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Report to Congressional Requesters

February 2016

DRINKING WATER

EPA Needs to Collect Information and Consistently Conduct Activities to Protect Underground Sources of Drinking Water

GAO-16-281

GAO Highlights

Highlights of GAO-16-281, a report to congressional requesters

February 2016

DRINKING WATER

EPA Needs to Collect Information and Consistently Conduct Activities to Protect Underground Sources of Drinking Water

Why GAO Did This Study

Since the early 2000s, increased oil and gas production has resulted in an increase in wastewater that must be managed properly. The majority of wastewater from oil and gas production is injected into underground wells known as class II wells. These wells are regulated to protect drinking water sources under EPA's UIC class II well program and approved state class II programs. EPA oversees state programs, and EPA regions manage programs in states without approval.

GAO was asked to review EPA's oversight of programs' inspection and enforcement information and activities. This report examines the extent to which EPA has collected inspection and enforcement information and conducted oversight activities needed to assess that class II programs protect underground sources of drinking water. GAO reviewed federal and state laws and regulations and EPA guidance and analyzed a nongeneralizable sample of significant violations. GAO interviewed EPA and state officials from programs in a nongeneralizable sample of eight states selected based on shale oil and gas regions, among other factors.

What GAO Recommends

GAO recommends that, among other things, EPA require programs to report well-specific inspections data, clarify guidance on enforcement data reporting, and analyze the resources needed to oversee programs. EPA generally agreed with GAO's findings, but does not plan to require well-specific data and analyze needed resources. GAO continues to believe that EPA should take both actions to better assess if programs protect underground sources of drinking water.

View GAO-16-281. For more information, contact Alfredo Gómez at (202) 512-3841 or gomezj@gao.gov.

What GAO Found

The Environmental Protection Agency (EPA) has not collected specific inspection and complete or consistent enforcement information, or consistently conducted oversight activities, to assess whether state and EPA-managed Underground Injection Control (UIC) class II programs are protecting underground sources of drinking water. EPA guidance calls for states and EPA regions to report certain information and for EPA to assess whether programs are effectively protecting underground sources of drinking water, but the agency does not. Specifically:

- EPA annually collects summary data from state and EPA-managed programs on the types of inspections they conduct. However, these data are not specific enough to determine the number of different types of inspections that states and EPA regions are to conduct to meet their annual goals. Such goals are specified at the well level (e.g., to inspect 100 percent of wells associated with emergency responses). Under federal internal control standards, managers are to compare actual performance to planned or expected results and analyze significant differences. Without well-specific data on inspections, EPA cannot assess whether state and EPA-managed programs are meeting annual inspection goals.
- EPA collects information on unresolved significant violations of state and EPA-managed programs to determine if the agency needs to take action to enforce applicable program requirements. However, GAO's analysis of a nongeneralizable sample of 93 significant violations for fiscal years 2008 through 2013 found that state and EPA-managed programs did not report data on such violations completely or consistently. For example, of 29 such violations that had not been enforced after 90 days as required, programs reported 7 to EPA. According to EPA and state officials, the cause was inconsistent interpretations of EPA's reporting guidance. EPA officials said they are aware that the data reported on such violations are not complete or consistent, but the agency has not clarified in guidance what data programs should report. Until it does so, EPA does not have reasonable assurance that it has the data needed to assess if it must take enforcement action.

EPA has not consistently conducted oversight activities necessary to assess whether state and EPA-managed programs are protecting underground sources of drinking water. For example, GAO found in June 2014 that EPA does not consistently conduct oversight activities, such as annual on-site program evaluations. According to EPA guidance, such evaluations should include a review of permitting and inspection files or activities to assess whether the state is protecting underground water. In California, for example, EPA did not regularly review permitting, and in July 2014, after a state review of permitting, EPA determined that the program was out of compliance with state and EPA requirements. EPA officials said that they have few resources to oversee UIC class II programs, but EPA has not conducted a workforce analysis consistent with GAO's work on strategic human capital management to identify the resources needed for such oversight. Without conducting such an analysis, EPA will not be able identify the human capital or other resources needed to carry out oversight of the UIC class II programs to help ensure that they protect underground sources of drinking water.

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Abbreviations

Division	California Division of Oil, Gas, and Geothermal Resources
EPA	Environmental Protection Agency
Board	California State Water Resources Control Board
MOA	memorandum of agreement
UIC	Underground Injection Control

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Congressional Requesters

Since the early 2000s, increased oil and gas production across the nation has resulted in a corresponding increase in wastewater that must be managed, reused, or disposed of properly, according to a June 2015 Environmental Protection Agency (EPA) draft report.[1] According to the same report, the growth in domestic oil and gas production has also raised concerns about potential effects to human health and the environment, including the potential contamination of underground drinking water sources by injecting wastewater associated with the production of oil and gas. In particular, the hydraulic fracturing process—in which water, sand, and chemical additives are injected under high pressure to create and maintain fractures in underground formations—allows oil and natural gas from unconventional sources, such as shales, tight sandstones, and coalbed formations, to be developed and can produce large volumes of wastewater. Underground wells used for injecting wastewater and other fluids associated with the extraction of oil and gas resources are known as class II injection wells.[2] The fluids injected into class II wells are composed mostly of saltwater and may contain pollutants such as chlorides, hydrocarbons, and naturally occurring radioactive materials originating from geologic formations containing oil and gas.[3]

EPA and states regulate three types of class II wells associated with oil and gas production: (1) enhanced recovery wells into which brine, water, steam, carbon dioxide, or other fluids and gases are injected into oil- or

[1]EPA, *Draft Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources* (Washington, D.C.: June 2015).

[2]EPA regulates six classes of underground injection wells.

[3]Fluids that are injected underground for disposal or to enhance recovery are regulated under the Safe Drinking Water Act. While hydraulic fracturing involves the injection of fluids underground for production purposes, the Energy Policy Act of 2005 exempted the process of injecting fluids—other than diesel fuel—into a well to hydraulically fracture formations. However, water that is produced from formations during oil and gas production, including water from hydraulic fracturing activities that flows back out of the well, needs to be disposed of or reused.

gas-bearing formations to increase the recovery of residual oil and gas; (2) disposal wells into which brines and other fluids brought to the surface during oil and gas production activities are injected for disposal; and (3) storage wells into which liquid petroleum products are injected, generally as part of the U.S. Strategic Petroleum Reserve.[4] As of 2013, there were over 176,000 class II injection wells in the United States, located in states as geographically dispersed as California, New Mexico, Oklahoma, Pennsylvania, Texas, and Virginia. As the volume of wastewater generated from oil and gas production has increased, the demand for underground injection wells for disposal of fluids has increased, particularly in states with limited injection capacity, such as Pennsylvania. In addition, some operators have violated federal regulations and disposed of fluids illegally, such as a Kentucky company that in 2013 pled guilty to illegally injecting fluids into sinkholes and an unpermitted well.

To protect underground sources of drinking water, class II injection wells are subject to regulation by the Underground Injection Control (UIC) program overseen by EPA under the Safe Drinking Water Act. The act includes provisions for states to request approval from EPA to manage the class II program in their respective state boundaries. States with approved programs have primary responsibility, or primacy, for managing and enforcing their programs, and EPA has responsibility for managing and enforcing programs in states without primacy. We refer to programs managed by states as state programs and those managed by EPA regional offices as EPA-managed programs. EPA has approved a total of 40 states (26 with class II wells) to manage their programs.[5] Many of these states were approved by EPA in the 1980s, soon after the program's inception. An additional 10 states (7 with class II injection wells) do not have program approval, and the programs in these states

[4]The U.S. Strategic Petroleum Reserve is an emergency stock of oil maintained by the U.S. Department of Energy.

[5]These states regulate over 95 percent of the class II wells nationwide.

are managed by five EPA regional offices.[6] (See app. I for a list of state programs and EPA-managed programs.)

The Safe Drinking Water Act establishes general minimum requirements for programs in each state. Applicants for a permit for underground injection must satisfy the state that the injection will not endanger drinking water sources, among other requirements. EPA and states rely on more detailed regulatory and policy safeguards to prevent fluids from migrating into aquifers that can be used as underground sources of drinking water. These safeguards require well operators to meet technical standards for constructing, operating, testing, and monitoring injection wells, among other requirements. In addition, if certain conditions are met, aquifers can be exempted from protection under the act and used for injection. An aquifer may be exempted if (1) it does not currently serve as a source of drinking water and (2) it will not in the future serve as a source of drinking water. If the state has primacy, well operators may request an exemption for injecting fluids into a particular aquifer or portion of an aquifer. The state must submit a request for the aquifer exemption to EPA for review and approval, and if EPA approves, operators may be permitted to inject fluids into the aquifer.

Given the increase in oil and gas production and wastewater disposal, EPA's oversight and enforcement of the UIC class II program is important to ensure that state and EPA-managed programs are protecting underground sources of drinking water. In June 2014, we reported on EPA and state roles, responsibilities, and resources for managing the class II program; EPA and selected state safeguards to protect underground sources of drinking water; EPA's oversight and enforcement of class II programs; and the reliability of data to report on the class II program nationwide.[7] In our June 2014 report, we did not review EPA

[6]According to EPA, the agency is also responsible for management of class II wells on all tribal lands except the Navajo Nation and the Fort Peck Assiniboine and Sioux Tribes. This report only discusses state programs and EPA-managed programs in states and does not directly address tribal or territorial programs. In our June 2014 report, we reported that EPA had approved 39 states for primacy. Tennessee received approval to manage its class II program in 2015, after we issued our report *Drinking Water: EPA Program to Protect Underground Sources from Injection of Fluids Associated With Oil and Gas Production Needs Improvement*, GAO-14-555 (Washington, D.C.: June 27, 2014).

[7]GAO-14-555

oversight of state and EPA-managed inspections and enforcement information and activities, which you requested that we review.

This report examines EPA's UIC class II program to determine the extent to which EPA has collected the inspection and enforcement information needed, and conducted the oversight activities necessary, to assess that state and EPA-managed programs are protecting underground sources of drinking water.

