are often implications for all three programs.

The overall objective of these programs is to protect the public health and safety and the waters and soils of the state by preventing releases from injection wells, hydrocarbon storage wells and brine storage ponds and by preventing contamination from improperly constructed or abandoned water wells. The activities listed herein support this objective.

On the following pages you will learn more about the significant activities of the programs administered by the Geology & Well Technology Section. In addition, the Geology & Well Technology Section performs outreach, training, distribution of information, and provides hydrogeologic support to environmental programs in the Bureau of Water, federal, state and local agencies. We have also listed some important facts for the programs administered by the Geology & Well Technology Section as well as significant accomplishments. The Geology & Well Technology Section continually strives to enhance the effectiveness of these programs. If you have questions or comments, please let us know.

Administrative Staff

Deb Biester, Public Service Administrator, 785.296.5524  
Debra.Biester@ks.gov

Rachael Berg, Administrative Assistant, 785.296.8565  
Rachael.Berg@ks.gov

Michael H. Cochran, Chief of Geology & Well Technology Section

1000 SW Jackson Street, Suite 420, Topeka, KS 66612-1367  
http://kdheks.gov/geo

KDHE’s Mission: To Protect and Improve the Health and Environment of all Kansans
The UIC Program regulates injection well activities including the disposal of industrial wastes into deep geologic formations, the solution mining of salt formations, and the shallow injection of non-hazardous fluids below the land surface. Injection wells are categorized into various well classes. This assures wells of similar design and operation meet appropriate performance criteria.

Unit Chief, Brandy DeArmond, L.G.
Brandy.DeArmond@ks.gov
785.296.5554
http://kdheks.gov/uic

Underground Injection Control (UIC)
Information for Calendar Year 2016

A Few Program Statistics:

- 50 Active Class I industrial waste disposal wells
- 154 Active Class III salt solution mining wells
- 6,778 Active Class V (shallow) injection wells in the KDHE inventory
- 3.8+ Billion gallons of waste water safely injected into Class I wells
- 1.4 Billion gallons of brine safely produced from Class III wells

Some Significant Activity numbers:

Mechanical Integrity Tests Conducted by Operators and Witnessed by KDHE:
- 14 Class I
- 31 Class III

Wells Inspected by KDHE:
- 25 Class I
- 23 Class III
- 4 Class V

Cows Assist with Class III Injection Well Mechanical Integrity Testing

Class III Salt Solution Mining Gallery Well Plugging
The Underground Hydrocarbon and Natural Gas Storage Program regulates the storage of hydrocarbons, including liquefied petroleum gas (LPG) and natural gas, in salt caverns formed by solutioning in the Hutchinson Salt. The program also regulates the brine ponds associated with the underground storage facilities.

A Few Program Statistics:

- 9 LPG facilities
- 375 Active LPG wells
- 206 LPG wells in monitoring status
- 22 Wells in wash status
- 48 Active brine storage ponds
- 398 Groundwater monitoring wells
- 1 Natural gas facility (inactive)
- 97 Natural gas wells (all in monitoring status)
- 104+ Million Barrels of storage capacity
- 40 Million barrels brine pond capacity

Unit Chief, Jessica Crossman, L.G.
Jessica.Crossman@ks.gov
785.296.7265
http://kdheks.gov/uhs

Staff Inspected 18 Brine Storage Ponds in 2016

Construction of a New Brine Pond

Staff Inspected 274 UHS Wells in 2016
The Field Operations, Permitting, and Compliance Unit oversees brine spill cleanups, coordinates Section field activities, administers facility enforcement action and reporting and provides technical assistance to Underground Hydrocarbon Storage facilities and the Section programs.

UHS Brine Spill Summary for 2016 Spills

- 14 brine spills occurred at KDHE Underground Hydrocarbon Storage (UHS) regulated facilities
- Total volume spilled – 525 barrels (22,050 gallons)
- Spills occurred at 5 central Kansas UHS facilities which use brine to displace pressurized liquid hydrocarbons from underground salt caverns
- Major causes include corrosion of buried and above grade pipelines and valve/gauge fitting leaks.
- Volume of brine released in 2016 represents a 92% reduction compared to brine volume released in 2007.
- Below is a graph depicting the brine spill volumes over the past 10 years.

Industry continues to work diligently to eliminate brine spills; including replacement of lines, monitoring for corrosion, and enhancing operator training. As can be seen by this graph, the results have been very successful.
Water Well & Technical Support
Information for Calendar Year 2016

The Water Well & Technical Support Program licenses water well contractors and regulations water well construction, pugging and abandonment.

