



# UNDERGROUND NEWS

Providing Information to the Water Well, UIC & Underground Hydrocarbon Storage Industries in Kansas

PUBLISHED BY THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT

SPRING 2013

## Kansas Ground Water Association Convention by Mike Cochran, LG

The Kansas Ground Water Association (KGWA) held its yearly Convention and Exposition in Hutchinson, Kansas on January 23-25, 2013. The KGWA is made up of Water Well Contractors, Manufactures and Suppliers



and Geologists and Engineers. The Convention and Exposition is a very popular event for the Kansas Licensed Water Well Contractors to obtain the necessary continuing education required by KDHE to retain their Kansas Water Well Contractors License.

The Geology Section took an active role in the Convention, giving several presentations and maintaining an informational booth. Approximately 400 people attended the Convention and Exposition, and there were approximately 40 exhibition booths. The Geology Section staff taking part in the Convention and Exposition were Mike Cochran, Chief of the Geology Section; Richard Harper, Chief of the Water Well Unit; and Jeffery Hand, Underground Hydrocarbon Storage Unit.



### INSIDE THIS ISSUE

- 1 Kansas Ground Water Association Convention
- 1 Upcoming Event
- 2 Regulatory Agenda
- 2 Geology Section Compliance Update
- 3 Presentation to Underground Hydrocarbon Storage Facility Contractors
- 3 KOLAR
- 4 Groundwater – What is it Worth?
- 4/5 An Overview of the Salt Solution Mining Industry in Kansas
- 6 Kansas Underground Hydrocarbon Storage Facilities See Need for Increased Capacity
- 7 Frequently Asked Question of the Water Well Unit
- 8 Did You Know?
- 8 KDHE Geology Section Contact List
- 8 KDHE Mission Statement

### ★ UPCOMING EVENT ★

**KDHE, GEOLOGY SECTION  
FALL 2013 SEMINAR**

**SEPTEMBER 5, 2013**

**WICHITA, KANSAS**

# REGULATORY AGENDA

by Mike Cochran, L.G.



The KDHE Geology Section is developing the following regulations:

- Water Well Program – The draft regulations include flush mount monitoring well completion and requiring water well contractors that are corporations to maintain on staff a person who has taken and passed the Kansas Water Well License Exam. The draft regulations have completed the Department of Administration and Attorney General’s Office review and are now on public notice for public comment. The public hearing is set for April 30, 2013, in KHDE’s Topeka office. For details, please go to: <http://www.kdheks.gov/waterwell/index.html>.
- Underground Hydrocarbon Storage Program – Developing conceptual draft regulations for internal KDHE discussion. A meeting was held with industry to obtain input. Input is still being obtained. The proposal is to modify existing regulations including allowing business entities such as LLCs and MLPs to use the financial test for financial assurance, add definition for plug/monitor status and option to convert to plug/monitor status, eliminating water sampling while drilling new monitoring wells, eliminating well spacing/diameter ratio in requests for approval of caverns with less than 100’ web thickness, delete requirements for testing cement samples, clarify that for brine ponds the 6-inch maximum thickness refers to each layer of compacted material, not the total thickness of compacted material and consider decreasing the frequency for casing inspection logs if no problems are indicated.

## **GEOLOGY SECTION COMPLIANCE UPDATE for Calendar Year 2012**

- The UIC Program – Two Class I industrial waste disposal wells and three Class V wells had significant violations. Violations included an annulus pressure below the minimum required for a Class I well, failure to take required samples for a Class I well, loss of mechanical integrity for a Class I well, directing motor vehicle waste to a Class V septic system and improperly securing the wellhead of a recently constructed Class V well. All violations were satisfactorily resolved and did not require the issuance of an order to obtain compliance.
- The Underground Hydrocarbon Storage Program – In 2012 there were a total of 17 brine spills reported to KDHE. This resulted in approximately 405 barrels of brine (17,000 gallons) being released to the environment. The majority of the spills resulted from line leaks. KDHE is working with the storage industry to reduce the number of spills. The industry continues to promptly cleanup spills to minimize the impact to the environment. In order to prevent spills, the industry has replaced or plastic lined a number of brine lines and this activity continues.
- A significant storage well monitoring violation occurred. This violation was satisfactorily resolved and did not require the issuance of an order to obtain compliance.
- The Water Well Program – Twenty-two water well contractor licenses were revoked for failure to complete the requirements for license renewal.

