

Attachment 2: Plan for Class II Program Improvements

Introduction

Since at least the time of the US EPA's 1983 delegation of primacy to the Division of Oil, Gas and Geothermal Resources (Division), the Division's largest regulatory endeavor has been its Class II underground injection control (UIC) program. Significant improvements to this plan will, by necessity, require significant changes in all aspects of the Division – leadership, staffing, training, data management, establishment of metrics, internal review and monitoring against standards. Organizational change of this magnitude is profound, affecting every employee action every day. The Brown Administration, the Department of Conservation and the Division have committed to this organizational restructuring, of which this Plan for Class II UIC Program Improvements is an important – but not sole -- piece.

Given the years of work and level of resources required, it is critical to know what the target is. This plan should be understood in the context of this vision for the Division:

The Division will become a modern, efficient, collaborative, science-driven agency that intelligently and consistently regulates State oil and gas activities using modern field tools integrated with advanced data management systems that allow for oversight of a greater number of activities. Safety and training will become integrated cultural norms. The Division will be much better connected with oil and gas-related research activities in industry, academia, and national laboratories so that it can see regulatory challenges coming in advance and apply regulations from an elevated platform of understanding. The Division will perform its duties with integrated collaboration of other State agencies to reduce the environmental impact of oil and gas development. Internal monitoring and compliance will be routine and fully integrated with all that we do so that Division performance can be measured objectively. The Division will be paperless and have instant access to data and information, and hence be able to support all stakeholder groups. Likewise, stakeholder groups will be able to routinely observe Division activities and retrieve information of interest. The Division will have more effective communications capabilities and be more comfortable engaging stakeholder groups.

BACKGROUND AND OVERVIEW

Injection wells have been an integral part of California's oil and gas operations for over 50 years. Currently, over 50,000 oilfield injection wells are operating in the state. Injection wells are used to increase oil recovery and to safely dispose of waste fluid produced with oil and natural gas. About 70-75 percent of California's oil production is the result of enhanced oil recovery (EOR) methods such as steam flood, cyclic steam, water flood, and natural gas injection, all of which involve some sort of injection activity.

Most of the oil and gas fields in the state are mature and require EOR to be productive. Each year more responsibility rests with the Division's Underground Injection Control (UIC) Program to deal with the enhanced recovery of the resource. This includes new methods and techniques developed by the industry to produce the oil and gas. The increased use of injection, such as cyclic steaming, also presents new public health and safety risks, especially in fields with older wells. These risks include groundwater contamination, reservoir fluids leaking to the surface, and fires and blowouts caused by the migration of oil and gas. Urban encroachment on or around older oil and gas wells raises additional issues and concerns.

The Horsley Witten audit, conducted at the request of the Division for the US EPA, was completed and sent to the Division in September 2011. The following issues were outlined in the audit:

- Additional plugging and cementing requirements to protect underground sources of drinking water (USDW)
- More in-depth evaluation of the zone of endangering influence (ZEI)
- Requirements for waste fluid disposal
- Changes to requirements for pressure gauges and/or monitoring of zone pressure
- Well construction and cementing
- Annual project reviews
- Standard Annual Pressure Test (SAPT) requirements
- Well monitoring requirements instead of the SAPT
- Mechanical integrity surveys and testing
- Inspections and compliance/enforcement practices and tools
- Idle well planning and testing program
- Financial responsibility requirements
- UIC staff qualifications
- Cyclic steam injection well testing requirements

In addition to the US EPA audit, the legislature has been involved with several UIC issues and has noted other areas that need to be addressed in regulation. These include:

- H₂S/Waste Gas Disposal
- Freshwater usage relating to EOR projects
- CO₂ EOR Projects

Additional areas of concern relating to the Division's UIC program include:

- Production from shallow diatomite formations
- Surface expressions
- Aquifer exemption process

- Well construction standards
- Injection relating to formation fracturing pressure