Unit Chief, Pamela Chaffee, L.G.
Pam.Chaffee@ks.gov
785.296.3565
http://kdheks.gov/waterwells

Results of Water Well Contractor Exams Taken During 2016

- Passed: 18
- Failed: 19

Inactive Well Requests received in 2016 = 9

Waiver Requests Reviewed in 2016 = 12 for 220 Wells

Total Constructed/Reconstructed Wells 2016

- Domestic: 1,761
- Environ. Monitoring: 683
- Environ. Remediation: 143
- Oil Field Water Supply: 54
- Geothermal Systems: 149
- Public Water Supply: 10
- Irrigation: 331
- Other: 102

Total Wells Plugged in 2016

- 1,793

Domestic Lawn and Garden Well

Windmill Well – Approved Well Head
Administrative Support
Information for Calendar Year 2016

The Administrative Assistant and Public Service Administrator (PSA) provides both support to the Geology & Well Technology Section professional staff and customer service to the public and entities outside the Section. The PSA administers the Water Well Contractor Renewals.

**SUPPORT FOR SPECIAL PROJECTS INCLUDING:**
- KOLAR – Kansas Online Automated Reporting System for the required submittal of water well records, form WWC-5, in conjunction with Kansas Geological Survey.
  - On-going publication of KOLAR Web site
  - 86 Water Well Contractors utilizing site http://kolar.kgs.ku.edu
- WWC-5 Water Well Record Forms
  - Process payments
- Water Well Contractor Licenses – Process new and renewals
- Geology & Well Technology Safety Captain
- UIC Database Entry & Filing
- UHS Electronic Filing
- Geology Annual Seminar and Training Events
- Forms Development
- Trained new staff on procedures and policies

**WATER WELL CONTRACTOR RENEWAL LICENSING:**

<table>
<thead>
<tr>
<th>Licensed Rigs 350</th>
<th>Licensed Contractors 222</th>
<th>Drillers 542</th>
</tr>
</thead>
</table>

**NUMBER OF LICENSES PROCESSED IN RENEWAL PERIOD JULY 1, 2015 - JUNE 30, 2016**

<table>
<thead>
<tr>
<th>Water Well Contractor Revocations for 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="chart.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

**CUSTOMER SERVICE:**
Web site development and updates—on going; including fillable pdf forms, maps, directions, notices, procedure and guidance documents, etc.

http://kdheks.gov/geo

- 7 File reviews/copying documents
- Geology Newsletter and Annual Report
- Cross training to acquire more knowledge of section programs to provide better service to customers
- E-mail notifications regarding Geology Section Events and Program Changes

**TRAINING:**
- Attended Woman’s Conference
- Attended KGWA Conference
- Facility Field Trips

Deb Biester, Public Service Administrator
Debra.Biester@ks.gov  785.296.5524
http://kdheks.gov/geo

Rachael Berg, Administrative Assistant
Rachael.Berg@ks.gov  785.296.8565
GEOLOGY & WELL TECHNOLOGY SECTION
Information for Calendar Year 2016

PROGRAM FEES COLLECTED
The Geology & Well Technology Section collects fees from the regulated community in some cases to fund or partially fund its regulatory programs. These fees are established by statute and implemented by KDHE through the appropriate program regulations.

<table>
<thead>
<tr>
<th>UNDERGROUND INJECTION CONTROL PROGRAM</th>
<th>FEES COLLECTED</th>
<th>UNDERGROUND HYDROCARBON STORAGE PROGRAM</th>
<th>FEES COLLECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Permit Fee/$12,000 per facility</td>
<td>$48,000</td>
<td>Annual Permit Fee/$18,890 per facility</td>
<td>$188,900</td>
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<tr>
<td>Annual Permit Fee/$175 per Unplugged Well</td>
<td>$27,125</td>
<td>Annual Permit Fee/$305 per Unplugged Well</td>
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<tr>
<td>New Permit Application N/A</td>
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<td>New Permit Application / $700</td>
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<tr>
<td>Sub Total</td>
<td>$75,125</td>
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<td>$375,255</td>
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</table>