## Presentation to Underground Hydrocarbon Storage Facility Contractors

by Mike Cochran, LG

On February 9, 2013, Mike Cochran and Jeffrey Hand with the Geology Section provided an outreach presentation entitled *Regulatory Aspects of the Underground Hydrocarbon Storage (UHS) Program and the Role Contractors Have in This* at the request of a company for contractors doing work at their underground hydrocarbon storage facilities. There were approximately 55 participants. The presentation included a description of the Geology Section and how the Water Well, Underground Injection Control and UHS Programs the Section administers are interrelated, the Underground Hydrocarbon Storage Program regulatory history, an overview of the statutes, regulations and procedures and discussion of contractor role in compliance and protection of the public health, safety, property and the environment.

The contractor is on the front lines for protecting the public health, safety and the environment. If the contractor does not do the work correctly, then protection of the public health, safety and the environment may not be achieved and can even be compromised. This may also put the facility in the position of being in non-compliance with the UHS Program regulations and requirements. Communication between the facility and the contractor is paramount to ensuring the work is done in a protective manner with the proper results.

\*\*\*\*\*



There are 40 Kansas Licensed Water Well Contractors now utilizing the Kansas On Line Automated Reporting system for submitting the WWC-5 water well record to KDHE..

Benefits of electronic submission include:

- 1 Easy to understand fill in forms resulting in time saving and efficient reporting.
- 2) You only need to provide a paper copy to:
  - a. the water well owner, and
  - b. retain one for your files.
- 3) Reduce human error (as the program will not let you submit your WWC-5 form unless it complies with pre-programmed parameters.
- 4) No more check writing or the possibility of checks getting lost in the mail. Electronic payment is done using credit card.
- 5) Automatically populates the Kansas water well database.

Instructions for registering to use KOLAR and how to use it are provided at:

[http://kdheks.gov/waterwell/download/KOLAR\\_Instructions by Kurt Look KGS 1-19-2012.pdf](http://kdheks.gov/waterwell/download/KOLAR_Instructions_by_Kurt_Look_KGS_1-19-2012.pdf).

If you have questions, please contact Richard Harper, KDHE, at 785.296.3565.

**KDHE—GEOLOGY SECTION CALENDAR  
YEAR 2012 ANNUAL REPORT IS NOW  
ON LINE AND CAN BE FOUND AT:  
<http://kdheks.gov/geo>**

### **UNDERGROUND NEWS**

**Kansas Department of  
Health and Environment**

**Prepared & Distributed by  
Bureau of Water - Geology Section**

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

**To receive this newsletter:  
Call: 785.296.5524  
E-mail: [dbiester@kdheks.gov](mailto:dbiester@kdheks.gov)**

*Visit us at:*

*<http://kdheks.gov/geo>*

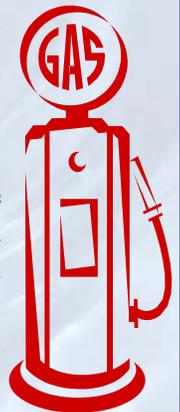
## Groundwater – What Is It Worth?

by Mike Cochran, LG

Groundwater has many uses. Groundwater in Kansas is the major source of water for irrigating crops. Groundwater provides the base flow for many rivers and streams. Groundwater serves as a drinking water supply for many Kansans and is used by many manufacturing facilities and electric generation plants.

Let's compare what water costs in relation to other liquids we use in our everyday lives:

- **1000 gallons of water = \$2.00 (A good sized city in Kansas source mainly groundwater)**
- 1000 gallons of milk = \$5,000
- 1000 gallons of gasoline = \$3,750
- 1000 gallons of soda pop = \$2,365



The cost of water from this perspective doesn't look too bad does it?

Due to water's reasonable cost in most cases and its reliable deliverability, we tend to take groundwater for granted until good clean water is no longer available to us. If you have been without water for a few days, think about the hardship this caused. So, we need to think once in a while, when looking at a river with the setting sun reflecting off the water or taking that cool drink of water on a hot summer's afternoon, about what we have done to protect and conserve this valuable resource. Remember, as the population continues to grow, the volume of fresh water does not.