To perform this work, we reviewed and analyzed the Safe Drinking Water Act and EPA regulations and guidance on the UIC class II program. We interviewed EPA UIC program officials in the eight regional offices with the highest number of class II wells. To understand the class II program at the state level, we interviewed state officials and reviewed state program documentation for the same sample of states from our June 2014 report on the UIC program.[8] Specifically, we selected a nongeneralizable sample of eight states with class II programs.[9] Two of these states are managed by EPA regions—Kentucky and Pennsylvania—and the remaining six—California, Colorado, North Dakota, Ohio, Oklahoma, and Texas—are state programs. We selected these states from the six shale oil and gas regions defined by the Energy Information Administration.[10] For each of the six oil and gas shale regions, we selected at least one state that had among the highest number of class II injection wells. In July 2014, after we issued our June 2014 report and before we started the work on this review, EPA determined that one of the state programs in the eight states we reviewed, California's class II program, was not in compliance with state and EPA requirements. EPA Region 9 officials and California's UIC program officials have since agreed to a plan to improve the California program over the next several years. We interviewed EPA headquarters, EPA Region 9, and California officials regarding the deficiencies in

[8]GAO-14-555.

[9]Because the sample is a nongeneralizable sample, our results cannot be generalized to other states but do provide detailed examples of EPA's and states' management of class II programs.

[10]The Energy Information Administration is a statistical agency within the Department of Energy that provides independent data, forecasts, and analyses on energy. Energy Information Administration, *Review of Emerging Resources: U.S. Shale Oil and Shale Gas Plays* (July 2011).

California's program, the agreed-upon improvement plan, and EPA oversight of California's progress. A summary of the deficiencies found by EPA and California, and California's plans to improve its program, can be found in appendix II. Because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements, we chose not to include California in our detailed analysis of inspection and enforcement information from the states. Thus, the results of our review of inspection and enforcement information reflect the seven remaining states in our sample.

To analyze the information EPA needs and oversight activities necessary to assess whether state and EPA-managed programs are protecting underground sources of drinking water, particularly inspection and enforcement information, we reviewed EPA regulations and guidance and obtained and analyzed data collected by EPA from the states and regions on forms called 7520-3 and 7520-4 forms for fiscal years 2008 through 2013, the most recent years of data available when we began our audit work. We interviewed EPA officials about the collection of these data and determined that they were sufficiently reliable for purposes of reporting data for individual states. To determine if EPA collects information it needs on inspections, we used EPA's 1987 Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions (Strategy),[11] which lays out minimum inspection goals that state and EPA-managed programs should set. We then analyzed inspection data from 7520-3 forms for fiscal year 2013, the most current data available, for the seven states to determine the extent to which they provide information to assess inspection goals set by states and EPA regions.

To determine if EPA collects information it needs on enforcement actions, we used EPA's Strategy, which directs states and EPA-managed programs to ensure that timely and appropriate enforcement actions are taken, and EPA's 1986 Reporting Requirements—Underground Injection Control Program Guidance, which provides guidance on what information on violations and enforcement actions should be reported by state and

[11]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions* (Washington, D.C.: Mar. 31, 1987).

EPA-managed programs on 7520-4 forms.[12] We then selected a nongeneralizable sample of 134 notices of violation, from fiscal years 2008 through 2013 from the seven state and EPA-managed programs we reviewed and compared the information collected on each violation and any related enforcement action to the enforcement data provided to EPA on the 7520-4 forms for that period.[13] We selected a nongeneralizable sample of at least six notices of violation in each of the seven states in our sample. We selected violations on the basis of their significance,[14] the type of enforcement action taken, and the number of days from when the operator was notified to when the violation was resolved, termed returning to compliance with EPA and state requirements. We analyzed the number of days that each of 93 significant violations (of 134) in our sample had been open and compared this to the number of days (90) established by EPA as timely for resolving significant violations; we also analyzed each significant violation to determine if an appropriate enforcement action was taken. The Strategy specifies the appropriate enforcement action for significant violations as a formal enforcement action, which among other

[12]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions*. EPA, Office of Drinking Water, *FY 1987 Reporting Requirements—Underground Injection Control Program Guidance (UICP) Guidance #53* (Washington, D.C.: December 1986).

[13]For the purposes of this report, we refer to all written notifications to operators that they are in violation of state or EPA requirements as notices of violation. During our review of seven states, we noted that state or EPA-managed programs may initiate a single enforcement case against an operator for multiple violations, and so a single notice of violation may cover more than one violation.

[14]Significant violations include those that pose a significant danger to underground sources of drinking water, according to EPA. Significant violations include well operation without mechanical integrity, which causes the movement of fluid outside the authorized zone; well operation at an injection pressure that exceeds the permitted or authorized injection pressure and causes the movement of fluid outside the authorized zone of injection; or the plugging and abandonment of an injection well in an unauthorized manner.

things, is legally enforceable, explicitly requires the well owner to take corrective action, and specifies a timetable for completion.[15]

Finally, to assess the oversight activities that EPA has conducted to ensure that programs are protecting underground sources of drinking water, we reviewed findings and recommendations from our June 2014 report and interviewed EPA officials on what the agency has done to implement our recommendations. In addition to the two oversight activities needed to manage UIC class II programs discussed in our June 2014 report, we interviewed EPA officials about another oversight activity—developing and maintaining a database on aquifer exemptions.

We conducted this performance audit from October 2014 to February 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. A more detailed description of our objectives, scope, and methodology is presented in appendix III.

Background

This section presents information on roles and responsibilities of EPA and states in the UIC class II program, information on UIC class II inspection and enforcement processes, information collected from state and EPA-managed programs, and activities to oversee state and EPA-managed programs.

[15]According to the *Strategy*, to take timely and appropriate enforcement actions against well operators with significant violations, programs should take one of the following actions within 90 days after a significant violation is identified: (1) verify that the well operator has returned to compliance, (2) place the well operator on an enforceable compliance schedule and track to ensure future compliance, or (3) initiate a formal enforcement action against the well operator. If the significant violation is not returned to compliance or addressed with a formal enforcement action, it should be reported on the 7520-4 after 90 days.

EPA and State Roles and Responsibilities for Class II UIC Programs

The UIC class II program is overseen by EPA headquarters and managed by states or EPA regions, depending on whether the state has received primacy. States can obtain primacy in one of two ways. Under section 1422 of the Safe Drinking Water Act, a state can adopt and implement a program that meets specific requirements established under EPA regulations and conduct reporting as EPA requires. Alternatively, under section 1425 of the act, a state can seek approval to manage its own program by demonstrating to EPA that the program is effective in preventing the contamination of underground sources of drinking water. Both types of program must meet four key requirements in the act: (1) they must prohibit unauthorized injections; (2) authorized injections must not endanger drinking water sources; (3) they must include inspection, monitoring, recordkeeping, and reporting requirements; and (4) they must apply their provisions to federal agencies and federal land.[16] However, states approved by this alternative process do not need to address all of the specific requirements, such as those related to well construction and testing, established in EPA regulations.

Program oversight by EPA headquarters includes issuing regulations and guidance, assessing implementation of regulations and guidance by state and EPA-managed programs, and gathering information and reporting it. EPA regions both oversee state programs that have primacy and manage programs in states that do not have primacy, and states with primacy manage their own programs. Management includes permitting wells; inspecting wells; enforcing regulations and implementing guidance; reporting information on well inventories, inspections, violations, and enforcement actions; and investigating instances of potential contamination of aquifers.

EPA issued a series of guidance documents describing the program and various responsibilities of states and EPA regions. To oversee state and EPA-managed programs and to ensure that they are protecting underground sources of drinking water, EPA collects certain information and conducts certain activities, as described in several guidance documents. Specifically:

- ***Memorandum of agreement for the UIC program***. Issued in 1981, this guidance directs EPA regions to enter into a memorandum of

[16]42 U.S.C. § 300h(b)(1) (2015).

agreement (MOA) with each primacy state that includes the terms, conditions, or agreements between the state and EPA regarding the administration and enforcement of state program requirements,[17] including state inspection, enforcement, and reporting requirements.[18]

- ***Reporting Requirements—Underground Injection Control Program (Program Reporting).*** Issued in 1986, this guidance explains and clarifies the information state and EPA-managed programs are to report.[19]

- ***Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions (Strategy).*** Issued in 1987, this document provides guidance to state and EPA-managed programs on well inspections and enforcement of program requirements, including information that should be reported on inspections and enforcement actions.[20]

- ***Interim Guidance for Overview of the Underground Injection Control Program (Program Oversight).*** Issued in 1983, this document provides guidance to EPA regions and headquarters on

[17]For example, 40 C.F.R. § 145.25(b) requires the MOA with states that received primacy under section 1422 of the act (1422 states) to include (1) provisions for the prompt transfer from EPA to the state of pending permit applications and any other information relevant to program operation not already in the possession of the state director (e.g., support files for permit issuance and compliance reports); (2) provisions specifying classes and categories of permit applications, draft permits, and proposed permits that the state will send to the regional administrator for review, comment, and, where applicable, objection; (3) provisions specifying the frequency and content of reports, documents, and other information that the state is required to submit to EPA (the state shall allow EPA to routinely review state records, reports, and files relevant to the administration and enforcement of the approved program, and state reports may be combined with grant reports where appropriate); (4) provisions on the state's compliance monitoring and enforcement program; (5) when appropriate, provisions for joint processing of permits by the state and EPA, for facilities or activities that require permits from both EPA and the state under different programs; and (6) provisions for modification of the MOA.

[18]EPA, Office of Drinking Water, *Memorandum of Agreement (MOA) for the Underground Injection Control Program (UIC) Ground-Water Program Guidance #14* (Washington, D.C.: May 1981).

[19]EPA, Office of Drinking Water, *FY 1987 Reporting Requirements—Underground Injection Control Program Guidance (UICP) Guidance #53*.

[20]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions*.

activities that they should take to effectively oversee state and EPA-managed programs, respectively.[21]

- ***Guidance for Review and Approval of State Underground Injection Control Programs and Revisions to Approved State Programs.*** Issued in 1984 to provide guidance for EPA regions on the review and approval of changes to state program requirements,[22] this document includes guidance for EPA regions and headquarters on how to review and approve requests to exempt aquifers and how decisions on aquifer exemptions should be documented and reported.