**TOTAL UIC,UHS FEES COLLECTED**

<table>
<thead>
<tr>
<th>WATER WELL PROGRAM</th>
<th>FEES COLLECTED</th>
<th>WATER WELL PROGRAM (Continued)</th>
<th>FEELS COLLECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Well Contractor License/$100 each</td>
<td>$22,200</td>
<td>WWC-5 Forms/$5 each constructed well</td>
<td>$12,590</td>
</tr>
<tr>
<td>Rig License/$25 each rig</td>
<td>$8,750</td>
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</tr>
<tr>
<td>Water Well Exam/$10 each</td>
<td>$430</td>
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<tr>
<td>Sub Total</td>
<td>$31,380</td>
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<td>$12,590</td>
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</tbody>
</table>

**TOTAL WATER WELL FEES COLLECTED**

$43,970
The Geology and Well Technology Section (GWTS) works vigorously with operators to achieve compliance with state and federal environmental statutes and regulations. The regulatory programs rely upon inspections and monitoring to determine compliance. Operators usually correct compliance problems quickly and effectively, however, on rare occurrences, KDHE must issue administrative orders or monetary penalties to obtain compliance.

**UIC Program** – There were 10 Class I well violations that included low annulus pressure, failure to notify KDHE of violation within 24 hours, and pH limit exceedance; 3 Class III well violations, all of which consisted of failed Mechanical Integrity Tests; and 2 Class V well violations consisting of 1 constituent concentration limit exceedance and 1 septic tank accepting floor shop drainage. These compliance incidents have all been resolved.

**UHS Program** – The UHS program had a total of 4 permit violations. 3 violations consisted of UHS operators exceeding permitted maximum allowable operating pressure in caverns. 1 UHS operator failed to conduct a required MIT. These compliance incidents have been resolved.

**Water Well Program** - There were 5 Water Well program violations all of which consisted of failure to submit required documentation or improper water well plugging. In addition, 17 water well contractor licenses were revoked in 2016. Reasons for revocation were primarily voluntary, with the remainder due to failure to obtain continuing education units (CEUs), and failure to submit renewal application materials and fee payments. 1 license revocation was stayed by the KDHE administrative process pending compliance with CEU requirements due to extenuating circumstances.
The three programs the Geology and Well Technology Section administer, which are the Underground Injection Control (UIC), Underground Hydrocarbon Storage (UHS), and Water Well Programs are integrated and interrelated to a significant degree. The Section also has a Field Operations, Permitting and Compliance Unit that as one of its responsibilities administers the brine spill part of the KDHE spill program for the Underground Hydrocarbon Salt Cavern Storage facilities. The KDHE UIC Program/Geology and Well Technology Section had numerous significant accomplishments and activities for in 2016 as detailed below.

**Outreach/Training Provided:**

- The Geology and Well Technology Section sponsored a KOLAR and Water Well Location workshop on September 7, 2016, in Wichita at the Sedgwick County Extension Education Center for water well contractors. KOLAR is the Kansas On-line Automated Reporting system for the required submittal of water well records. The next day at the same location the Geology and Well Technology Section conducted its annual fall technical seminar which consisted of a variety of presentations by a number of experts; including an overview of current environmental issues by KDHE Deputy Secretary of Environment Gary Mason, salt cavern testing, update on injection induced seismicity, casing inspection logs, Geothermal wells and problems encountered during installation, Governor’s Water Vision, casing repair and KDHE program and EPA Underground Injection Control Program updates. There were 138 participants. Many compliments were received by KDHE staff on the quality of the presenters and the presentations and that the workshop and seminar were well organized. The Geology and Well Technology Section staff worked very hard and succeeded in providing useful information to its regulated community and those interested in the Section’s programs. These seminars provide an excellent networking event for the attendees. The workshop and seminar together provided an opportunity to earn 11 professional development hours.
- Made water well program presentations and an update of Section activities at the Kansas Ground Water Association (KGWA) Annual Convention & Trade Show in Hutchinson. Provided and staffed a Section programs information booth.
- A spring and fall 2016 Geology and Well Technology Section newsletter were developed and emailed to the Geology Section’s regulated community, other government entities and programs and environmental consultants.
Developed and posted on the Section website a Section Calendar Year 2015 Annual Report.

Made a Water Well Program update presentation at the KGWA Fall Technical Seminar.

Participated in meetings with several consultants at their place of business (Wichita, Great Bend) concerning nitrogen/brine Interface testing procedures, concepts, regulatory requirements, practices and procedures for storage and UIC wells.

Several staff members participated in the spring Kansas Ground Water Association technical seminar, which included a water well drilling demonstration by a Kansas licensed water well contractor and a water well record reporting presentation by KDHE staff.

Staff member made presentations on water well regulations, assessment, and maintenance as part of the annual meeting of county sanitarians, local environmental protection program staff, and KDHE district office staff at four cities in Kansas.