ACTIONS TAKEN TO DATE

The Division first identified issues with its UIC Program in 2009. Division management began a review of then-current practices in regards to approving injection projects, annual project reviews, and the evaluation of wells within the Area of Review (AOR). At the conclusion of the Division's self-assessment, it developed a general plan to work with the administration and Legislature to increase the number of staff so that several deficiencies in the program could be addressed proactively. 17 positions (PYs) established in the FY 2010-2011 budget were spread throughout the Division to add staff to the UIC program to ensure project applications were reviewed according to both the program specifications outline in the Primacy application to the US EPA and in accordance with State statutes and regulations. In addition, Division management also put in place a Letter of Expectations to remove any confusion regarding how injection project applications were to be evaluated. These expectations were issued in May 2010 and revised in November 2010. The Letter of Expectations was mentioned and supported in the Horsley Witten Report.

As the Division continued to monitor its performance and the pace of program improvements, the Division recognized that additional resources were needed to reach improvement goals and therefore requested and received additional staff in FY 2011-2012. Most of these positions were added to the UIC program to provide additional staff to conduct an adequate UIC project application review. Several PYs were used to form an internal monitoring and compliance group to dig deeper into the UIC project files to provide a more refined evaluation of the Division's internal adherence to UIC requirements. Once established, the Monitoring and Compliance Group began an assessment of the Division's activities in District 1 (Los Angeles Basin) regarding past and current work regarding UIC project approvals, area of review and zone of endangerment assessments, project monitoring and annual reviews.

To meet the objectives listed in the Letter of Expectations, Division management executed an internal strategy to explain and train staff regarding the requirements for an UIC project approval, and how existing projects were to be reviewed, remediated and monitored to move UIC projects to full compliance.

As these activities were underway, Division management recognized the need to address the emergence of cyclic steam enhanced oil recovery as not only a rapidly evolving technology but one that was being employed to produce a major fraction of the state's oil. Further, the Division set in motion steps to deal with the mismatch between existing regulations and the realities in the state's oilfields. Of greatest concern was cyclic steam production from shallow diatomite formations as this type of production was rapidly emerging, and the state's regulations were inadequate to properly regulate these activities and ensure protection of USDWs.

Moving Forward and UIC Assessment

Even though there has been consistent recognition by several top leaders within the Division that the UIC program has had significant deficiencies, Division plans and actions for UIC improvement have been less effective than needs demand. In part, the mismatch between plan objectives and results have been caused by numerous management changes. Furthermore, it was not fully understood that fundamental problems with the lack of consistent business processes, poor record-keeping and the lack of modern data management tools were only some of the root causes of the Division's lack of performance in the UIC program. Hence, until recently, a coherent plan addressing broad, fundamental foundational problems was not developed. This spring, with the strong support of the Brown administration, the Division requested and received 23 additional positions to address deficiencies in a number of areas – capacity in program leadership, monitoring and compliance, data management and geographic information systems, emerging technologies, and environmental review. Furthermore, as part of the overall plan, the Division requested and received funding for a modern data management system designed for the oil and gas regulatory environment. Further changes will be forthcoming in the weeks ahead to better align the Division for significant performance improvements.

The Division has already started its UIC program evaluation and will continue the following efforts:

- Identifying gaps in UIC Program compliance and develop a corrective action plan
- Hiring qualified personnel to fill retirement and new position vacancies
- Providing technical and regulatory training for UIC staff
- Increasing management oversight of UIC staff
- Increasing accountability for technical work
- Conducting outreach to the public regarding state and federal mandates
- Conducting outreach to the oil and gas industry to raise awareness of changes in Division regulatory approaches and monitoring
- Pursuing and implementing electronic data systems development