- ***Enhancing Coordination and Communication with States on Review and Approval of Aquifer Exemption Requests Under the Safe Drinking Water Act (Aquifer Exemption Coordination).*** Issued in 2014, this document provides guidance on how to improve coordination and recordkeeping on aquifer exemption decisions among states, EPA regions, and EPA headquarters.[23]

According to EPA's 1981 MOA guidance, EPA regions should develop an MOA with each primacy state to outline areas of the applicable regulations that are relevant to the administration and enforcement of the state's program requirements, including clarifying

- EPA and state roles and responsibilities and the process for sharing information between EPA and the state;

- state responsibilities for expeditiously drafting, circulating, issuing, modifying, reissuing, and terminating permits, consistent with applicable regulations;

[21]EPA, Office of Drinking Water, *Interim Guidance for Overview of the Underground Injection Control (UIC) Program, Ground-Water Program Guidance #30* (Washington, D.C.: June 1983).

[22]EPA, Office of Drinking Water, *Guidance for Review and Approval of State Underground Injection Control (UIC) Programs and Revisions to Approved State Programs GWPB Guidance #34* (Washington, D.C.: January 1984).

[23]EPA, Office of Ground Water and Drinking Water, *Enhancing Coordination and Communication with States on Review and Approval of Aquifer Exemption Requests Under the Safe Drinking Water Act* (Washington, D.C.: July 14, 2014).

- state responsibilities to operate a timely and effective system to track well operator compliance with program requirements, including inspection procedures;
- state responsibilities for taking timely and appropriate enforcement action against persons in violation of program requirements, including use of effective enforcement tools such as penalties; and
- state reporting requirements, including the type and frequency of data to be reported, and EPA's annual evaluation of the state program.[24]

According to EPA's 1983 Program Oversight guidance, EPA-managed programs are also responsible for establishing systems to track well operator compliance; taking timely and appropriate action to resolve violations, including use of effective enforcement tools; and reporting data on the program.[25]

Information on the UIC Class II Program Inspection and Enforcement Process

Injection well inspections, to discover and deter violations, and enforcement are identified in EPA's 1987 Strategy as tools to achieve operator compliance with applicable requirements.[26] According to the Strategy, each state and EPA-managed program should have a strategy for identifying how many wells it should inspect and the types of inspections to be conducted at these wells. The types of inspections that state and EPA inspectors conduct can vary from routine inspections that ensure that well sites are being properly maintained, to inspections that include observing pressure tests to determine if wells are structurally sound, known as mechanical integrity tests (see app. IV for information on types of inspections).

The enforcement process begins once an inspector identifies a violation. Violations of UIC program requirements can involve a number of actions on the part of well operators, such as injecting fluids without authorization, injecting fluids at pressures above those permitted, or failing to show that

[24]EPA, Office of Drinking Water, *Memorandum of Agreement (MOA) for the Underground Injection Control Program (UIC) Ground-Water Program Guidance #14*.

[25]EPA, Office of Drinking Water, *Interim Guidance for Overview of the Underground Injection Control (UIC) Program, Ground-Water Program Guidance #30*.

[26]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions*.

a well holds pressure during testing (mechanical integrity testing). According to EPA's Strategy, a state or EPA-managed program can take various enforcement actions when it finds wells that are violating program requirements. When inspectors identify wells that are violating applicable program requirements, they typically first notify the well operators of the violations. According to EPA's Strategy, these notifications can be done through discussion or in writing. For more serious violations, state and EPA-managed programs can take stronger enforcement actions.

According to EPA's Strategy, state and EPA-managed programs are to escalate their enforcement response as needed to resolve violations, although the actions taken by a program may depend on a number of factors, including the severity of the violation and its potential to contaminate drinking water sources. Actions to gain compliance with program requirements can include sanctions, such as shutting down a well, assessing administrative penalties, or referring the matter for civil or criminal adjudication (see app. V for details of the enforcement process).

Information Collected from State and EPA-Managed Programs

EPA's regulations and 1986 Program Reporting guidance direct state and EPA-managed programs to report specific information on class II wells to assist with program oversight.[27] The Program Reporting guidance directs these programs to report data on inspections, violations, and enforcement actions. Specifically, the agency collects information from programs on different 7520 forms submitted by state and EPA-managed programs. According to the Program Reporting guidance, information on inspections conducted by state and EPA-managed programs is collected on 7520-3 forms and includes information on the total number of different types of inspections. According to this guidance, EPA also collects information on the number of significant violations and enforcement actions conducted by state and EPA-managed programs on 7520-4 forms. Under the Safe Drinking Water Act, EPA is required to notify primacy states of any violations of state UIC programs it discovers and, if a state does not take appropriate enforcement action within 30 days, issue an order or initiate legal action itself.[28] According to EPA guidance, the 7520-4 forms collect information on individual significant violations that threaten underground

[27]EPA, Office of Drinking Water, *FY 1987 Reporting Requirements—Underground Injection Control Program Guidance (UICP) Guidance #53*.

[28]42 U.S.C. §1423(a)(1) (2015).

sources of drinking water to help EPA determine whether it should intervene to enforce state or EPA requirements.

In June 2014, we found that the data on violations and contamination of underground sources of drinking water that EPA collects from its 7520 forms were not sufficiently complete or comparable to allow EPA to aggregate state information and report on the status of the class II program nationally.[29] We also found that EPA was developing a national UIC database to collect comparable, well-specific data from states, but that, as of January 2014, the database was not fully populated. We recommended in our June 2014 report that to support nationwide reporting goals until the national UIC database is complete, EPA develop and implement a protocol for states and regions to enter 7520 data consistently and for regions to check 7520 data for consistency and completeness to ensure that data collected from state and EPA-managed class II programs are complete and comparable for purposes of reporting at a national level. EPA agreed that there is room for improvement in the completeness and consistency of data submitted by the states and regions through the 7520 forms. In response to our recommendation, according to EPA officials, the agency has proposed updated 7520 instructions, intended to encourage consistent reporting by states and regions. The updated instructions have not been finalized and, according to EPA officials, cannot be used for reporting until they are approved by the Office of Management and Budget.[30] EPA has also developed new standard operating procedures that update protocols for EPA regional review of 7520 reports submitted by state programs and headquarters review of 7520 reports submitted by EPA-managed programs.

Activities to Oversee State and EPA-Managed Programs

EPA's regulations and 1983 Program Oversight guidance[31] direct EPA headquarters and regions to conduct specific activities to ensure that the state and EPA-managed programs are protecting underground sources of drinking water. These activities include conducting annual on-site

[29]GAO-14-555. This refers to data from EPA's 7520-2 form, which collects violation information.

[30]According to EPA officials, as of December 2015, the Office of Management and Budget was reviewing the updated instructions.

[31]EPA, Office of Drinking Water, *Interim Guidance for Overview of the Underground Injection Control (UIC) Program, Ground-Water Program Guidance #30*.

evaluations of state and EPA-managed programs. In addition, EPA regulations require the agency to incorporate state program requirements, and any changes to them, into federal regulations to be able to enforce them if necessary, and to approve aquifers for exemption from protection under the act, as appropriate, to allow injection of fluids.

According to EPA's Program Oversight guidance, EPA regional officials are expected to conduct annual on-site evaluations of state programs.[32] These evaluations involve, among other things, an on-site meeting with state UIC officials to discuss program performance and can include a review of inspection and enforcement files, both of which are intended to help determine whether the state program is effective at protecting underground sources of drinking water. We found in June 2014, however, that EPA was not consistently carrying out annual on-site evaluations of state class II programs.[33] According to EPA officials at the time, limited resources have prevented EPA regions and headquarters from consistently conducting on-site reviews, and some of the oversight activities identified in the Program Oversight guidance may no longer be needed. We recommended, and EPA agreed, that EPA should evaluate, and revise as needed, UIC program guidance on effective oversight to identify essential activities that EPA headquarters and regions need to conduct to effectively oversee state and EPA-managed programs.

According to EPA regulations, EPA is also required to incorporate state program requirements and changes to those requirements into federal regulations. Under its regulations, EPA can only enforce state program requirements that it has incorporated into federal regulations. In June 2014, we found that EPA was not consistently incorporating state program requirements, or changes to state program requirements, into federal regulations, and as a result, EPA had not been able to enforce at least one state's program requirements.[34] To ensure that EPA maintains enforcement authority of state program requirements, we recommended that EPA conduct a rulemaking to incorporate state program requirements, and changes to state program requirements, into federal regulations and, at the same time, evaluate and consider alternative

[32]EPA, Office of Drinking Water, *Interim Guidance for Overview of the Underground Injection Control (UIC) Program, Ground-Water Program Guidance #30*.

[33]GAO-14-555.

[34]GAO-14-555.

processes to more efficiently incorporate future changes to state program requirements into federal regulations without a rulemaking.[35] EPA disagreed with this recommendation and said that in lieu of a single rulemaking, it was conducting an ongoing process of individual rulemakings to approve and codify state program revisions, as discussed later in the report.

According to EPA regulations and EPA's 2014 Aquifer Exemption Coordination memorandum, EPA is responsible for the final review and approval of all aquifer exemption requests. Well operators seeking an aquifer exemption to conduct injection activities in a state with primacy typically submit the exemption application to state program officials along with supporting information. State program officials are to review the application and, if the information submitted supports an exemption, submit a request to approve the exemption to the appropriate EPA regional office. Applicants in states with EPA-managed programs are to submit applications directly to the EPA region managing the program, and the region approves or disapproves the exemption applications. EPA regions are responsible for maintaining documentation supporting the decision to exempt an aquifer and a record of all exempted aquifers. According to the Aquifer Exemption Coordination memorandum, maintaining the decision memos and records underlying EPA's approval or disapproval of exemption applications and standardized, readily available data on all existing aquifer exemptions is important to supporting informed decisions about uses for drinking water.