Participated in a seminar/tour of the City of Wichita Aquifer Storage and Recovery project for state of Oklahoma state water resource staff. KDHE made a presentation on the Class V permitting aspects of this project. KWO, GMD #2, Governor’s Water Vision Team, City of Wichita were among the participants.

Provided training to a Class I well operator on Class I well monitoring and reporting with approximately 50 participants.

One member co-presented at a Private Well Seminar in Ness City, Kansas, sponsored by the Midwest Assistance Program, Inc. (October 2015)

One member presented on Private Water Well Protection and Maintenance at an Ag Producers meeting in Pratt, Kansas. (November 2015)

Training Attended:

- Several staff members attended the 8 Hour HazWoper Refresher.
- All Section staff attended Active Shooter Training.
- Several staff members participated in a logging company presentation on through tubing casing inspection log.
- UIC Web Map Viewer training by KDHE IT for several staff members.
- 4 staff members attended the EPA UIC Inspectors week long training course in Denver, Colorado. All received their certificates of training.
- Conducted Section all staff field training day. This included observing a legacy brine well sinkhole, natural sinkholes, geology, a salt cavern storage facility and a salt solution mining facility and salt plant.
- A staff member is participating in the Private Well Class monthly webinars.

Administrative/Programmatic:

Section:
- Continue to enhance and add new procedure and guidance documents to the KDHE Geology and Well Technology Section website.
• Conducted an all-day planning meeting to update the operational plan and determine how to best address anticipated upcoming issues and work activities.

• Continue to address a turnover of all the professional staff in the Section due to retirements and staff leaving the agency. Continue training new staff.

• Provided opportunities for cross-training of staff at field oversight events and meetings with industry.

• Participated in a Section meeting with EPA Region 7 staff to discuss issues and items of common interest. KDHE Bureau of Water Director also participated.

• Established a Section enforcement tracking system and enforcement actions determination group.

• Staff participated in the joint Bureau of Water/Bureau of Environmental Field Services planning and emerging issues meeting.

• Staff participated in two 4-State/EPA UIC Program Directors face to face meeting. The spring 2016 meeting was in Hastings, Nebraska and the fall 2016 meeting was in the EPA Region 7 office. KDHE also participated in the fall 2015 meeting which was by conference call for the states.

• Completed migration of email system to Office 365. All staff attended training for this prior to the migration event.

• Staff conducted annual review of KDHE Environment Division, Bureau of Water and UIC Program Quality Management Plan and provided comments to the QMP Officer.

• Established a Section Compliance Committee that meets routinely to review compliance and address non-compliance events.

UIC:

• Met with Class I well industry in Wichita and had experts from the Kansas Geological Survey, K-State Pollution Prevention Program and Governor’s Water Vision project present information on KDHE’s initiatives for seismic monitoring and injection volume reduction. This was to facilitate implementation of KDHE initiatives for Class I well seismic monitoring and injection volume reduction.

• Provided comments to EPA Region 7 on the Occidental Chemical petition to EPA seeking an exemption to the ban on hazardous waste injection.

• Participated in a meeting at the Kansas Geological Survey with CH2M Hill and Kansas Geological Survey on technologies to reuse oil and gas produced brine.

UHS:

• Met with industry in McPherson regarding planned changes to the regulations.

• Met with industry representatives at Williams Conway office to discuss potential involvement of Pipeline and Hazardous Materials Safety Administration regulation of liquids storage in salt caverns.

• Attended the Gas Storage Seminar and StatesFirst meeting in Orlando, Florida.
Water Well:

- A web based water well record submittal system for use by water well contractors is now in its fifth year of implementation. This system also automatically populates the water well data base, which among its many uses, includes AOR for UIC and Underground Hydrocarbon Storage projects to ensure protections of fresh and usable water zones. Approximately 86 water well contractors have signed on and at this time approximately 28% of the water well records filed with KDHE are now being filed electronically through KOLAR.
- Revised the water well contractor license exam to be clearer and more relevant and to be more of an educational tool.
- Met with Sedgwick County and the City of Wichita to develop an assessment and variance procedure for existing wells determined to be too close to a sewer line during a property transfer.
- Developed a study guide containing links to online study materials and documents to assist in preparation for the Kansas water well contractors licensure exam.
- Implemented revisions to improve the Kansas Water Well Contractor Licensure Examination Study Guide.
- Met with KDHE Bureau of Environmental Remediation staff to review plugging procedures for groundwater monitoring wells.

