



# Underground News

Providing Information to the Water Well, Underground Injection Control (UIC) & Underground Hydrocarbon Storage (UHS) Industries in Kansas and other Partners Interested in these Operations, the Environment and Energy

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Fall 2014

## INDUCED SEISMICITY TASK FORCE SUBMITS SEISMIC ACTION PLAN TO GOVERNOR SAM BROWNBACK

by Mike Cochran, P.G.

The Induced Seismicity Task Force established by Governor Brownback submitted on September 25, 2014, its action plan to the Governor for addressing the seismic activity occurring in south-central Kansas. The Task Force consists of the Kansas Corporation Commission, the Kansas Department of Health and Environment and the Kansas Geological Survey. The following are the press release describing the submittal of the action plan to the Governor and the action plan transfer letter to the Governor.

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### NEWS RELEASE

#### For Immediate Release

Oct .1, 2014

#### Contact Information

Jesse Borjon (785) 271-3269

## INDUCED SEISMICITY TASK FORCE SUBMITS SEISMIC ACTION PLAN TO GOVERNOR SAM BROWNBACK

Topeka, Kan. – A three-member task force established by Governor Brownback in February has submitted its action plan to the Governor.

“I created this task force to address public safety based on seismic activity we were seeing in south-central Kansas,” said Governor Brownback. “I appreciate their hard work and look forward to reviewing the plan and its recommendations.”

Governor Brownback established the State Task Force on Induced Seismicity with representation from the Kansas Geological Survey, the Kansas Corporation Commission, and the Kansas Department of Health and Environment. The Task Force met five times and held a public meeting in Wichita. Experts were consulted from the U.S. Geological Survey, the Oklahoma Geological Survey, and private industry. The Task Force developed a draft plan that was presented and discussed at a public meeting in Wichita, revised, and resubmitted a second time for public comment. The final result is the plan being presented to Governor Brownback today.

(continued on page 2)

**PRESS RELEASE—cont.**

“We appreciate Governor Brownback’s foresight in establishing a task force to look at induced seismicity,” said Rex Buchanan, Interim Director, Kansas Geological Survey. “The Action Plan takes into account both public safety and activities of the state’s oil and gas industry.”

Oil and gas is a cornerstone industry in Kansas generating nearly \$4.3 billion each year, and employing 118,000 Kansans each day. The task force was directed to ensure the safety of all Kansans, and to consider the impacts to industry and the environment.

The Kansas Seismic Action Plan addresses the issue of induced seismicity, that is, earthquakes resulting from human activity. The plan provides background information citing national studies linking seismic activity to fluid injection; however, the task force had no conclusive evidence linking fluid injection to specific seismic events in Kansas.

The Seismic Action Plan consists of two major components – a plan for enhanced seismic monitoring and a response plan. Enhanced seismic monitoring includes installation of a strategically located permanent monitoring network that will allow all earthquakes in Kansas of a magnitude greater than 1.5 to be detected and located. Kansas currently has no state-supported seismic network. In addition, the plan recommends a portable seismic array that will allow the Kansas Geological Survey to deploy monitoring stations in areas with significant seismic activity to better understand the cause of localized earthquakes. The enhanced seismic monitoring component of the plan will collect important data resulting in a better understanding of the seismic activity over time.

The second component is a seismic response plan. A key component of the plan is a Seismic Action Score (SAS), a formula for evaluating seismic events that will guide an appropriate response by the Kansas Geological Survey, Kansas Corporation Commission, and Kansas Department of Health and Environment. The SAS formula provides a mechanism designed to trigger an agency response. The formula is subject to change as more data becomes available and scientifically credible information about induced seismicity is published.

Thus far in 2014, the U.S. Geological Survey’s National Earthquake Information Center has recorded 58 earthquakes, ranging from magnitude 1.3 to 3.8, nearly all in Sumner, Harper, and Barber counties. This is an increase over 2013 and prior years.

It is important to note that hydraulic fracturing (or “fracking”) should not be confused with the injection of salt water. In their 2012 report, the United States Geological Survey in stated there is “no evidence to suggest hydraulic fracturing itself is the cause of the increased rate of earthquakes in the midcontinent.”

“We appreciate Governor Brownback’s foresight in establishing a task force to look at induced seismicity,” said Rex Buchanan, Interim Director, Kansas Geological Survey. “The Action Plan takes into account both public safety and activities of the state’s oil and gas industry.”

The State Action Plan can be found at:

[http://kcc.ks.gov/induced\\_seismicity/seismic\\_action\\_plan\\_9\\_26\\_14.pdf](http://kcc.ks.gov/induced_seismicity/seismic_action_plan_9_26_14.pdf)

(continued on page 3)



## Task Force State Action Plan Transfer Letter

25 September 2014

The Honorable Governor Sam Brownback  
Office of the Governor  
Capitol, 300 SW 10<sup>th</sup> Ave, Suite 241S  
Topeka, KS 66612-1590

Dear Governor Brownback:

In February 2014 you created the State Task Force on Induced Seismicity, with representation from the Kansas Geological Survey, the Kansas Corporation Commission, and the Kansas Department of Health and Environment. You charged the task force with developing a State Action Plan for Induced Seismicity.