California is moving forward to meet the changing regulatory imperatives with respect to technology, demographics, and more aggressive oversight of oil and gas production. To reiterate, the target is to evolve the Division to a modern, efficient, collaborative, science-driven agency that intelligently and consistently regulates State oil and gas activities using modern field tools integrated with advanced data management systems that allow for oversight of a greater number of activities. Safety and continuous training and improvement will become integrated cultural norms. The Division will be much better connected with oil and gas-related research activities in industry, academia, and national laboratories so that it can see regulatory challenges coming in advance and apply regulations from an elevated platform of understanding. The Division will perform its duties with integrated collaboration of other State agencies to reduce the environmental impact of oil and gas development. Internal monitoring and compliance will be routine and fully integrated with all that is done so that Division performance can

be measured objectively. The Division will be able to support all stakeholder groups because it will be paperless and have instant access to data and information. Hence stakeholder groups will be able to routinely observe Division activities and retrieve information of interest. The Division will have more effective communications capabilities and be more comfortable engaging the constellation of stakeholder groups.

Such profound organizational renewal will consume several years and require constant, focused attention. This work plan is an important initial piece of that renewal. The UIC plan is designed to strengthen the current UIC Program through new regulations, consistent, ongoing training, enhanced compliance oversight, and an evaluation of existing projects and UIC operations.

Assessment by Monitoring and Compliance Unit

The Division has conducted a partial assessment of the Division UIC Program by sampling and reviewing program activities and compliance oversight in one of its District offices. In the development of the assessment, the Division considered the following concerns to help develop a priority list:

- Risk to the public
- Risk to health and safety
- Risk to property
- Risk to natural resources
- Risk of litigation

Based upon known conditions at the time of the assessment, the injection projects located in the Cypress District (Division – District 1) appeared to have the highest priority. The District has around 800 injection projects, which includes over 2,000 injection wells.

The assessment was designed to give greater insight into the range of shortcomings in the Division's UIC program. The UIC program standards that should be used are listed in both California's Primacy application and the federal regulations associated with the Safe Drinking Water Act and Class II injection wells. The assessment has:

- Evaluated a representative sampling of old projects that are in fields that were discovered in the 1930's and 1940's to determine if appropriate Area of Reviews (AOR) were completed and to determine if possible conduits for the injection fluid are present
- Evaluated a representative sampling of recent projects to determine if appropriate AORs were completed and to determine if possible conduits for injection fluid are present
- Evaluated a representative sampling of the records for annual project reviews to determine if they were performed and documented adequately to determine if the project is in compliance with the project approval

- Evaluated a representative sampling of the Division’s UIC monitoring program to determine if adequate Mechanical Integrity Testing (MIT) surveys were conducted, evaluated, and documented to ensure mechanical integrity of the injection wells
- Evaluated a representative sampling of the Division’s UIC monitoring program to determine if the Maximum Allowable Surface Pressures (MASP) are determined correctly and monitored to ensure compliance with the project approval
- Evaluated if the Division’s UIC staff are appropriately educated and trained and have the necessary tools to enforce the Safe Drinking Water Act in regards to Class II wells
- Evaluated if the Division has enough staff and resources to adequately enforce the Safe Drinking Water Act in regards to Class II wells

A draft report that lists the results of the assessment in our Cypress district office has been prepared and is under final administration review.

Bonding

The State has already addressed some of the financial responsibility requirements. Effective January 1, 2014, the State has increased its bonding amounts to address the rising costs to remediate problem wells that become the responsibility of the State. These changes also affect the number of wells that may be covered by a blanket bond. What is not clear, pending further review, is the magnitude of the state’s financial liabilities and whether the incremental changes heretofore are sufficient to address long-term needs.