Compliance:

- Implemented a compliance team within the section that meets regularly to review non-compliance and to determine appropriate actions. A tracking database has also been developed.

Public Service Administrator/Administrative Assistant:

- Data continues to be entered into the UIC and UHS data bases. This has been enhanced with the addition of a part time administrative assistant.
- Meetings and training with both KOLAR program administrators and water well contractors have provided opportunities for exchange of information on potential issues, training topics, and needed revisions in KOLAR.
- Updates and revisions to KOLAR have continued to ensure compliance with current regulations and improve use by water well contractors.

Brine Spills:

- Met with KDHE northcentral district staff and KDHE Bureau of Remediation staff at NCDO in Salina to coordinate brine spill response at salt solution mining and underground hydrocarbon storage facilities.
• Continue working with industry to reduce number of brine spills and volume of brine spilled at Underground Hydrocarbon Storage facilities. Considerable progress has been made since 2007. In calendar year 2007, 6,407 barrels of brine were spilled. In calendar year 2016, only 525 barrels of brine were spilled.

Sinkholes/Legacy Brine Wells:

• Met with responsible party to review status of legacy brine well response at Hutchinson, Kansas facility. The caverns with high risk of collapse have been stabilized and the legacy brine wells are now in monitoring mode.
• Continued working with responsible party on a legacy brine well cavern located in Hutchinson, Kansas. The cavern Investigation has been completed and a report with results and recommendations will be submitted shortly.
• Investigated concern of possible sinkhole by a homeowner in Hutchinson, Kansas, relayed through the City Building Inspector. Determined this was not a sinkhole, but rather a shallow dry well (5’ depth) for possibly gray water many years ago but no longer in use. Advised the Building Inspector to have the homeowner fill the hole with clean soil.

Induced Seismicity:

• Participated in meeting with Oklahoma Geological Survey, Oklahoma Oil and Gas Commission and Kansas Geological survey in Norman, OK to discuss Oklahoma’s response to injection induced seismicity.

Significant Regulatory and Compliance Projects/Actions:

• Work continues on updates/revisions to the Underground Hydrocarbon Storage Program regulations. Outreach to the industry on the proposal has been received and a draft for internal KDHE concurrence is being prepared.

Significant Field Projects:

• Comprehensive inspections, which encompassed the following: observing the condition of the well, collecting monitoring readings, reviewing files to ensure three years of compliance record keeping, providing program updates to operators and answering owner/operator questions regarding UIC program were conducted for four Class I disposal wells and one Class V deep injection well facility.
• 18 brine ponds and 274 hydrocarbon salt cavern storage wells were inspected at UHS facilities.
• Observed windmill completions to observe current techniques and materials to confirm compliance with water well regulations.
• Observed plugging of a water supply well by the water well contractor addressing a complaint received from well owner.
• Completed KDHE witnessing of all Class I and III 5 year cycle Mechanical Integrity Tests.
Boards/Workgroup Participation:

- Serve as KDHE’s representative to the KCC Oil & Gas Advisory Committee. Participated in quarterly meetings by conference call.
- 2 staff are members of the StatesFirst Gas Storage Primer Workgroup. This includes weekly conference calls and several face to face meetings in Denver, Colorado and Orlando, Florida.
- Section Chief serves as KDHE’s member of the Induced Seismicity Task Force. Participated in numerous meetings with affected county commissions and participating agencies.
- UIC staff member serves on the board of the Ground Water Protection Council and as GWPC Lass V Board Liaison.
- Member of the newly formed Water Well Policy Advisory Committee – funded by a grant from the Kansas Health Foundation.
- Member of the Shallow Exploration Driller’s Clinic Kansas Host Planning Committee.

Conferences Attended:

- The fall 2016 Water & Future of Kansas Conference in Manhattan, Kansas.
- Attended and participated in the Kansas Ground Water Association Annual Convention and Expo in Hutchinson, Kansas, in January. This included a KDHE informational booth. KDHE also made presentations on water well regulations and Geology & Well Technology Section activities.
- The American Institute of Hydrology Seminar, in November in Topeka, Kansas.
- The fall Ground Water Protection Council conference in Orlando, Florida. This included UIC technical and program presentations/topics and issues.
- SMRI conference in Galveston, Texas.
- Shallow Exploration Drillers Clinic in Catoosa, Oklahoma.

Organizational Memberships:

- Solution Mining Research Institute
- Ground Water Protection Council
- National Ground Water Association
- Kansas Ground Water Association