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INJECTION AND MINING DIVISION

INTRA-OFFICE POLICY STATEMENT

POLICY NO.: IMD-GS-09
EFFECTIVE DATE: March 24, 2009

AMENDMENT NO.: 1
AMENDMENT EFFECTIVE DATE: February 15, 2017

SUBJECT: Determination Of A Maximum Allowable Surface Injection Pressure for Class II Saltwater Disposal and Enhanced Oil Recovery Wells By Applying The Provisions Of LAC 43:XIX.405.B.4 To The Confining Zone

BACKGROUND:

The regulatory provision at LAC 43:XIX.405.B.4 for establishing the maximum allowable surface injection pressure (MASIP) in saltwater disposal (SWD) and enhanced oil recovery (EOR) wells require that the application contains

information showing that injection into the proposed zone will not initiate fractures through the overlying strata which could enable the injection fluid or formation fluid to enter an underground source of drinking water. This requirement will be satisfied upon proper demonstration by the applicant that the pressure in the well at the depth of injection shall not exceed 75 percent of the pressure needed to fracture the formation;

Applications for SWD and EOR wells historically have lacked any data regarding the confining zone's geomechanical properties, therefore, the MASIP criteria stated above was applied to properties of the injection formation.

The regulatory requirements of LAC 43:XIX.415.A outlining the construction and operational standards for Class II SWD and EOR injection wells require that

[e]ach new enhanced recovery injection well or disposal well shall be completed, equipped, operated and maintained in a manner that will prevent endangerment of USDWs or damage to sources of oil or gas and will confine injected fluids to the interval or intervals approved.

In order to fulfill the requirements of §415.A with respect to potentially deficient wellbores around the Class II injection well and the assignment of a MASIP based upon 75 percent of the pressure needed to fracture the approved injection formation, the area-of-review (AOR) for a Class II injection well was set at a fixed ¼-mile radius around the wellbore (LAC 43:XIX.405.B.1),

...the applicable area of review (for individual wells - ¼ mile radius)....

With an increased MASIP based upon the fracture pressure of the confining zone, the regulatory AOR for Class II wells specified in §405.B.1 may be insufficient to prevent endangerment of the Underground Sources of Drinking Water (USDW), damage to sources of oil or gas, adverse effects to other injection operations or ensure confinement of injected fluids to the interval or intervals approved.

UPDATED POLICY

Applicants, who do not provide geomechanical data of the confining zone so that the fracture gradient can be determined, shall have the well's MASIP calculated as stated in Policy No. IMD 1999-03, effective March 1, 1999.

The Maximum Allowable Surface Injection Pressure (MASIP) for a Class II Disposal Well shall not exceed 90 percent of the calculated fracture pressure of the injection zone based upon Eaton's Correlation (9.0 ppg formation fluid). Any request for an increase in injection pressure must be substantiated by interpretable test results (e.g., step-rate, pressure fall-off, extended leak-off, etc.) which prove that the higher injection pressure will not initiate fractures or extend existing fractures in the injection zone. Radioactive Time Drive surveys shall not be accepted as proof that an injection pressure will not induce fracturing.

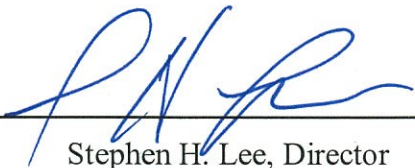
Applicants who provide geomechanical data of the confining zone and comply with the control measures listed below to assure protection of the lowermost USDW may request a MASIP calculated by applying the provisions of LAC 43:XIX.405.B.4 to the confining zone.

1. Applicants shall request in writing that the SWD or EOR well's MASIP be established under the conditions of this policy and submit Form UIC-2 MASIP with all required information and any applicable fee.
2. Applicants shall provide geomechanical data of the confining beds above the proposed injection zone to determine the fracture gradient of the confining beds. This data may be derived from subsurface core acquisition and testing of the confining beds, wireline logging to generate mechanical properties logs, leak-off testing of the confining beds using fluid with timed viscosity, or other means acceptable to the commissioner.
3. Applicants shall provide properties of the injection formation sufficient to calculate a Cone of Influence (COI) around the injection well in order to define an AOR for identification of wellbores or other possible avenues of migration into the USDW or oil or gas zones and to demonstrate that injection will not pose a risk to the USDW, oil and gas drilling and production, other injection operations, or the health, safety and welfare of the general public.
4. The AOR shall encompass a radius around the SWD or EOR well the greater of ¼-mile (1,320 feet) or the calculated COI. Any deficient well within this AOR must be properly plugged and abandoned or the

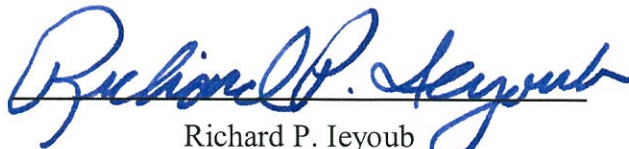
threat mitigated by a corrective action plan approved by the commissioner and performed to protect the USDW or oil and gas zones.