DIVISION’S NEXT STEPS

Individual Project Evaluation

The Division will undertake improvements to its administration of the UIC Program through a series of actions including increasing program leadership talent, enhancing field monitoring of compliance with regulations, a series of rulemakings on priority topics, and a project-by-project review of each UIC project to assess the status of the project with respect to compliance with UIC regulations, testing requirements and adherence to limitations placed on the project in project approval letters. This plan will be informed based upon the findings of the partial assessment of the UIC program already conducted. The Division will take the following steps to ensure all injection projects are in compliance with State law and the Primacy agreement with the US EPA:

1. District staff will review all of the active injection projects in the State and determine what, if any, data are missing to fully evaluate the injection project and ensure the protection of Underground Sources of Drinking Water (USDW). Any data that need to be updated because of changes or modifications to the original approval, will be identified and collected, and the project files organized and

prepared to meet two goals: improved, consistent regulatory oversight and efficient uploading of project data into the coming new data management system.

2. As this project-by-project review is underway, Division staff will meet with operators to discuss the list of deficiencies and develop a compliance schedule for all issues. Operators will be given no more than 6-12 months to supply the Division with the missing or updated data. Depending on the data requests, this timeline may be greatly reduced. Based on the project-by-project review, projects could be terminated or modified.
3. Division staff will evaluate the data submitted and require operators to make changes to ensure the project is still viable. Projects will be modified or cancelled based on this analysis.
4. All projects will be evaluated by the District office and sent to Sacramento for review and concurrence by the program director prior to being approved.
5. Projects may require a new Project Approval Letter (PAL) with additional conditions and/or reporting requirements to ensure compliance.
6. All projects will be reviewed to assess containment of injection fluids. The Division will work closely with the State Water Quality Control Board on the evaluation of fluid containment and the adequacy of the required zone of endangering influence and area of review.
7. All injection data will be entered or verified in the State's databases. Because existing databases may not have the capacity to manage all the data required, the Division will implement a temporary database until the Division's data management system is developed and implemented.
8. All required mechanical integrity tests will be confirmed and verified.
9. Once every year thereafter, the projects will be evaluated to ensure the projects are operated in compliance with the PAL and all testing and monitoring requirements have been met in compliance with UIC regulations.

Project-by-Project Review Schedule

The project-by-project review process will be time consuming and demand significant investment if staff time. In the Cypress and Bakersfield districts, this effort will be very significant. Even though with the implementation of the Letter of Expectations, project applications and project files have improved, many of the injection projects were evaluated and approved under a less stringent process. Many of the Districts have had District policies in place that fell short of directives in the primacy application, statutes, and regulations. The time to complete this review will vary based upon the following:

- Number of projects in each District
- Number of injection wells in the project
- Number of wells within the AOR (project area)
- Amount and type of data missing from the project file
- Current status of the project

Division leadership expects that a review of this depth could require as much as a week (5 working days) to evaluate what is missing from a project file. Such a review can be complicated and complex since the data provided needs to be relevant and accurate, and requires comparison with the project application.

All projects are not equal in size or complexity, and based upon the project status and number of injection projects by District, the following is an estimate of time needed for initial review to evaluate existing data, identify gaps and the develop a list of compliance deficiencies:

District 1 (Cypress)

Number of projects: 817 (X 40 hours) = 32,680 hours

District 2 (Ventura)

Number of projects: 322 (X 40 hours) = 12,880 hours

District 3 (Orcutt)

Number of projects: 255 (X 40 hours) = 10,200 hours

District 4 (Bakersfield)

Number of projects: 1342 (X 40 hours) = 53,680 hours

District 5 (Coalinga)

Number of projects: 195 (X 40 hours) = 7,800 hours

District 6 (Sacramento)

Number of projects: 43 (X 40 hours) = 1,720 hours

The Division is mindful that review of all projects will not consume a full 40 hours. Some projects are no longer active, so the District staff will prioritize the projects based upon

their status. Based upon these numbers it is estimated to take anywhere from six to 18 months to complete this first phase. Phase II -- developing a compliance schedule required of operators and certifying the completion of requirements-- will consume, in total, approximately an additional 12-18 months. Therefore, the overall time to fully complete the project review, certify remedial work, and move the program into full regulatory compliance is estimated to be three years.