Under the act, if EPA determines that a state program is no longer protecting underground sources of drinking water, the agency can revoke a state's primacy by rule. According to EPA officials, before such a point is reached, the agency can work with the state to return the state's program to compliance with EPA and state UIC class II regulations. For example, in July 2014, after California identified instances in which it had authorized injection into nonexempt aquifers, EPA determined that the state's program was not in compliance with state and EPA requirements. In a series of letters from July 2014 through July 2015, EPA and the

[35]The Safe Drinking Water Act requires that state UIC program revisions made in response to changes in EPA UIC regulations be approved by rule. Our recommendation focused on the requirement in EPA's regulation, but not in the Safe Drinking Water Act, that effectively prohibits EPA enforcement of state UIC regulations unless these regulations are codified in the federal regulations.

state's Division of Oil, Gas, and Geothermal Resources reached agreement on a plan to improve California's program. (See app. II for the details of the status of California's program.)

EPA Has Not Collected Information, or Consistently Conducted Activities, Necessary to Assess If Programs Are Protecting Underground Sources of Drinking Water

EPA has not collected inspection and enforcement information, or consistently conducted specific oversight activities, to assess whether state and EPA-managed programs are protecting underground sources of drinking water. EPA's 1981 MOA guidance directs states and EPA regions to include provisions in memorandums with states to ensure that regional offices can collect the information and conduct the activities necessary for oversight, including (1) collecting information on inspections and enforcement actions and (2) conducting activities to incorporate approved changes to state program regulations into federal regulations, conducting annual on-site program evaluations, and reviewing and approving aquifer exemption applications.[36] EPA's Program Oversight guidance also states that EPA headquarters should collect the same information and conduct the same activities to oversee programs managed by EPA regions where applicable.

EPA Has Not Collected Inspection and Enforcement Information to Assess Whether Programs Are Protecting Underground Sources of Drinking Water

EPA has not collected inspection and enforcement information that can be used to assess whether state and EPA-managed programs are effectively protecting underground sources of drinking water.

Inspections

EPA collects information from state and EPA-managed programs on the types of inspections they conduct, but the information EPA collects is at a summary level and not specific enough to assess whether states are meeting inspection goals established to protect underground sources of drinking water.[37] In the 1987 Strategy, EPA provides guidance on the

[36]EPA, Office of Drinking Water, *Memorandum of Agreement (MOA) for the Underground Injection Control Program (UIC) Ground-Water Program Guidance #14*.

[37]The Safe Drinking Water Act requires class II programs to have inspection requirements to protect underground sources of drinking water.

types of UIC inspections that state and EPA-managed programs should conduct and specifies minimum annual inspection goals (i.e., frequency of each inspection type) for state and EPA-managed programs. For example, (1) 100 percent of wells associated with emergency responses and public complaints should be inspected annually,[38] (2) 25 percent of mechanical integrity tests conducted annually should be witnessed by an inspector, and (3) routine inspections to verify that wells are operating in compliance with applicable requirements should be conducted at least once every 5 years. According to the Strategy, state and EPA-managed programs should set goals for different types of inspections based on factors such as available resources and program priorities (see app. IV for additional information on EPA guidance on inspections and selected state inspection programs).

EPA's 1987 Program Reporting guidance states that the inspection data that EPA collects from state and EPA-managed programs should be used to track each program's progress toward meeting its inspection goals, which are to be based on EPA's minimum annual inspection goals.[39] EPA's minimum annual inspection goals are specified at the well level (e.g., 100 percent of wells associated with emergency responses). However, state and EPA-managed programs report annual summary data on the number of inspections conducted for each inspection type by state and not data on which wells were inspected, when they were inspected, the types of inspection conducted at each well, and the results of those inspections. For example, the summary data EPA collects on routine inspections, as shown in table 1, could not be used to determine if a state or EPA-managed program had conducted a routine inspection of each of its class II wells over a 5-year period or multiple inspections of individual wells. For the seven state and EPA-managed programs we reviewed, annual data reported to EPA included the total number of wells inspected and types of inspections conducted statewide, as shown in table 1 for fiscal year 2013.

[38]According to the *Strategy*, public complaints warrant prompt attention but should be evaluated (e.g., with a telephone call) to determine their veracity.

[39]EPA, Office of Drinking Water, *FY 1987 Reporting Requirements—Underground Injection Control Program Guidance (UICP) Guidance #53*.

Table 1: Inspections Reported by Selected State and EPA-Managed Programs for Fiscal Year 2013

State	Emergency and complaint response	Mechanical integrity tests witnessed	Well pluggings witnessed	Well constructions witnessed	Routine inspections
Colorado	0	275	4	6	601
Kentucky	9	213	10	0	871
North Dakota	7	343	9	75	8,474
Ohio	0	57	3	18	2,010
Oklahoma	Not reported	3,368	Not reported	Not reported	6,378
Pennsylvania	0	245	9	16	42
Texas[a]	475	6,601	Not reported	Not reported	23,242

Legend: EPA = Environmental Protection Agency.

Source: GAO analysis of EPA and selected state data. | GAO-16-281

Notes: We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Kentucky and Pennsylvania are EPA-managed programs. Although each state uses different procedures to collect its data, we found that the data were not comparable across states but that they were sufficiently reliable for reporting on a state-by-state basis.

[a]Texas reports on total well pluggings and well constructions witnessed for both production wells and injection wells but cannot provide numbers specific to class II wells.

Because the inspection data that EPA has collected from states have not been well-specific and therefore have not included the total number of inspections by type that could have been done, EPA's ability to track each state program's progress toward meeting its inspection goals is limited. Under federal standards for internal control, managers need to compare actual performance to planned or expected results and analyze significant differences.[40] EPA officials told us that they recognize that they cannot verify progress toward meeting state program inspection goals without well-specific data on inspections and have made efforts to collect well-specific data through voluntary programs, but do not require its collection. Starting in 2007, EPA had been working to develop a voluntary national UIC database to provide well-specific data from state and EPA-managed programs; however, according to EPA officials in December 2015, Montana was the only participating state program, and the agency plans to complete the national database with Montana and the seven EPA-

[40]GAO, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C.: November 1999).

managed programs currently participating.[41] EPA officials said that they do not have well-specific information because they do not require it and most state programs have not provided it voluntarily through the national UIC database. However, EPA's MOA guidance says that EPA may request and should be given access to all files necessary for evaluating the administration of the state program.[42] Until EPA requires and collects well-specific data on inspections from state and EPA-managed programs, including the types of inspections conducted at each well, when the inspections were conducted, and the results of the inspections, the agency cannot assess whether the programs are meeting their annual inspection goals to protect underground sources of drinking water. EPA officials said that EPA will also have access to another voluntary database being compiled by the Department of Energy that contains additional data from state programs on injection wells. According to the officials, however, the department's database does not provide well-specific information on inspections either.

Enforcement

EPA has not collected consistent or complete enforcement information that can be used to assess whether state and EPA-managed programs are effectively protecting underground sources of drinking water. To carry out the Safe Drinking Water Act's provision that EPA take action on violations that have not been enforced, EPA's 1987 Strategy directs state and EPA-managed programs to take timely and appropriate enforcement action against significant violations of state or EPA requirements. The Strategy defines a timely and appropriate response taken by a state or EPA-managed program as resolving the violation or initiating a formal enforcement action within 90 days of the identification of the violation. To help ensure that violations are addressed in a timely and appropriate way, EPA's 1987 Strategy and 1986 Program Reporting guidance call for state and EPA-managed programs to report information to EPA on significant violations that were not resolved within 90 days of discovery and also did not have a formal enforcement action taken against the well operator. The act requires EPA to enforce state program requirements within 30 days

[41]According to EPA officials, several other class II programs are working on developing their own data submission capability for the national UIC database but are not currently participating.

[42]EPA, Office of Drinking Water, *Memorandum of Agreement (MOA) for the Underground Injection Control Program (UIC) Ground-Water Program Guidance #14*.

after the agency becomes aware that the state has not taken appropriate enforcement action.

However, our review of data collected by EPA on significant violations demonstrated that EPA's ability to take action may be limited by incomplete and inconsistent enforcement data reported by state and EPA-managed programs. Specifically, our analysis of 93 significant violations for fiscal years 2008 thru 2013 for the seven state and EPA-managed programs we reviewed found that there were 29 that were not resolved within 90 days of operator notification and for which formal action had not been taken within that time.[43] According to the Strategy, each of these violations should have been reported on the 7520-4 form by the state to the appropriate EPA region or by the EPA-managed program to EPA headquarters. However, our analysis of the 7520-4 form data showed that state and EPA-managed programs reported 7 of these 29 violations to the agency. Table 2 shows the results of our analysis of the 7520-4 forms (see app. V for additional information on our analysis and app. VI for the full list of violations and enforcement actions taken).

[43]EPA's 1987 *Strategy* calls for state or EPA-managed programs to take action within 90 days of identifying the significant violation. We calculated this time frame using the number of days from the time the operator was notified of the significant violation to when the state or EPA-managed program took formal enforcement action, as defined by the *Strategy*. Using this calculation provides the most conservative estimate of the time that a program took to determine if the violation should have been reported to EPA on the state's appropriate 7520 form.

Table 2: Summary of Selected State and EPA-Managed Programs' Reporting of Significant Violations on the 7520-4 Forms

State	Significant violations	Violations that should have been reported on the 7520-4	Violations that were reported on the 7520-4	Violations that were not reported on the 7520-4
Colorado	1	0	N/A	N/A
Kentucky	29	7	7	0
North Dakota	0	0	N/A	N/A
Ohio	18	2	0	2
Oklahoma	20	0	N/A	N/A
Pennsylvania	5	3	0	3
Texas	20	17	0	17
Total	**93**	**29**	**7**	**22**

Legend: EPA = Environmental Protection Agency.

Source: GAO analysis of EPA and selected state data. | GAO-16-281

Notes: We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Kentucky and Pennsylvania are EPA-managed programs.