The Task Force met five times and held a public meeting in Wichita that was attended by approximately 85 participants, representing a wide range of industry, business, governmental, legislative, and environmental organizations, and the general public. We also consulted experts from the U.S. Geological Survey, the Oklahoma Geological Survey, and private industry. The Task Force developed a draft plan that was submitted for public comment and discussed at the Wichita meeting, revised, then submitted a second time for public comment. The final result is attached.

As you are no doubt aware, seismic activity continues to be an issue in south-central Kansas. Thus far in 2014, the U.S. Geological Survey has recorded 54 earthquakes, ranging from magnitude 1.3 to 3.4, nearly all in Sumner, Harper, and Barber counties. That is a significant increase over seismic activity in 2013 and the years prior to that. We believe the attached plan is an appropriate response, taking into account both public safety and activities of the state's oil and gas industry. It recommends increased monitoring so that our understanding of this phenomenon will improve over time. It recommends a formula for evaluating seismic events that will guide an appropriate response by the KGS, KCC, and KDHE. While this formula is meant to trigger an agency response, the formula is subject to change and we plan to revise it as we gain experience and as new, scientifically credible information about induced seismicity is published.

In short, the attached plan represents our best efforts to address and respond to this ongoing issue. It also represents our attempt to engage the public and respond to their concerns. We will remain engaged in this issue, through interagency cooperation as outlined in the plan; consultation with the public and interested organizations; interaction with colleagues in Oklahoma; and participation in national professional and academic organizations, including a task force on induced seismicity established by the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission.

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State Action Plan for Induced Seismicity  
Governor Sam Brownback  
25 September 2014  
Page 2

We appreciate your foresight in establishing this task force. We also want to acknowledge and thank staff members from our respective organizations for their ideas, hard work, and support in this effort. This was truly a collaborative effort.

We would be glad to provide additional information or answer any questions about this activity.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Buchanan'.

Rex C. Buchanan  
Interim Director  
Kansas Geological Survey

A handwritten signature in black ink, appearing to read 'Ryan A. Hoffman'.

Ryan A. Hoffman  
Director  
Conservation Division  
Kansas Corporation Commission

A handwritten signature in black ink, appearing to read 'Michael B. Tate'.

Michael B. Tate, PE  
Director  
Bureau of Water  
Kansas Department of  
Health and Environment

## Geology & Well Technology Fall 2014 Seminar/Training Event

by Mike Cochran, P.G.

The Geology and Well Technology Section (GWTS) conducted its annual fall technical seminar in Wichita on Thursday, September 11 at the Sedgwick County Extension Education Center. A number of compliments were received including: ***always the best seminar of the year, great job, learned a lot of interesting and useful information, all presenters were great.*** The purpose of this seminar is to provide education and information on water, energy, geology and to foster information exchange and discussion between a diverse group of people. There were 139 participants registered including underground hydrocarbon storage well operators, injection well operators, water well contractors, college students and professors, environmental consultants, state and local water and environmental agencies and several from the general public. The topics covered included disposal of wastewater into the Arbuckle Formation, induced seismicity, horizontal drilling, the Governor's 50 Water Vision, inside an EPA criminal environmental investigation, climate trends in Kansas and EPA and KDHE GWTS Program updates. In addition, for the first time two training sessions were conducted by KDHE the afternoon prior to the day of the seminar. This included a session on KOLAR, the web based water well record reporting system for water well contractors and a session covering Class I Underground Injection Control (UIC) Disposal wells. There were 19 people registered for the KOLAR training and 28 registered for the UIC training.



*Kim Bahney, Special Agent, US Environment Protection Agency had the audience stand up and do a few defensive punch maneuvers to start her presentation.*

*(continued on page 5)*

## Geology & Well Technology Fall 2014 Seminar/Training Event—continued

### KOLAR Training

KOLAR training covered the Kansas On-line Automated Reporting of WWC-5 forms by Licensed Water Well Contractors. Nineteen contractors and others wishing to know about KOLAR attended this training on September 10, 2014 in Wichita, KS.



### UIC Training

The UIC training covered permit applications, permits, monitoring and other relevant issues relating to Underground Injection Control Class I Disposal Wells. Twenty-eight people attended this training on September 10, 2014 in Wichita, KS.



## UPCOMING SPRING 2015 TRAINING

by Mike Cochran, P.G.