The Division anticipates that the review and compliance process can be completed in different districts on different schedules. Beginning October 1, 2015, the Division has developed the following schedule:

Districts 3 and 6, review complete within 7 months, compliance certification within 18 months (18 months start to finish);

Districts 2 and 5, review complete in 9 months, compliance certification in 24 months (24 months total).

District 1, review complete in 10 months, compliance certification in 28 months (28 months total).

District 4, review complete in 16 months, compliance certification in 36 months (36 months total)

A very significant unknown in this review will be the amount of time needed for joint Division and Water Board assessment and validation of containment of injected fluids. Furthermore, demands on staff time for aquifer exemption data review and preparation for the implementation of the new data management system will be significant and will have to be orchestrated to meet these timelines. Once an initial assessment of file status in each of the Districts is complete, the Division can develop a more refined assessment of schedule.

Aquifer Exemptions

The Division continues to evaluate wells that have been permitted to inject into non-exempt aquifers, according to the compliance schedule agreed upon by the Division, State Water Board, and US EPA. The Division, working with the State Water Board, is continuing to evaluate potential impacts to water supply wells and, where precautionary measures are needed, ordering wells to cease injection if there is a potential impact to any water supply well. In addition to the well evaluation, the Division and State Water Board are working with operators to obtain additional data on aquifers to determine if the State will pursue aquifer exemption applications to the US EPA. The State continues to meet its obligations to the compliance schedule and acknowledges that a failure to receive approval from the US EPA on proposed aquifer exemptions will result in additional injection well closures.

Staffing

As noted above, the Division has recently received 23 additional positions to augment the Division's program. Ten positions will be deployed to the district offices to enhance field presence and the review of UIC projects. Five positions will be added to the GIS/Data Management Unit to ensure data quality and support to the district staff evaluating UIC project applications and reviews. Three positions will be added to the California Environmental Quality Act (CEQA) Unit to ensure compliance with project approvals and environmental reviews associated with the approvals. Four positions will be added to the Monitoring and Compliance Unit, which will increase capacity to the current Monitoring and Compliance Unit to ensure there is consistency throughout the Division and that all districts are fully implementing the UIC program. We have also added one position to the legal staff to assist with rulemakings, litigation, and other legal issues associated to UIC issues.

The Division is also assessing its organizational structure, workload, and supervisory oversight requirements of the organization and is preparing to make adjustments to be more effective and to better assimilate the additional staff. These adjustments, based upon identified priorities, will be announced soon.

Compliance Monitoring

This work plan includes utilizing the Division's Monitor and Compliance Unit to verify District staff are following statutes, regulations, and policies in the regulating of the UIC projects. This unit is separate from the UIC Program and therefore can provide objective analysis of the adequacies of the UIC Program improvements. This unit is comprised of one Senior Oil and Gas Engineer to oversee the unit, seven Engineers, and one Associate Government Program Analyst. This team will provide the necessary resources to assist with the improvement plan implementation and execution, and then continued monitoring to ensure Division statutes, regulations, and policies are followed. This unit is providing feedback to the Technical Services Manager, UIC Program Manager, and the Chief Deputy to ensure accountability.

Training

The Division is seeking a Technical Training Coordinator to evaluate training needs of the Division's technical staff. As we move to fill this position, the Division is also moving to put in place training contracts and training requirements for staff to complete, prior to going into the field and evaluating UIC project applications. The Division is also in the process of developing a training plan that clearly outlines the necessary training requirements for each level of engineer as well as a list of skills, knowledge, and abilities for each level of engineer. This plan is also expected to be ready by autumn, 2015.

In addition to specific training courses, the Division will continue its meetings of engineers in the Districts. The Division has had two such meetings in the last year.

These meetings are designed to develop team work and share important information regarding different aspects of the work district engineers perform. They provide a forum to share findings regarding investigations of injection activities the Division has undertaken and provide guidance as to how to monitor and identify issues before problems occur.