According to EPA headquarters, regional, and state officials we interviewed, state and EPA-managed programs used different interpretations of the Strategy and Program Reporting guidance to fill out the forms, resulting in incomplete, and potentially inconsistent, information across the programs. EPA headquarters officials told us that all significant violations that were not resolved within 90 days from the date the violation was discovered should be reported on the 7520-4 form quarterly until they are resolved, regardless of whether the program had already initiated enforcement action against the well operator. However, EPA's Strategy and Program Reporting guidance call for programs to report, on the 7520-4 form, information on significant violations that (1) were not resolved within 90 days from the date the violation was discovered and (2) had not had a formal enforcement action taken against the well operator. In addition, according to the Program Reporting guidance, significant violations reported on the 7520-4 form should continue to be reported quarterly on subsequent 7420-4 forms until they

are resolved.[44] State and EPA officials we interviewed provided different interpretations of what they were to put on the 7520-4 form, which would result in some programs reporting significant violations and some not. Consistent with EPA's Strategy and Program Reporting guidance, officials we interviewed from Ohio and EPA Region 4 (Kentucky) told us that they only report significant violations on the 7520-4 form that were not resolved within 90 days and for which a formal enforcement action had not been taken against the well operator. However, officials we interviewed from North Dakota, Oklahoma, Texas, and EPA Region 3 (Pennsylvania), told us that they report all unresolved significant violations regardless of whether they have taken a formal enforcement action. According to the officials, the information that ultimately gets reported on the 7520-4 form is based on a quarterly calculation of how long the well has been out of compliance; however, according to the officials, EPA only requires state and EPA-managed programs to submit 7520-4 forms to EPA semiannually. In addition, officials in North Dakota and Oklahoma told us that they only report significant violations once and not in subsequent quarters, even if the violations have not been resolved.

EPA headquarters officials told us they are aware that the information reported by states and EPA regions is not complete or consistent, but they have not clarified, in guidance or otherwise, what information should be reported. EPA headquarters officials told us that regions are responsible for ensuring that state and EPA-managed programs take timely and appropriate enforcement actions, and that regions generally assess the programs' enforcement response on a case-by-case basis through informal communications with state program staff. The information received on the 7520-4 form, however, is the only documented information reported to EPA regions and headquarters on individual violations that may not have been enforced in a timely or appropriate manner. Until it clarifies guidance on what data should be reported on the 7520-4 form, EPA does not have reasonable assurance that state and EPA-managed programs report complete and consistent information on unresolved significant violations or that it has the information it needs to assess whether it must take enforcement action,

[44]According to EPA officials, the information that ultimately gets reported on the 7520-4 form is based on a quarterly calculation of how long the well has been out of compliance; however, according to the officials, EPA only requires state and EPA-managed programs to submit 7520-4 forms to EPA semiannually and regions can request that the forms be submitted more frequently if needed.

as directed under the act, to protect underground sources of drinking water.

EPA Has Not Consistently Conducted Oversight Activities Necessary to Assess Whether Programs Are Protecting Underground Sources of Drinking Water

EPA has not consistently conducted three oversight activities necessary to assess whether state and EPA-managed programs are protecting underground sources of drinking water, as required by regulations and specified in guidance: (1) incorporation of state program requirements, or changes to state program requirements, into federal regulations; (2) the final review and recordkeeping for all aquifer exemption applications it approves; and (3) annual on-site program evaluations.

State Program Requirements

We found in June 2014 that EPA had not consistently incorporated state program requirements, or changes to state program requirements, into federal regulations, as required by agency regulations.[45] Specifically, if a state does not enforce a requirement against an injection well operator violating state regulations, EPA can take enforcement action if EPA has approved the state regulations being violated and incorporated them into federal regulations, and has met specific procedural requirements.[46] EPA regulations and guidance establish a process for EPA and its regions to review and approve state programs, as well as changes to state programs. Under its regulations, EPA can only enforce state program requirements that it has incorporated into federal regulations through a rulemaking process.[47] Where it has not done so, EPA is not able to enforce state program requirements if needed. In June 2014, we found that EPA had not yet incorporated changes to some state program requirements into federal regulations and therefore did not have the ability to enforce these state program requirements if necessary. We concluded that until it conducts a rulemaking to incorporate the backlog of state program requirements and changes to state program requirements that

[45]GAO-14-555.

[46]EPA must give the state notice; if after 30 days the state has failed to commence appropriate action, EPA is to issue an order or begin a court action.

[47]Rulemaking requires EPA to provide public notice of the proposed regulatory changes, respond to the significant issues raised during the comment period and discuss any changes made to the regulation as a result, and publish the text of the final regulation in the *Federal Register*. The *Federal Register* is the daily publication for rules, proposed rules, and notices of federal agencies.

have been approved, EPA would not be able to enforce some state program requirements, hindering its ability to protect underground sources of drinking water. To ensure that EPA maintained enforcement authority of state program requirements, we recommended that EPA conduct a rulemaking to incorporate state program requirements, and changes to state program requirements, into federal regulations. We also recommended that at the same time, EPA evaluate and consider alternative processes to more efficiently incorporate future changes to state program requirements into federal regulations without a rulemaking.

In comments responding to our June 2014 report, EPA disagreed with our recommendation to conduct a rulemaking and said that a single rulemaking would be impractical because the process would take many years to complete and would still not ensure that all program changes were incorporated into federal regulations, as other states could make changes to their programs during this time.[48] In lieu of a single rulemaking, EPA said in its comments that it was conducting an ongoing process of individual rulemakings to approve and codify state program revisions in collaboration with states, EPA regions, and EPA's Office of Enforcement and Compliance Assurance. However, as stated in our June 2014 report, according to an analysis conducted by EPA in 2010, EPA estimated that it would take 2 to 3 years, dedicated EPA personnel, and $150,000 in outside contractor support to identify, approve, and conduct a single rulemaking to incorporate all state program changes made since 1991 into federal regulations. By EPA's own estimate, the targeted state-by-state approach will take much longer than a single rulemaking and will face greater challenges with states continuing to make changes in the interim, leaving EPA without the ability to enforce state programs to protect underground sources of drinking water if needed. EPA provided no evidence in its comments that individual rulemakings would be any less costly or any more efficient than the approach it assessed in 2010. As of December 2015, EPA has not taken action to incorporate state program requirements, or changes to state program requirements, into federal regulations.

Aquifer Exemptions

EPA is also responsible for the final review, approval, and recordkeeping for all aquifer exemption applications, but the agency does not have the location or supporting documentation necessary to identify the size and

[48] GAO-14-555.

location of all aquifers for which it has approved exemptions from protection under the act. According to EPA's 2014 Aquifer Exemption Coordination guidance, EPA regions need to have complete records documenting support for EPA's approval or disapproval of exemption applications to inform decision making by state and EPA-managed programs on injection well permits.[49] According to EPA officials, regional offices generally maintain the most comprehensive and up-to-date data on aquifer exemption approvals. Since 2003, EPA has worked to compile comprehensive information on aquifer exemptions, including data on the aquifers' sizes and locations. In 2011, EPA determined that its headquarters did not have information on all exempted aquifers and requested that EPA regional offices provide information on all aquifers exempted in their respective regions to help compile a centralized database.[50]

According to EPA officials, the agency has compiled a rudimentary database from regional datasets, paper files supporting aquifer exemption decisions, and hard copies of maps specifying the size and location of exempted aquifers. However, EPA officials said that the database of aquifer exemptions does not include complete information on each exemption listed and that EPA does not have a complete inventory of exemptions. In particular, according to EPA officials, the agency is missing information on exemption decisions made when state programs were granted primacy in the 1980s because the supporting documentation is not readily accessible or was damaged while in storage.

If EPA had maintained an updated database on aquifer exemptions, then EPA Region 9 may have had the information it needed to review injection well permits to determine whether injections were being made into exempted aquifers in California. Instead, California discovered that it had authorized injection into nonexempt aquifers. Specifically, EPA requested additional information on aquifer exemptions from California in 2012 as a part of EPA's review of historical data on aquifer exemptions nationwide. At that time, the state reviewed supporting documentation for the aquifer

[49]EPA, Office of Ground Water and Drinking Water, *Enhancing Coordination and Communication with States on Review and Approval of Aquifer Exemption Requests Under the Safe Drinking Water Act*.

[50]EPA, Office of Ground Water and Drinking Water, *Underground Injection Control Program - Aquifer Exemptions - New Regional Reporting Process* (Washington, D.C.: July 2011).

exemptions and the associated injection wells and determined that it had permitted operators to inject into nonexempt aquifers that the state believed were exempted in the 1980s, when EPA granted primacy to California to manage the class II program.

In July 2014, after identifying water supply wells in the vicinity of some of these injection wells and informing EPA Region 9, California ordered operators of those injection wells to cease injection into certain nonexempt aquifers, and to submit data to California so the threat to underground sources of drinking water and human health could be assessed. In July 2014, as a result of this issue, EPA determined that California's program was not in compliance with state and EPA requirements and supported California's plan to review injection wells that were permitted to inject into nonexempt aquifers. As of October 2015, California had identified over 500 wells injecting into 11 nonexempt aquifers with the potential to threaten underground sources of drinking water, and 23 of those wells had been shut-in, or ceased injecting fluids. In November 2015, California shut-in an additional 33 injection wells injecting into nonexempt aquifers. As of October 2015, California officials said that they are continuing to collect information on wells injecting into nonexempt aquifers to determine if additional wells should be shut-in to protect underground sources of drinking water and are working with EPA Region 9 to collect additional information on aquifer exemptions to help complete EPA's database.

As of December 2015, EPA officials told us that the majority of aquifers in its database of approved exemptions have complete size and location data and that headquarters continues to collect information from the regions and state programs to fill in the remaining data gaps and ensure that the database is complete and accurate. The officials told us that for this reason, it is unlikely that they will discover deficiencies in recordkeeping for approved aquifer exemptions similar to those identified in California. However, while EPA officials believe that they have the majority of the data on aquifer exemptions, the database does not include some historical data on exemption decisions made when state programs were granted primacy in the 1980s. In addition, the database only has aquifer exemption data through 2011 and is missing data on aquifer exemptions approved over the past 4 years. According to EPA officials, the database is a headquarters-based spreadsheet and updates with new approvals on aquifer exemptions will need to be collected from EPA

regions and entered manually.[51] The officials also said that EPA will complete the database using 2011 data and only plan to add updated data if sufficient resources are available. Until it has a complete aquifer exemption database and a way to update it periodically, EPA does not have sufficient information on aquifer exemptions to oversee state and EPA-managed programs and assess whether programs are protecting underground sources of drinking water.