A heads up for upcoming training to be conducted in the Spring 2015 facilitated by the Geology and Well Technology Section. In keeping with the Section's ongoing efforts to provide information to our regulated community and other partners, we will be scheduling an all-day training session on various well logs and tests. We plan to have experts present the material, including problems identified by the log and how the problem was resolved. The intent is to also provide an explanation on the how the log works and the information it can provide. This training will be kept to a very limited number of participants in order to provide a setting where information can more easily be exchanged between participants and presenters.



Check our Web site at <http://kdheks.gov/geo> for training event details which will be posted as they become available.

## GEOLOGY SECTION REORGANIZATION

by Mike Cochran, P.G.

The KDHE Geology Section, which is within the Bureau of Water in the Kansas Department of Health and Environment's Division of Environment, has conducted a reorganization that is now effective. **As a part of this reorganization the Geology Section has been renamed the Geology and Well Technology Section to better describe the work of the Section**

The purpose of the reorganization is to improve efficiency, enhance customer service and to ensure core functions protective of the public health, safety, property and the environment are accomplished. As part of this reorganization, there have been some minor changes of duties and responsibilities for some Section staff members.

The reorganization forms a new Unit named the Field Operations, Permitting and Licensing Unit. This Unit is managed by Jeffrey Hand and accomplishes the following:

- Emphasizes the importance of the field activities and facilitates the coordination of field activities between the Section's programs. Many facilities have well types that are regulated under all three of the Section's programs. For example, the Underground Hydrocarbon Storage (UHS) facilities have; in addition to hydrocarbon storage wells; groundwater monitoring wells, water supply wells and Class I disposal wells.
- Brings the complex permitting and licensing functions of the Section under one unit for increased efficiency and focus on these important functions.
- Allows the professional geology staff to focus on complex geologic issues and problems that the Section is increasingly involved with.
- This Unit is also responsible for the oversight of brine spill cleanup at Underground Hydrocarbon (UHS) and in some cases Salt Solution Mining facilities.

The Underground Hydrocarbon Storage (UHS) Unit is responsible for the UHS Program and is managed by Rick Bean. This Unit is also responsible for chloride related groundwater remediation activities at the UHS facilities and in some cases the Class III Salt Solution Mining facilities. This provides a "one stop shop" that will enhance both efficiency and customer service and reduce confusion. For example, many of the compliance groundwater monitoring systems required at these facilities also function as monitoring wells that are part of groundwater remediation projects.

The Water Well Unit, which is responsible for the Water Well Program and is managed by Richard Harper, has been renamed the Water Well and Technical Support Unit. This reflects the function of also providing geologic and technical support to the other Section's programs. This will assist in addressing the complex geologic/technical problems encountered on an increasing basis.

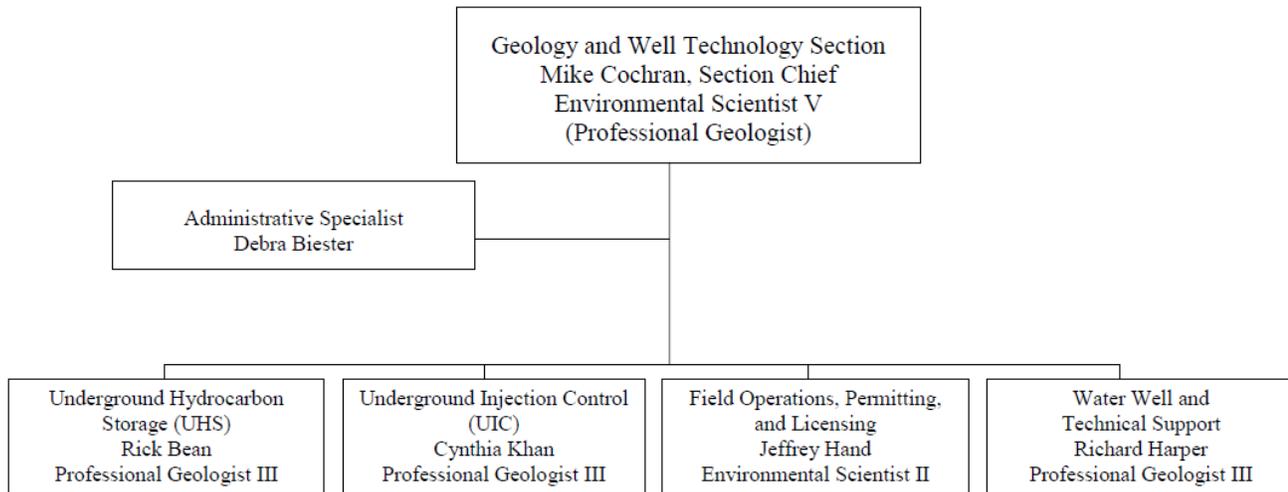
The Underground Injection Control (UIC) Unit which is responsible for the UIC Program continues to be managed by Cynthia Khan.