## An Overview of the Salt Solution Mining Industry in Kansas

by Mike Cochran, LG and Cynthia Khan, LG

Bedded salt deposits in Central Kansas have been mined for many years by solution mining methods. Historical records indicate solution mining for the extraction of brine has occurred in Kansas since the 1880's.

Solution mining occurs by injection of fresh water or unsaturated brine down a properly cased and cemented well. When this water contacts the salt, the salt is dissolved and a cavern begins to form. The saturated brine that results from this process is then withdrawn from another well.

These salt solution mining wells are regulated under the Class III well part of the KDHE's Underground Injection Control Program. These regulations are found in Article 46, Underground Injection Control Regulations. Article 46 includes regulations for site evaluation, permitting, well construction, testing, monitoring, reporting, financial assurance, and plugging. The regulations can be accessed at: <http://www.kdheks.gov/uic/index.html>.

The salt which is solution mined in Kansas is the Hutchinson Salt member of the Wellington formation and is of Permian age. The Hutchinson Salt is a layered salt formation consisting of halite beds

## An Overview of the Salt Solution Mining Industry in Kansas (cont.)

separated by shale beds, shale partings, thin anhydrite layers and thin limestone layers. On average, the Hutchinson Salt consists of 80% halite, 5% calcium sulfate, 5% carbonate and 10% shale.

The Hutchinson Salt varies from a few feet to 400 feet in thickness. Where solution mining is conducted in Kansas, the average thickness is approximately 375 feet. The depth to the top of the Hutchinson Salt, in areas where solution mining takes place, varies from approximately 225 feet below ground surface in Sedgwick County to 725 feet below ground surface in Rice County. The depositional environment of the Hutchinson Salt is described as a broad, shallow embayment with extensive tidal flats. The salt beds are nearly horizontal with a westerly regional dip of approximately 30 feet/mile.

The Hutchinson Salt is overlain by shale beds. These shale deposits are nearly impermeable and serve to separate the salt beds from the unconsolidated sand and gravel aquifers which overlie the shale.

Salt solution mining is accomplished using the gallery system. A gallery means a series of two or more salt solution mining wells that are artificially connected within the salt horizon and are produced as a system. For each solution mining well, surface casing is set through all fresh and usable water formations (water <10,000 mg/L Total Dissolve Solids) and cemented to the surface. The production casing is then set at least 55 feet in the top of the salt formation and the outside of the casing cemented from the bottom of the casing to surface. The requirement to set the casing 55 feet into the salt formation is to ensure the existence of a 50 foot salt roof in the wells for stability purposes.

A design for gallery systems that is commonly used and which was introduced by industry approximately 25 years ago is the “horizontal well gallery” and is developed by drilling a horizontal borehole along the base of the salt formation and the construction of vertical wells which intersect the horizontal borehole. The vertical wells and horizontal well are washed until connection occurs. Mining can then begin. With this type of gallery, connection of the gallery wells is more probable and much more controlled. Also, the development of the caverns can be controlled by alternating the injection and withdrawal modes of wells in the gallery. Almost all production now occurs using the horizontal gallery system.

A total of 1,372,000,000 gallons of brine were safely produced in Kansas calendar year 2012 by the salt solution mining industry. Three facilities use the brine from these wells for production of such items as: food grade salt; salt for pharmaceutical products; salt blocks for livestock; and water softener pellets. One chemical manufacturing facility uses the brine as a chlorine feed stock for use in production of various chemicals, including chlorinated hydrocarbon chemicals.

As of January 1, 2013, there are currently four active salt production facilities located in Kansas which utilize a total of 141 active Class III wells for the solution mining of salt. Two of these facilities are located in Hutchinson, one is located just west of Clearwater and one facility is located just south of Lyons.

The industry and KDHE work together to successfully ensure the public health, safety and the environment are protected.