Annual On-site Program Evaluations

As we reported in June 2014, EPA has not consistently conducted annual on-site program evaluations, as directed by its 1983 Program Oversight guidance.[52] This guidance directs EPA regions and headquarters to conduct annual on-site program evaluations of state and EPA-managed programs, which it characterizes as a key activity necessary for effective oversight, and to ensure that state and EPA-managed class II programs protect underground sources of drinking water.[53] According to EPA's Program Oversight guidance, EPA regions should perform at least one on-site evaluation of each state program each year to assess whether the state is managing the program consistent with state regulations, setting program objectives consistent with national and regional program priorities, and implementing recommendations from previous evaluations, among other activities. According to the Program Oversight guidance, annual on-site evaluations of state programs should also include a review of permitting and inspection files or activities to assess whether the state program is protecting underground sources of drinking water. In particular, because permitting files should include information on the well location, and the geology and aquifers in the area surrounding the injection well, a review of permitting files should cover this information. EPA headquarters is responsible for conducting similar on-site program evaluations of EPA-managed programs.

In our June 2014 report, regional officials said that on-site program evaluations are valuable for coordinating between federal and state

[51]According to EPA officials, information collected by headquarters from the regions is contained in two data files: (1) an Excel spreadsheet with data on aquifer exemptions and (2) a geospatial data file that will allow the aquifer exemption boundaries to be displayed on a United States map.

[52]EPA, Office of Drinking Water, *Interim Guidance for Overview of the Underground Injection Control (UIC) Program, Ground-Water Program Guidance #30*.

[53]GAO-14-555.

officials to improve program management. According to EPA officials at the time, however, limited resources have prevented regions, and EPA headquarters, from consistently conducting on-site program evaluations. To ensure effective oversight of the class II program, in June 2014, we recommended, and EPA agreed, that EPA evaluate and revise, as needed, UIC program guidance on effective oversight to identify essential activities that EPA headquarters and regions need to conduct to effectively oversee state and EPA-managed programs to ensure that they were effective at protecting underground sources of drinking water.

If EPA had conducted oversight activities, such as annual on-site program evaluations, EPA Region 9 may have discovered that California's class II program did not comply with state and EPA requirements before 2014. In particular, regular on-site program evaluations that included reviews of permitting files may have identified the deficiencies in California's program. Specifically, reviews of well permitting files, including well location and information on aquifers surrounding the well, may have helped identify injections into nonexempt aquifers when compared to complete records on aquifer exemptions. However, according to EPA Region 9 officials, they have not conducted annual on-site evaluations of California's program. In 2011, regional officials requested a third-party audit of California's program, which was the first comprehensive review of California's program since primacy was granted in 1983. The audit found several program deficiencies, including inadequate inspection and enforcement practices and insufficient staff to adequately manage and implement the program, but Region 9 did not have complete information on approved aquifer exemptions in California and did not conduct a review of permitting files and aquifers in the area surrounding injection wells to identify wells that California had authorized to inject into nonexempt aquifers. According to EPA officials, in response to the recommendation from our June 2014 report for EPA to update its guidance on effective oversight, EPA headquarters and regional officials have held preliminary discussions to determine what oversight activities are necessary to ensure that state and EPA-managed programs are effective at protecting underground sources of drinking water, including on-site evaluations of state and EPA-managed programs.

Concerning why annual on-site reviews had not been consistently conducted, EPA headquarters and regional officials said that they have few resources to oversee state and EPA-managed programs, and regional officials told us that available resources are directed toward the class II programs they manage directly and not oversight of state programs. EPA headquarters officials we interviewed said that they have

an effective oversight program and conduct necessary activities with the resources available. The same officials said they do not have the resources, including the workforce, necessary to consistently conduct the oversight activities to help assess whether state and EPA-managed programs are complying with applicable requirements.

According to a key workforce planning principle from our body of work on strategic human capital management, an agency should determine the critical skills and competencies that will be needed to achieve current and future programmatic results, particularly given factors that change the environment within which agencies work, such as budget constraints.[54] Our body of work on strategic human capital management indicates that each agency needs to ask if it has an explicit workforce planning strategy linked to the agency's strategic and program planning efforts to identify its current and future human capital needs, including the size of the workforce; its deployment across the organization; and the knowledge, skills, and abilities needed for the agency to pursue its shared vision.[55] In November 2015, EPA officials said that the agency had not conducted a comprehensive workforce analysis to identify the resources necessary, including human capital resources, to oversee state and EPA-managed programs, and that the agency had not requested additional resources for oversight. Without conducting such an analysis, EPA will not be able to identify the human capital and other resources it needs to carry out its oversight of state and EPA-managed programs and help ensure that they are effective at protecting underground sources of drinking water.

Conclusions

EPA established the UIC class II program in in the 1980s, with a vigorous role for the agency to oversee state and EPA-managed programs to prevent contamination of underground sources of drinking water. However, the findings in our June 2014 report, our findings on inspection and enforcement information and oversight activities in this report, and the recent decision that California's program was not complying with state and EPA requirements illustrate that EPA does not have the information, or consistently conduct the oversight activities, needed to assess state

[54]GAO, *Human Capital: Key Principles for Effective Strategic Workforce Planning*, GAO-04-39 (Washington, D.C.: Dec. 11, 2003), and *Human Capital: A Self-Assessment Checklist for Agency Leaders*, GAO/OCG-00-14G (Washington, D.C.: September 2000).

[55]GAO/OCG-00-14G.

and EPA-managed class II programs to help ensure that they protect underground sources of drinking water.

Specifically, the data EPA requires and collects from state and EPA-managed programs do not include well-specific information on inspections conducted by those programs needed to track each program's progress toward meeting its annual inspection goals, as called for in EPA's Program Reporting guidance. Until EPA requires and collects well-specific data on inspections from state and EPA-managed programs, including when wells were inspected, the types of inspections conducted at each well, and the results of those inspections, the agency does not have the well-specific information to assess whether the programs are meeting annual inspection goals to protect underground sources of drinking water.

To assess whether state and EPA-managed programs are effectively protecting underground sources of drinking water when permitting fluids to be injected into aquifers, EPA needs complete, updated information on approved aquifer exemptions. Yet EPA does not have a complete, up-to-date database on aquifer exemptions for all state and EPA-managed programs, or a way to keep the database containing information on aquifer exemptions updated. Until it has a complete aquifer exemption database and a way to update it, EPA does not have sufficient information on aquifer exemptions to oversee state and EPA-managed programs and assess whether programs are effectively protecting underground sources of drinking water.

Moreover, under the Safe Drinking Water Act, EPA must enforce state program requirements if they have not been enforced by the state in a timely and appropriate fashion. However, because of inconsistent interpretations of reporting guidance, state and EPA-managed programs report inconsistent and incomplete information on individual significant violations that have not been resolved, and therefore EPA regions and headquarters cannot know about, let alone take enforcement action against, operators committing significant violations. Until it clarifies guidance on what data should be reported on the 7520-4 form, EPA does not have reasonable assurance that state and EPA-managed programs report complete and consistent information on unresolved significant violations or that it has the information needed to assess whether it must take enforcement action, as required under the act, to protect underground sources of drinking water.

Finally, although EPA headquarters officials said they do not have the resources necessary to conduct the oversight activities needed to assess whether state and EPA-managed programs comply with applicable requirements, the agency has not conducted a workforce analysis to identify the resources, including human capital resources, the agency needs to oversee state and EPA-managed programs. Without conducting such an analysis, EPA will not be able to identify the human capital and other resources it needs to oversee state and EPA-managed programs and help ensure that they are effective at protecting underground sources of drinking water.

Recommendations for Executive Action

To help ensure protection of underground drinking water from the injection of wastewater associated with domestic oil and gas production, we recommend that the Administrator of the Environmental Protection Agency take the following four actions:

- Require and collect well-specific data on inspections from state and EPA-managed programs, including when the wells were inspected, the types of inspections conducted, and the results of the inspections in order to track progress toward state and EPA-managed annual inspection goals.
- Complete the aquifer exemption database and establish a way to update it to provide EPA headquarters and regions with sufficient information on aquifer exemptions to oversee state and EPA-managed programs.
- Clarify guidance on what data should be reported on the 7520-4 form to help ensure that the data collected are complete and consistent across state and EPA-managed programs and to provide the information EPA needs to assess whether it must take enforcement actions.
- Conduct a workforce analysis to identify the human capital and other resources EPA needs to carry out its oversight of state and EPA-managed programs.

Agency Comments and Our Evaluation

We provided the Administrator of EPA with a draft of this report for review and comment. In written comments provided by EPA (reproduced in app. VII), EPA generally agreed with our analysis and findings on the class II program and described planned actions, but disagreed with some findings and recommended actions, as discussed below. EPA also provided

technical comments that we incorporated in the report, as appropriate. In addition, we provided the draft report to the six states whose programs we reviewed. Officials from these states—California, Colorado, North Dakota, Ohio, Oklahoma, and Texas—provided technical comments, which we incorporated as appropriate.

In response to our first recommendation that EPA require and collect well-specific data on inspections from state and EPA-managed programs to track progress toward state and EPA-managed annual inspection goals, EPA stated that the agency's goal is to obtain high quality data to understand program activities at the well-specific level, but that it didn't make sense to require the states to submit well-specific data now. EPA said that it is mindful of the need to think carefully about requiring information from states, and it will continue to work with its state partners to improve both the collection and the quality of the data currently required and to expand EPA's access to additional state data. Specifically, EPA stated that it had taken steps to address the gaps in the summary data collected on 7520 forms identified in GAO's June 2014 report, including developing standard operating procedures for submission and review of the data forms, and revising instructions to increase consistency in reporting the data to EPA. EPA said that it plans to continue to increase the inventory of well-specific data in the national UIC database including states that were working towards e-reporting status, and that EPA welcomes and encourages further participation. Further, EPA stated that it will continue to work with the Department of Energy and other stakeholders as they develop a database with well-specific state inventory data. We recognize EPA's efforts to improve the consistency and completeness of summary data collected on the 7520 forms, and to collect additional well-specific data through voluntary programs such as the national UIC database and the Department of Energy's database, but EPA has made little progress since 2007 collecting well-specific inspections data from state programs voluntarily. As we stated in the report, EPA needs access to well-specific inspections data from all programs to track the progress of state and EPA-managed programs towards meeting their inspection goals. If EPA believes that well-specific data is important, it should require that state and EPA-managed programs report well-specific data on inspections.