Even though the Geology and Well Technology Section is organized into Units, this Section functions as a team. This utilizes the expertise of the Section staff in a flexible manner to address complex geologic and technical issues and problems and to accomplish core functions. For example, many project proposals are reviewed as a team effort. The reorganization strengthens the team's ability to protect the public health, safety, property and the environment. We believe the impacts to the regulated community and others that work with the Section will be that of increased efficiency, reduction of confusion and enhanced customer service.

(continued on page 7)

**GEOLOGY SECTION REORGANIZATION—continued**

**GEOLOGY AND WELL TECHNOLOGY SECTION**



**ATTENTION WATER WELL CONTRACTORS**

**WWC-5 AND WWC-5P FORMS**

- ◆ When submitting hard copy WWC-5 or WWC-5p forms to KDHE, only one white copy needs to be mailed to KDHE.
- ◆ Make one copy for your file, and
- ◆ one copy for the landowner.

Thanks



## Salt-Solution Mining (Class III) Facilities Monitoring Well and Water Well Inspections

by Richard Harper, P.G.

There are four salt solution mining companies operating in Kansas. Each facility has a number of monitoring wells installed to monitor the groundwater for chloride contamination. There are also a number of water supply wells located at each facility. Water from the water supply wells is used to solution salt from the subsurface and conduct plant processes. Recently, KDHE inspected the monitoring wells and water supply wells at all four facilities.

Monitoring wells must be constructed to ensure they are sealed and locked at the top so no one can tamper with them and must also be labeled for proper identification. Additionally, the monitoring well casing should be in good condition, thus not allowing any surface waters or contaminants to enter the wells.

Water wells should be kept in good,

clean operating condition, with the top of the water well sealed air-tight so that contaminants cannot enter the well. If the water well is within a structure, the structure should be clean and free of any sources of contamination. Water wells should not have any opening in any of the surface piping which could transfer contaminants to the aquifer. Water wells should be numbered and/or named for proper identification.

Water wells that were inspected also had a few issues, such as the casing open to atmosphere, contamination sources, located in pump houses, junk and debris located next to or near the water well. The facilities are correcting the deficiencies identified.

KDHE was very pleased overall with the condition of both the monitoring wells and water wells.

***A Typical  
Monitoring  
Well at a Salt  
Solution Mining  
Facility***



## **“One Stop Shop” Concept for the Underground Hydrocarbon Storage Program**

**by Rick Bean, P.G.**

Quality Improvement (QI) can be defined as a continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, and outcomes for a program; thus, improving the functions and services provided. For a regulatory program, the QI process, generally involves identifying innovative approaches to simplify the governmental process for industry in a streamlined and flexible manner, while staying within the statutes, laws, and regulations, to accomplish the agency’s mission of protecting public health and the environment.

The Kansas Department of Health and Environment (KDHE)/Geology and Well Technology Section (GWTS)/Underground Hydrocarbon Storage Unit (UHS) has implemented a QI project for the UHS Industry by merging the remedial responsibilities, historically implemented by the Bureau of Environmental Remediation, with the regulatory responsibilities in the Bureau of Water to create a “one stop shop” for the UHS industry. The term “one stop shop” originated in the late 1920’s to describe a business model offering customers the convenience of having multiple needs met in one location instead of having to “drive all over town” to attain related services at different stores.

The UHS Industry in Kansas consists of nine active and one inactive (“monitoring status”) Liquefied Petroleum Gas (LPG) facilities in the state. These facilities include 387 active and 97 inactive (“monitoring status”) LPG storage wells with a capacity of 73 million barrels and 48 active brine storage ponds. The KDHE GWTS and UHS is responsible for the permitting, construction, operation, monitoring, testing, financial assurance and plugging of these facilities as defined by the regulations. Many of these same facilities are also performing environmental cleanup of soil and groundwater contaminated with brine and hydrocarbons from facility operations which, through the “one stop shop” concept, is now managed by the UHS Unit. The “one stop shop” concept promotes efficiency and provides a coordinated, streamlined approach to better manage these facilities for both regulatory and remedial issues.

To date, the UHS Program has heard nothing but positive comments from the UHS industry regarding the “one stop shop” concept. The process has enhanced agency/industry communication and streamlined internal and external coordination by having one entity responsible for overseeing the various regulatory and remedial issues at a facility. A facility representative recently commented, *“The right hand now knows what the left hand is doing because it is the same regulatory program managing the facility.”*

The UHS industry is also starting to realize a resource and cost savings through consolidating their monitoring requirements. For example, historically ground water monitoring was required by two different bureaus within KDHE and included sampling observation wells for regulatory compliance and monitoring wells to track ground water cleanup. Generally, these wells were monitored at different times and two different reports (one for remedial activities and one for regulatory activities) were required by the different KDHE programs. The UHS Program is working with facilities to consolidate all ground water monitoring and reporting into combined events and one comprehensive report. This process will not only save industry resources but the UHS Program will also benefit by reducing the number of necessary technical reviews. The UHS Program and industry will continue to evaluate and consolidate areas of duplication and redundancy.