5. If the top of the injection zone is within 1,000 feet of the base of the USDW, the MASIP shall be equal to the shallowest injection perforation or the top of an open-hole completion multiplied by 0.25 psi/ft.
6. The SWD or EOR well's surface casing shall be set at least 100 feet below the base of the USDW.
7. A groundwater monitoring plan shall be submitted with the SWD or EOR well application and shall incorporate the following:
 - a. Installation of a monitor well or wells screened or perforated in a zone and at a location or locations acceptable to the commissioner provided that no monitor well shall be completed in a zone higher than the lowermost aquifer of the USDW.
 - b. Fluid from the monitor well or wells shall be sampled by a third party and analyzed by a Louisiana Department of Environmental Quality, LELAP accredited laboratory on a quarterly basis for:
 - i. chlorides,
 - ii. total dissolved solids,
 - iii. BTEX,
 - iv. specific gravity,
 - v. temperature, and
 - vi. pH.
 - c. The fluid level in the monitor well or wells shall be measured monthly.
 - d. All laboratory analytical data and fluid level measurements shall be assembled in a report and submitted to the Injection & Mining Division (IMD) quarterly. The report shall be submitted within 30 days of the end of the quarter in which the sampling and measurements were performed. Failure to file reports or delinquent report filings shall subject the well operator to enforcement action.
 - e. If changes occur in the laboratory analytical data or fluid level measurements that indicate the injection well operation may be endangering the USDW, the Commissioner of Conservation may require the well operator to cease injection into the SWD or EOR well until the reason for the data excursion is determined. Failure to notify the IMD in accordance with the requirements of LAC 43:XIX.413.G or LAC 43:XIX.421.A constitutes a violation of the regulations and shall result in enforcement action.
8. Upon fulfillment of the requirements of this policy, the applicant shall be granted a MASIP based upon the fracture pressure of the confining zone for a period up to 5 years. At any time during the term granted, the commissioner may require a re-evaluation of the MASIP. If it is determined that continued injection poses a risk to the USDW, oil and gas drilling and production, other injection operations, or the health, safety, and welfare of the general public, the commissioner shall administratively revoke the existing MASIP and issue a new MASIP based upon the re-evaluation.
9. Continued injection beyond the expiration date of the MASIP shall constitute a violation of the regulations and result in enforcement action unless the operator has re-applied by submitting Form UIC-2 MASIP and any applicable fee to the IMD at least 6 months prior to the MASIP expiration date.

10. The applicant may reapply for a MASIP based upon the fracture pressure of the confining zone by:
 - a. Submitting Form UIC-2 MASIP with all required information and any applicable fee,
 - b. Demonstrating that the COI has not expanded beyond the injection well's permitted AOR, or in the alternative that there are no deficient wellbores or other avenues of migration into the USDW or oil and gas zones within a new AOR defined in conformance with item 4 above, and
 - c. Demonstrating that the injection formation has not become pressured to the point of posing a risk to the USDW, oil and gas drilling and production, other injection operations, or the health, safety and welfare of the general public.
11. If the applicant is unable to demonstrate no threat to the USDW, oil and gas drilling and production, other injection operations, or the health, safety and welfare of the general public, the MASIP shall be calculated as stated in Policy No. IMD 1999-03, effective March 1, 1999.
12. For the purposes of establishing a MASIP based upon the fracture pressure of the confining zone, naturally fractured formations shall not be considered suitable confining zones.
13. No other variances shall be considered for SWD or EOR wells whose MASIP is calculated under the conditions of this policy.
14. This policy is not applicable to any form of annular disposal well.
15. For wells previously granted a MASIP based upon the fracture pressure of the confining zone (IMD-GS-09, March 24, 2009), that MASIP shall be valid for 5 years from the effective date of this amended guidance statement subject to the applicable regulations and requirements of this policy.
16. As a condition of this policy and its application, the commissioner reserves the right, at his sole discretion, to require the certification of any application, submittal, test, or report by a licenced Professional Engineer (PE) authorized to practice by and in good standing with the Louisiana Professional Engineering and Land Surveying Board and/or by a licensed Professional Geoscientist (PG) authorized to practice by and in good standing with the Louisiana Board of Professional Geoscientists.

APPROVED BY:

Stephen H. Lee, Director
Injection & Mining Division



Richard P. Ieyoub
Commissioner of Conservation