In response to our second recommendation that EPA complete the aquifer exemption database and establish a way to update it to provide EPA headquarters and regions with sufficient information on aquifer exemptions to oversee state and EPA-managed programs, EPA disagreed with our assessment that the agency is deficient in its duties to

maintain aquifer exemption records, but is taking action to complete the database and to update it. Specifically, EPA stated that the draft report presents incomplete information as to which materials are held at the EPA headquarters and regional levels, and the roles and objectives that EPA headquarters and regions play regarding aquifer exemptions and the use of data. EPA said that our statement that the agency does not have sufficient information to oversee state and EPA-managed programs is incorrect because its regions have the most comprehensive and current data on aquifer exemptions as they conduct the final review of exemption requests and must approve all exemptions. According to EPA, it initiated the effort to collect data from the regional offices to better understand the number, locations, and nature and quality of aquifers exempted by the UIC program and expects to release a public data set by the end of 2016, which will include data current through 2015 with the exception of Region 9's data for the State of California. EPA stated that it anticipates adding Region 9's aquifer exemption data for California as the region works with the state to clarify the boundaries of the agency's historic approvals and takes action on the state's requests for new exemptions. Further, EPA said it plans to update the data set annually and that the regions will continue to hold the most current data. We commend EPA's efforts to develop an up-to-date data set of aquifer exemptions and note that the updated information is important for overseeing whether the regions have current information on aquifer exemptions. As shown in the situation in Region 9 with California, at least one region did not have current or comprehensive information on aquifer exemptions. Further, EPA has been working since 2003 to compile comprehensive information on aquifer exemptions from regions, and, according to EPA officials, does not have a complete inventory of exemptions. In light of the situation in Region 9, until EPA has a complete aquifer exemption database and a way to update it, we continue to believe that it does not have sufficient information on aquifer exemptions to oversee state and EPA-managed programs and assess whether programs are protecting underground sources of drinking water.

In response to our third recommendation that EPA clarify guidance on what data should be reported on the 7520-4 form to help ensure that the data collected are complete and consistent across state and EPA-managed programs and to provide the information EPA needs to assess whether to take enforcement action, EPA agreed that the continued improvement in collection and consistency of data via the 7520-4 form would be valuable for more effective oversight. Specifically, EPA stated that the form is a tool for obtaining important information used in assessing enforcement activities and that providing guidance on the

7520-4 form could be valuable to improve the quality of information the agency receives. EPA also said that the 7520 standard operating procedures that it created in response to our June 2014 report reminds reviewers that wells with significant violations for two or more quarters should remain listed on the 7520-4 until the issue is resolved. In addition, EPA said that it will provide further materials to UIC data submitters to improve completeness and consistency of the data that programs report on the 7520-4 form within 6 months of this final report. As these standard operating procedures have not yet been finalized, we have not assessed them to determine whether they meet the intent of our recommendation.

In response to our fourth recommendation that EPA should conduct a workforce analysis to identify the resources it needs to conduct effective program oversight, EPA agreed that oversight is an important aspect of ensuring an effective UIC program, but stated that a workforce analysis was not necessary to better assess the resources needed to oversee the implementation of the UIC class II program. EPA stated that it is working with program managers to evaluate the effectiveness of EPA's oversight activities in response to our June 2014 report, and would expand the evaluation to include elements of inspection and enforcement activities if necessary. Upon completion of its evaluation, EPA said that it would look to improve the effectiveness of state and EPA oversight of the UIC programs, if needed. EPA may, for example, pilot a project to explore the potential to ensure program implementation by use of remote approaches, such as data collection, data analysis, targeting and priority ranking, and public transparency, as a viable option for increased oversight. While we recognize EPA's commitment to assess whether it should expand its evaluation of oversight activities to include inspections and enforcement, we still believe it is critical for EPA to identify the resources necessary, including human capital resources, to oversee state and EPA-managed programs and that without doing so, EPA may not have reasonable assurance that it can effectively collect information or conduct activities to ensure protection of underground sources of drinking water.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the appropriate congressional committees, the Administrator of the Environmental Protection Agency, and other interested parties. In addition, this report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or gomezj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix VIII.

J. Alfredo Gómez
Director, Natural Resources and Environment

List of Requesters

The Honorable Barbara Boxer
Ranking Member
Committee on Environment and Public Works
United States Senate

The Honorable Sheldon Whitehouse
Ranking Member
Subcommittee on Fisheries, Water, and Wildlife
Committee on Environment and Public Works
United States Senate

The Honorable Edward Markey
Ranking Member
Subcommittee on Superfund, Waste Management, and Regulatory Oversight
Committee on Environment and Public Works
United States Senate

The Honorable Peter DeFazio
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

The Honorable Raul Grijalva
Ranking Member
Committee on Natural Resources
House of Representatives

The Honorable Alan Lowenthal
Ranking Member
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
House of Representatives

The Honorable Diana DeGette
Ranking Member
Subcommittee on Oversight and Investigations
Committee on Energy and Commerce
House of Representatives

The Honorable Benjamin Cardin
United States Senate

Appendix I: List of State and EPA-Managed Class II Programs and Well Inventory

Table 3 provides a list of programs managed by the Environmental Protection Agency (EPA), state programs with safeguards deemed effective by EPA, state programs that have adopted minimum federal underground injection control requirements, and the number of class II wells in each state in 2014.

Table 3: Class II Program Management Authority and Well Inventory by State

State	EPA-managed programs	State programs with safeguards deemed effective by EPA	State programs that have adopted minimum federal requirements	Number of class II wells in FY2014
Alabama		X		257
Alaska		X		1,386
Arizona	X			0
Arkansas		X		1,118
California		X		51,982
Colorado		X		901
Connecticut			X	0
Delaware			X	0
Florida	X			65
Georgia			X	0
Hawaii	X			0
Idaho			X	0
Illinois		X		8,167
Indiana		X		1,242
Iowa	X			7
Kansas		X		16,947
Kentucky	X			3,073
Louisiana		X		3,755
Maine			X	0
Maryland			X	0
Massachusetts			X	0
Michigan	X			1,634
Minnesota	X			0
Mississippi		X		1,311
Missouri		X		519
Montana		X		1,206
Nebraska		X		666
Nevada			X	18
New Hampshire			X	0

State	EPA-managed programs	State programs with safeguards deemed effective by EPA	State programs that have adopted minimum federal requirements	Number of class II wells in FY2014
New Jersey			X	0
New Mexico		X		4,512
New York	X			406
North Carolina			X	0
North Dakota		X		1,349
Ohio		X		2,394
Oklahoma		X		11,432
Oregon		X		9
Pennsylvania	X			1,804
Rhode Island			X	0
South Carolina			X	0
South Dakota		X		134
Tennessee			X	29
Texas		X		54,332
Utah		X		640
Vermont			X	0
Virginia	X			15
Washington			X	1
West Virginia		X		402
Wisconsin			X	0
Wyoming		X		5,122

Legend: EPA = Environmental Protection Agency; FY = fiscal year.

Source: EPA. | GAO-16-281

Notes: This table excludes tribes, U.S. territories, and the District of Columbia. According to EPA, in some cases, states with no wells may have approval to manage their class II programs but may not have active class II programs.

Appendix II: Status of California's Underground Injection Control Class II Program

According to a 2015 letter from California to Environmental Protection Agency (EPA) Region 9, California is the nation's third largest oil-producing state, producing 575,000 barrels per day, and the state's oil and gas industry earns $34 billion annually.[1] Injection wells have been used in the state for more than 50 years. According to a 2015 report, currently over 50,000 injection wells are operating in California, with about 75 percent of the state's production coming from enhanced oil recovery methods using underground injection wells.[2] California's class II underground injection control (UIC) program is managed by the Division of Oil, Gas, and Geothermal Resources (Division) and is divided across the Division's six district offices. The majority of class II underground injection activity occurs in District 1 (Cypress) and District 4 (Bakersfield).

California Program Determined to Be Noncompliant

In July 2014, EPA Region 9 determined that the UIC class II program managed by the Division did not comply with state and EPA requirements. In a series of letters from July 2014 through July 2015, EPA Region 9 and the Division reached agreement on a plan to improve California's UIC class II program. Below is a summary of the deficiencies identified in California's UIC class II program and the plans California and EPA Region 9 agreed on to resolve these deficiencies, including actions taken by EPA and California before and after the determination of noncompliance in 2014.

- In 2011, EPA requested a third-party audit of the state's UIC class II program.[3] The audit made recommendations to improve California's class II program, including recommendations regarding the program's definition of underground sources of drinking water, area of review calculations, well construction practices, inspection and enforcement practices, and staff qualifications.

[1]California Division of Oil, Gas, and Geothermal Resources Letter to EPA Region 9 Re: Class II Oil and Gas Underground Injection Control (Feb. 6, 2015).

[2]California Division of Oil, Gas, and Geothermal Resources, *Underground Injection Control Program Report on Permitting and Program Assessment: Reporting Period of Calendar Years 2011-2014* (Sacramento, CA: October 2015).

[3]Horsely Witten Group for EPA Region 9, *California Class II Underground Injection Control Program Review* (June 2011).

- In November 2012, the Division developed an action plan to address each of the recommendations from EPA's audit. To address a number of recommendations necessitating regulatory updates, the Division committed to update its class II program regulations beginning in 2013.[4]

- In response to an EPA inquiry initiated in 2012, California reviewed program records to ensure that injection wells the state authorized aligned with EPA-approved aquifer exemptions.[5] In doing so, in 2014 the Division discovered that it authorized operators to inject class II wastewater into 11 nonexempt aquifers in the vicinity of water supply wells, and EPA determined that the program was not in compliance with state and EPA requirements.