## **Sonar Surveys Provide Critical Information about Storage Caverns**

**by Rick Bean, P.G. and Jeffrey Hand**

One of the primary responsibilities of the Underground Hydrocarbon Storage (UHS) Program is to thoroughly monitor cavern growth and development, salt roof thickness, web thickness and the overall integrity of the storage cavern. The program relies on various types of logging to track these important cavern characteristics. One of the main tools used by industry to determine the cavern's geometrics (dimensions, development, configuration and historical growth) is a sonar survey.

Kansas Administrative Regulation (K.A.R.) 28-45-15 requires a sonar survey be conducted: 1) before placing a cavern in service; 2) every 10 years; and 3) before plugging or placing the well in plug-monitoring status. A sonar survey may be required by KDHE if the stability of the cavern is suspect or if there has been 20 percent or greater increase in volume of the cavern. KDHE Procedure UICLPG-2a provides the general procedure to conduct a sonar survey.

Sonar surveys also provide the UHS industry valuable information regarding the volume and the efficiency of the storage caverns. They provide the cavern operator with the opportunity to increase operational safety and at the same time allows the capacities and performance profiles during injection and extraction to be assessed and predicted.

Sonar surveys measure cavern geometrics on the basis of travel time measurements or, in other words, the time an ultrasonic pulse takes to travel from the survey tool to the cavern wall and back to the tool. The technology determines cavern geometry by measuring numerous horizontal sections over the entire depth range of the cavern. The tool head can be tilted to enable the floor and the roof of the cavern to be measured which is vital in determining if there are any hidden zones.

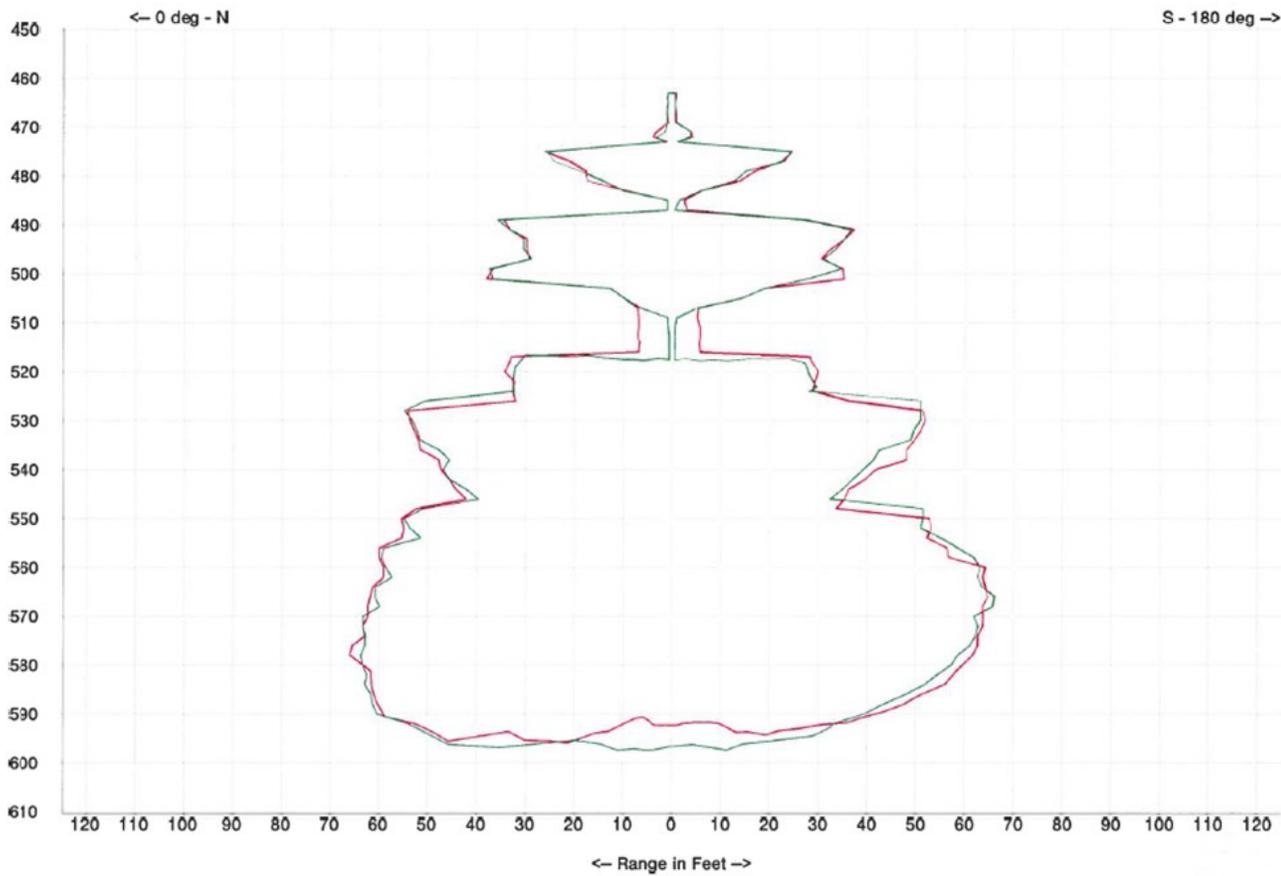
Sonars can provide evidence of any possible changes that have occurred in the cavern, such as wall collapse, roof fall and convergence. Comparisons of three-dimensional survey data from two or more surveys can be used to reveal the smallest of changes, which can then be investigated in more detail.