*Location of Class III Injection Well Facilities*

## Kansas Underground Hydrocarbon Storage Facilities See Need for Increased Capacity

by Mark Jennings, LG and Jeffrey Hand

Business has been good the last few years for companies storing LPG underground in Kansas salt caverns. In the last two years 11 caverns have been converted from monitor status to active status. This means that caverns previously not used to store product, which were completely filled with brine, have been returned to active status authorized to store hydrocarbons. This has been done in response to the increased demand for storage volume. In addition, 21 additional caverns currently in monitor status are being investigated for return to active status. In order for KDHE to approve caverns in monitor status to be returned to active service, operators must demonstrate that the wells and caverns comply with all rules and regulations. This means that all required logging and testing be brought up to date, to demonstrate that the caverns are safe to return to service. All surface monitoring equipment required by regulation must also be installed if not already present. This equipment includes emergency shut-down valves, heat detectors, gas detectors, flow meters, and electronic monitoring systems. If enough capacity is added by reactivating storage caverns, additional brine ponds may also be needed to be able to move product in and out of the caverns efficiently.



*Well in Monitoring Status*



*Same Well in Active Status with all Regulated Safety Devices*

## Frequently Asked Water Well Program Questions

by Richard Harper, LG

KDHE receives numerous questions regarding a number of different water well related topics. Here are responses to some of the more common questions.

- 1. “As an individual, do I have to have a Kansas Water Well Contractor’s License to construct a water well on my property”?**

*Answer:* You do not have to obtain a license, however the well must be constructed in accordance to current KDHE regulations and statutes and the WWC-5 Well Record submitted to KDHE for the well.

- 2. “Where can I look up information about a drilled water well”?**

*Answer:* The information on all reported water wells since 1975 can be obtained by searching the Kansas Water Well Database at <http://www.kgs.ku.edu/Magellan/WaterWell/>

- 3. “How do I obtain a Kansas Water Well Contractor’s License”?**

*Answer:* The procedure to obtain a license can be obtained at <http://www.kdheks.gov/waterwell/download/WWP-9.pdf>

- 4. “If I have a license from another state, can I construct water wells in Kansas”?**

*Answer:* No, you cannot. You must have a Kansas Water Well Contractor’s License and the procedure for obtaining the Kansas license can be found at the website listed above in question #3.

- 5. “Does KDHE have any study material available to prepare for the Kansas Water Well Contractor’s Exam”?**

*Answer:* Yes. The study material can be found at [http://www.kdheks.gov/waterwell/download/FINAL\\_WATER\\_WELL\\_HANDBOOK\\_8-4-2011.pdf](http://www.kdheks.gov/waterwell/download/FINAL_WATER_WELL_HANDBOOK_8-4-2011.pdf)

- 6. “Is a Kansas Water Well Contractor’s License required to construct Geothermal closed and/or open loop wells required”?**

*Answer:* Yes.

## Did you know. . . ???



- Taking a shower uses much less water than filling up a bathtub. A shower only uses 10 to 35 gallons, while a bath takes up to 70 gallons.
- You can save up to 8 gallons of water just by turning off the tap while you brush your teeth in the morning and before bedtime,. That adds up to more than 200 gallons a month.
- If your toilet has a leak, you could be wasting about 200 gallons of water every day. That would be like flushing your toilet more than 50 times for no reason.
- The best time to water your yard is in the early morning or late evening when it's cool outside. Watering when it's hot and sunny is wasteful because most of the water evaporates before the plants have time to drink it.
- Washing your car with a bucket and sponge instead of a hose saves a lot of water. A hose can waste 6 gallons per minute if you leave it running, but using a bucket and sponge only uses a few gallons.

Source: U.S. EPA

### ***KDHE Geology Section Contact List:***

Mike Cochran, Section Chief.....	785.296.5560	mcochran@kdheks.gov
Debra Biester, Senior Administrative Assistant .....	785.296.5524	dbiester@kdheks.gov
Richard Harper, Unit Chief, Water Wells.....	785.296.3565	rharper@kdheks.gov
Cynthia Khan, Unit Chief, Geologist, UIC Program .....	785.296.5554	ckhan@kdheks.gov
Mark Jennings, Unit Chief, Underground Storage Unit .....	785.296.7254	mjjennings@kdheks.gov
Jeffrey Hand, Environmental Technician, Underground Storage Unit .....	785.296.7265	jhand@kdheks.gov

#### **MEMBER:**



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