Business Process

The Division lacks clear and consistent business process. To deal with this challenge, the Division has contracted for assistance with:

1. Identification of the various permitting processes throughout the Division
2. Identification of common relevant steps in each the process
3. Recommendations of statewide processes for our permitting

Along the way, the contract will ensure that legislative mandates are being captured in our existing processes. Much of the work done for this will also contribute to essential preparations for the implementation of our data management project.

Phase 1 of the contract will require 90 days. The contractor is now traveling to District offices to interview employees who have a part of the UIC program.

Data Management System

The Division has already begun working with the California Department of Technology to evaluate our current systems and to develop a plan to meet the Division's future data management needs. This plan will include looking at a data management system that captures all the required data and a method for either the Division to push data to an US EPA-wide data management system or a method for EPA to download data. The State employs a "Stage/Gate" model process to assess business needs and processes and develop deliverables and project completion schedules. The entire process of assessment to delivery of a complete system could take 3-4 years including the uploading of legacy data.

Rulemaking

The Division has identified an ambitious list of regulatory goals to be accomplished by rulemaking action. This list of regulatory goals is based on the Division's own evaluation of its UIC Program, concerns raised in the review prepared by the Horsley Witten Group, input from stakeholders, and input from other regulatory agencies. In addition, these regulatory goals dovetail with issues related to the UIC Program that were identified by the California Council on Science and Technology in the independent

scientific assessment of well stimulation treatments in California that it conducted pursuant to Senate Bill 4 (Pavley 2013).

These regulatory goals each relate to the Division's UIC Program, but some issues – such as well construction standards and idle well management – are actually broader in scope than just injection regulation. Because these rulemaking goals are likely to be more than could be effectively addressed at one time, the Division will undertake its rulemaking efforts around these goals in two phases. The regulatory goals to be addressed in these two phases of rulemaking are as follows:

Phase 1

- *Clarify standards for ensuring zonal isolation of injection projects*
- *Expressly define the quality of water to be protected when constructing wells*
- *Codify best practices for well construction*
- *Establish permitting and regulatory requirements specific to cyclic steam operations*
- *Establish requirements specific to cyclic steam in diatomite, including a regulatory framework for responding to surface expressions and clarification regarding injection above fracture gradient*
- *Clarifying process and standards for establishing maximum allowable surface pressure for injection operations*

Phase 2

- *Codify requirements for ongoing project review*
- *Establish requirements for securing idle wells and standards for well abandonment*
- *Elaborate on existing idle well testing requirements*

Generally, these rulemaking goals will be accomplished through a process of (1) identifying interested parties and engaging with stakeholders to solicit concerns and suggestions; (2) drafting proposed regulations and informally soliciting input on the draft regulations; and then (3) commencing formal rulemaking to adopt proposed regulations.

The Division has already started this process for Phase 1 of its rulemaking effort. The Division has circulated a notice identifying the Phase1 regulatory goals and encouraging people to identify themselves as interested parties for the rulemaking effort. In the near future, the Division will be sending notice to interested parties of workshops to be conducted this fall throughout the state, in order to provide an opportunity to provide

input on how to best accomplish the regulatory goals identified. The Division's goal is to informally circulate draft regulations in November 2015, commence formal rulemaking in January 2016, and complete the rulemaking process for the Phase 1 rulemaking effort by winter of 2016.

Although the Division has already begun giving consideration to Phase 2 regulatory goals, the Division will not begin working in earnest to pursue the Phase 2 rulemaking effort until formal rulemaking for the Phase 1 rulemaking effort is near completion. Accordingly, the Division estimates that the Phase 2 rulemaking effort will not begin until fall of 2016, and will not be completed until winter of 2017.

Conclusion

The job of meeting the many goals laid out here is indeed a substantial one. But with the continued support and effort of those involved, doing the job well will result in a modern and responsive regulatory unit that is able to meet the challenge of helping to shepherd our oil and gas resources in a way that will, to the greatest extent possible, both protect public health and the environment and maintain California's significant oil production economy.