The UHS Program carefully evaluates results from the sonar survey including the comparison of recent testing with historical results to track the following important cavern geometrics defined by the regulations: 1) minimum salt roof thickness of 100 feet; 2) identify and monitor any communication between caverns; 3) underground communication in the upper 50 feet of the salt formation; 4) horizontal distance of at least 100 feet between cavern boundaries; 5) maximum horizontal diameter of each cavern not to exceed 300 feet; 6) growth of a cavern resulting in a volume increase of 20 percent or more; and 7) overall cavern geometry indicating that the stability of the cavern or overburden is at risk.

Both the UHS Industry and KDHE recognize the importance of performing sonar surveys on underground storage caverns. Reporting test results in a comprehensive manner that is consistent with the requirements in KDHE Procedure UICLPG-2a allows the KDHE UHS Program to accurately track cavern geometrics and identify potential issues with cavern integrity before a problem develops.

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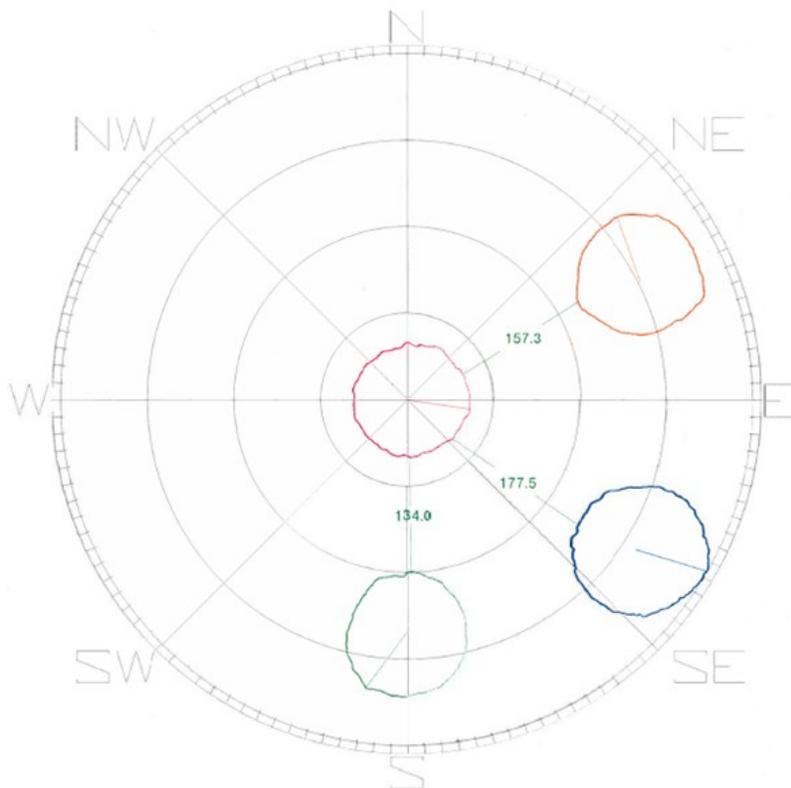
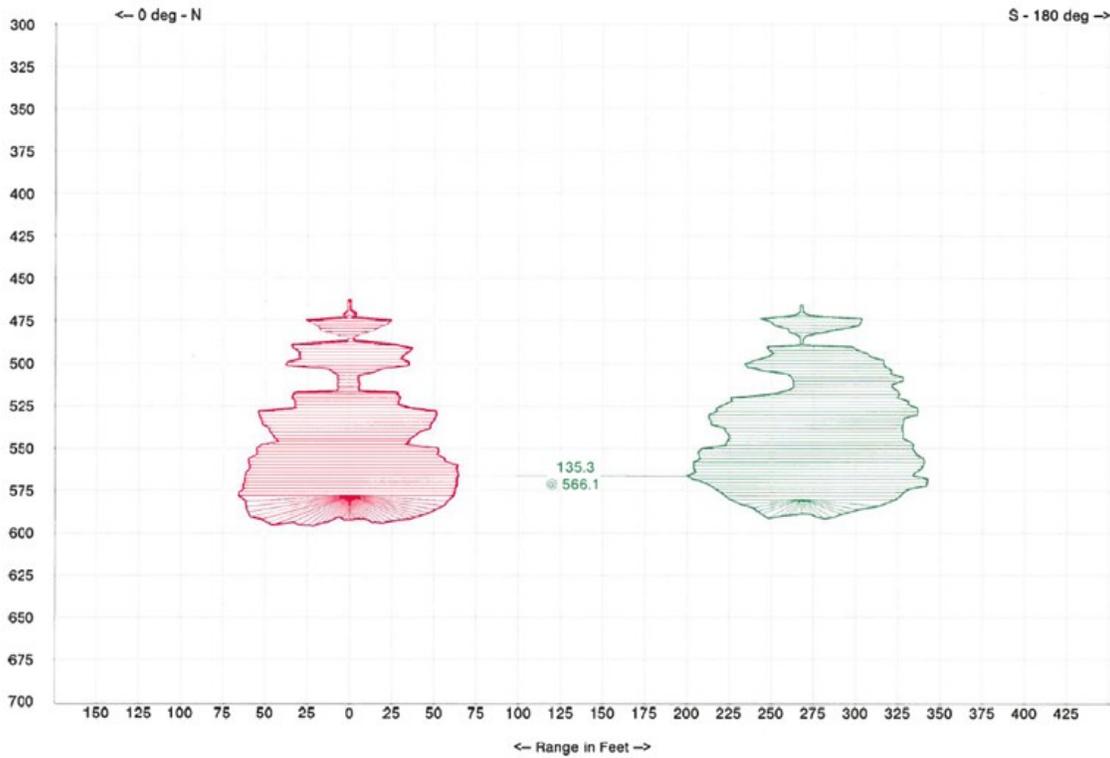
## Sonar Surveys Provide Critical Information about Storage Caverns—continued



Cross-Section view of a cavern provides the shape and dimensions of the cavern from various angles. In this example, the green outline represents the cavern in 2008 and the red outline represents the cavern in 2014.

(continued on page 12)

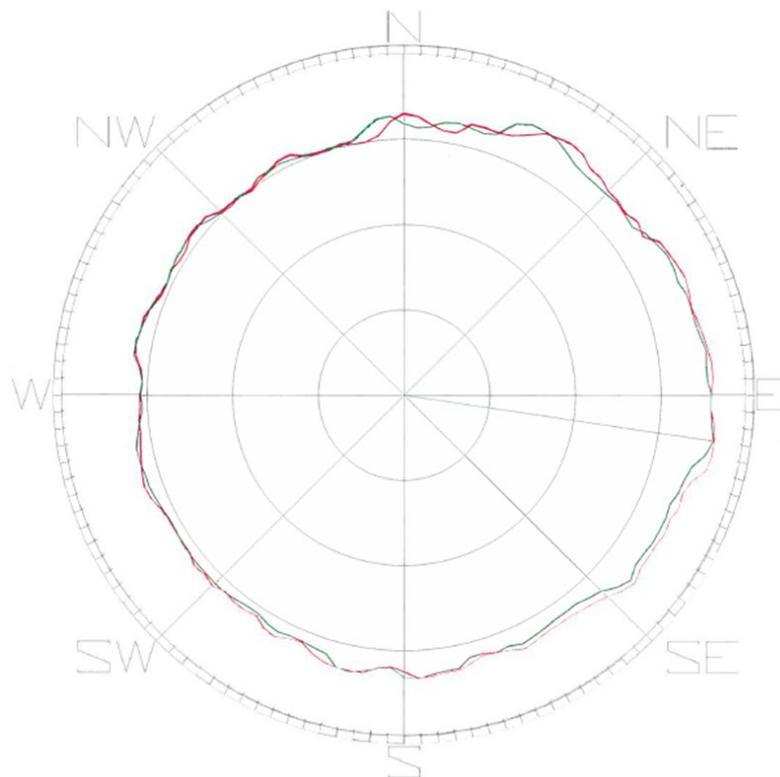
### Sonar Surveys Provide Critical Information about Storage Caverns—continued



Cross-Section and plane view of the cavern tested (in red) with historical information of the adjacent caverns provides web-thickness information (distance between caverns).

(continued on page 13)

## Sonar Surveys Provide Critical Information about Storage Caverns—continued



Plane view of the cavern shows the cavern growth, radius and diameter between sonar durations. In this example, the green outline represents 2008 and the red outline represents the cavern in 2014.

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### Brine Pond Renewal Permits Reissued

By Rick Bean, P.G.

A majority of the brine pond permits associated with operating Underground Hydrocarbon Storage Facilities were initially issued in November of 2004 in accordance with Kansas Statutes Annotated (K.S.A.) 55-1,117 through K.S.A. 55-1,119 and Kansas Administrative Regulations (K.A.R.) 28-45-22 through K.A.R. 28-45-30. These brine pond permits were issued for a maximum 10-year period and most were set to expire in November of 2014. The Underground Hydrocar-

bon Storage (UHS) Program is pleased to state that all facilities were very proactive and submitted renewal applications well in advance of the November 2014 expiration date. The UHS Program has processed and reissued 47 renewal permits that are effective until 2024. KDHE appreciates the UHS industry for its proactive approach by submitting these renewal applications well in advance of the expiration date.

## Keeping Information Current for Class I Disposal Wells

by Cynthia Khan, P.G.

It is important to keep information current with KDHE regarding your Class I disposal wells. For instance, personnel and/or financial changes are major items that may need updating with us. Frequently, a facility may have turnover with regards to who manages the well, who is responsible for signing and /or submitting monitoring reports, etc.

One issue that commonly arises is not updating KDHE regarding personnel changes. KDHE can assist in preparing new personnel for the responsibilities of managing a Class I disposal well. We can provide training and technical assistance as necessary in order to smooth the transition. Violations of the Class I disposal permit can occur due to personnel changes and preventing these types of violations is a priority of the KDHE UIC program. Current contact information also helps us notify your facility promptly when issues arise that need to be handled immediately.

Another major source of confusion can be financial assurance. Frequently, personnel handling the financial aspects of our business can change from year to year. It is therefore very important to make sure your financial assurance documents are current and accurate. Some types of financial assurance require yearly submittals and some have automatic expiration dates built into them. Due to changes in how banks handle bonds, letters of credit, etc., KDHE has recently experienced violations resulting from dropped financial assurance documentation. We know that facility personnel do not usually handle the documentation for financial assurance, so if you have any questions about whether or not your financial assurance documentation is sufficient, feel free to contact us regarding any questions you may have.



### WE CAN HELP

***We can provide technical assistance to new staff to help your company smooth the transition.***

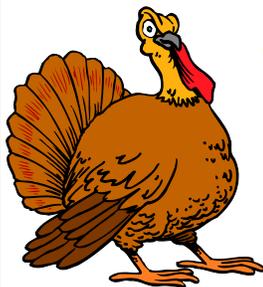
***Call the Geology & Well Technology Section at 785-296-5524.***

***Check our Web site at:  
<http://kdheks.gov/geo>  
for training opportunities.***

### KDHE Office Closings During Upcoming Holidays

November 11, 2014 Veteran's Day  
 November 27, 2014 Thanksgiving  
 November 28, 2014 Thanksgiving

December 24, 2014 pm Christmas  
 December 25, 2015 all day Christmas  
 December 26, 2014 all day Christmas



#### November

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#### December

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| 28 | 29 | 30 | 31 |    |    |    |



## Web News

The following changes have recently been made to the Geology and Well Technology Section Web site:

#### Geology (<http://kdheks.gov/geo>)

Updated Organizational Chart  
 Annual Report 2013  
 Seminar and Training Courses (held September 10 and 11, 2014.)

#### UHS (<http://kdheks.gov/uhs>)

Overview of the KDHE UHS Program 2013  
 Application for Renewal of a Brine Pond  
 Associated with an Underground Storage  
 Facility  
 Brine Pond Inspection Report ( Semiannual/  
 Annual)

#### UIC (<http://kdheks.gov/uic>)

Quality Management Plan, KDHE UIC  
 Program

#### Water Well (<http://kdheks.gov/waterwell>)

Updated Water Well Contractor List

## UNDERGROUND NEWS

Kansas Department of  
 Health and Environment

Prepared & Distributed by  
 Bureau of Water - Geology & Well  
 Technology Section

Direct inquiries and opinions to:  
 KDHE - BOW  
 Underground News  
 1000 SW Jackson, Suite 420  
 Topeka, KS 66612-1367

### Coming in January 2015

GWTS will be revising and reorganizing its web pages to achieve a more "user friendly" site.

**KANSAS  
DEPARTMENT OF  
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### **Did You Know... ???**

Climate change has many impacts on our natural resources, including shifts to the local and regional hydrologic (water-flow) cycle. For example, in many areas of our country, frequency of droughts and extreme rainfall events are increasing. Every year seems to bring about an earlier spring melt and increased surface water temperatures. These new patterns are expected to continue and to shift outside of historical trends – making forecasting our water quality and supply more difficult. Additionally, more than two thirds of our country is anticipating water shortages over the next several years. To learn more, visit:



<http://www2.epa.gov/water-research/water-and-climate-research>

*Article from EPA Website.*

### **KDHE STAFF**

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**MEMBER:**



***KDHE's Mission is to Protect and Improve the  
Health and Environment of all Kansans***