- In October 2015, the Division issued the first report from its Monitoring and Compliance Unit, which was created in 2011.[6] The report identified a number of program deficiencies, including insufficient staffing to address increasing regulatory workload and significant remedial programmatic work; poor recordkeeping on mostly paper forms and a lack of modern data tools and systems; outdated regulations that in some cases do not address the modern oil and gas extraction environment; inconsistent and understaffed program leadership; insufficient breadth and depth of technical talent; insufficient coordination among district and state offices; and lack of consistent, regular, high-quality technical training.

Division officials also identified deficiencies with the enforcement of class II requirements. Division officials said that the state office receives violation information from districts and is responsible for pursuing

[4]California Division of Oil, Gas, and Geothermal Resources, *Underground Injection Control Action Plan: Response to the U.S. EPA June 2011 Review of California's UIC Program* (Sacramento, CA: November 2012).

[5]If certain conditions are met, aquifers can be exempted from protection under the Safe Drinking Water Act. Well operators may request an exemption for a particular aquifer, and if EPA approves, operators may inject fluids into the aquifer.

[6]In 2011, the Division created the Monitoring and Compliance Unit to evaluate program compliance with state and EPA requirements. The Monitoring and Compliance Unit was tasked with evaluating and reporting on the strengths and challenges of the state's program in meeting the statutory and regulatory standards on which the program is based, including state statutes and regulations and California's memorandum of agreement with EPA detailing how the state would manage its program to comply with the Safe Drinking Water Act.

enforcement actions against operators and collecting penalties assessed by the Division. However, according to Division officials, California has historically had difficulties enforcing regulations for both production and class II wells in the state. In particular, the Division identified many examples of enforcement actions that were not pursued and wells that were not being returned to compliance in a timely manner. For example, in 2010, the Division hired a contractor to review its accounts receivable to identify outstanding penalties that the Division had not collected. According to Division officials, there were over $5 million in unpaid penalties that the Division had assessed but did not collect. In September 2015, according to Division officials, the Division hired a deputy supervisor to start tracking enforcement of state requirements and to lead the development of new business processes to improve violation tracking and enforcement.

Division's Plan for Program Improvements

Since July 2014, the Division, California's State Water Resources Control Board (Board), and EPA have been working together to systematically address a number of important deficiencies in the UIC program, including permitting injection into nonexempt aquifers.[7] In letters between California (the Division and the Board) and EPA, the three-agency group agreed to a plan for the Division to shut down wells permitted to inject into nonexempt aquifers and improve and modernize its UIC practices.[8] Specifically, the plan consists of four major components to be completed concurrently:

- **New regulations and program revisions.** The Division determined that many state regulations that govern underground injection control are obsolete, deficient, or unable to address current industry practice. According to agency documents, the Division plans to undertake a series of rulemakings to improve California's regulatory framework to address these issues, including isolation of injected fluids, quality of water to be protected, well construction practices, cyclic steam operations,[9] project review, and idle well standards and testing. In

[7]The Board consults with the Division on injection well permits.

[8]California Division of Oil, Gas, and Geothermal Resources, *Underground Injection Control Program Report on Permitting and Program Assessment: Reporting Period of Calendar Years 2011-2014*.

[9]Cyclic steam wells inject steam into hydrocarbon producing formations to enhance recovery of oil.

July 2015, the Division stated that it planned to update its class II regulations in two phases, with the first phase starting with the informal circulation of draft regulations in the fall of 2015 and the second phase beginning in 2016.[10]

- **Well review and aquifer exemptions.** The Division and the Board have been systematically reviewing injection wells that may have been permitted to inject into nonexempt aquifers. The Division has proposed a schedule for reviewing and ceasing injection into these aquifers. As of October 2015, the Division shut down 23 wells injecting wastewater into underground sources of drinking water that may have posed an immediate risk to waters of beneficial use. Over the next 2 years, through 2017, according to agency documents, the Division will review additional injection wells to determine whether they should be shut down or continue operating.[11] The Division is collecting information from operators interested in pursuing exemptions and will review each exemption application to determine whether exemption criteria have been sufficiently met. If the Division approves the aquifer exemption, it will forward it to EPA for review and approval or disapproval. EPA has final authority to declare an aquifer exempt. The Division has issued regulations to ensure that injection activity ends by specified deadlines unless aquifer exemptions are approved.

- **Project-by-project review of injection project approvals.** The Division plans to conduct individual project reviews designed to find missing data, identify UIC compliance issues, and compare existing project approvals with current conditions in the field.[12] Operators will be required to provide missing data, and the Division will reevaluate

[10]California Division of Oil, Gas, and Geothermal Resources, *Underground Injection Control Program Report on Permitting and Program Assessment: Reporting Period of Calendar Years 2011-2014*.

[11]California Division of Oil, Gas, and Geothermal Resources, *Underground Injection Control Program Report on Permitting and Program Assessment: Reporting Period of Calendar Years 2011-2014*.

[12]A project under the Division's class II program consists of many wells, sometimes as many as 200 wells, in an injection production system. A project includes both injection and production wells. The project proposal includes evaluation of the geology of the area to be subject to injection and production operations. It also must include review of the construction of neighboring wells and the ability of the geologic structures to contain injection fluid within the intended injection zone.

the project based on all relevant regulations, mandates, and policies, including demonstration of zonal isolation of injected fluids. Projects will be reapproved, modified, or canceled as appropriate. The Division plans to conduct separate reviews in each Division district and plans to complete the review by October 2018.

- **Development of a modern well and data management system.** The Division is updating its data management systems for production and injection wells to improve regulatory compliance and effectiveness, transparency, and support of all stakeholders. Finishing every component of the UIC improvement plan submitted to EPA could take 3 to 4 years. However, according to state documents, as each piece is completed, improvements in the Division's mission performance will follow. According to state documents, changes will be supported by the development of training programs to support the process of internal review and adjustments for continuously improving the Division's execution of its responsibilities.

Appendix III: Objectives, Scope, and Methodology

This report examines the Environmental Protection Agency's (EPA) Underground Injection Control (UIC) class II program to determine the extent to which EPA has collected the inspection and enforcement information needed, and conducted the oversight activities necessary, to assess that state and EPA-managed programs are protecting underground sources of drinking water. To perform this work, we reviewed and analyzed the Safe Drinking Water Act, and EPA regulations and guidance applicable to the UIC class II program. We also interviewed EPA UIC program officials in the eight regional offices with class II wells. To understand the class II program at the state level, we interviewed state officials and reviewed state program documentation for the same sample of states from our June 2014 report on the UIC program.[1] Specifically, we selected a nongeneralizable sample of eight states with class II programs. Two of these states are managed by EPA regions—Kentucky and Pennsylvania—and the remaining six—California, Colorado, North Dakota, Ohio, Oklahoma, and Texas—are managed under provisions of the act that allow them to have primary responsibility to manage the program in their states. We selected these states from the six shale oil and gas regions defined by the Energy Information Administration. For each of the six shale regions, we selected at least one state that had among the highest number of class II injection wells.

In July 2014, after we issued our June 2014 report and before we started the work on this review, EPA determined that one of the programs in the eight states we reviewed, California's class II program, was not in compliance with state or EPA requirements. EPA Region 9 officials and California's UIC program officials have since agreed to a plan to improve the California program over the next several years. We interviewed EPA headquarters, EPA Region 9, and California officials regarding the deficiencies in California's program, the agreed-upon improvement plan, and EPA oversight of California's progress. A summary of the deficiencies found by EPA and California, and California's plans to improve its program, can be found in appendix II. Because of the deficiencies in California's program, we chose not to include California in our detailed analysis of inspection and enforcement information from the states. Thus, the results of our review of inspection and enforcement reflect the seven states remaining in our sample. Because the sample is a

[1]GAO, *Drinking Water: EPA Program to Protect Underground Sources from Injection of Fluids Associated With Oil and Gas Production Needs Improvement*, GAO-14-555 (Washington, D.C.: June 27, 2014).

nongeneralizable sample, our results cannot be generalized to other states but do provide detailed examples of EPA's and states' management of class II programs.

To analyze whether EPA collects the information it needs to assess whether state and EPA-managed programs are protecting underground sources of drinking water, particularly inspection and enforcement information, we first reviewed EPA regulations and guidance on UIC inspections and enforcement to determine what information EPA needs to assess the programs and their ability to protect underground sources of drinking water. EPA's 1987 guidance document Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions (Strategy) establishes minimum goals for inspections of class II wells.[2] We obtained and summarized inspections data collected by EPA from each program we reviewed for fiscal year 2013, the most current year of data available at the beginning of this review. The state and EPA-managed programs are directed to report these data to EPA quarterly on the 7520-3 form. To assess the reliability of these data, we interviewed EPA and state officials about their processes for managing the data collected on the 7520-3 forms and tested the data for completeness. We found that the data were not comparable across states but were sufficiently reliable for reporting on a state-by-state basis. To understand EPA's use of the data to assess state and EPA-managed programs, we interviewed officials from EPA headquarters about their use of the information to oversee EPA-managed programs and from EPA regions about their oversight of inspections conducted by state programs. We also interviewed selected state program officials about how they manage class II inspections, and we requested information on annual inspection goals and inspection strategies. Similarly, we interviewed regional office staff responsible for managing the programs in Kentucky and Pennsylvania about their management of the class II programs in these states, including any inspection goals and strategies they have.

To analyze whether EPA has the enforcement information to assess whether state and EPA-managed programs are protecting underground sources of drinking water, we reviewed EPA's Strategy, which also

[2]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions* (Washington, D.C.: Mar. 31, 1987).

establishes enforcement expectations for both state and EPA-managed programs. In particular, the Strategy identifies the need for state and EPA-managed programs to conduct timely and appropriate enforcement actions. Specifically, state and EPA-managed programs are expected to resolve significant violations within 90 days of discovery or take a formal enforcement action against the well operator. According to the Strategy, a formal enforcement action, among other things, is legally enforceable, explicitly requires the well owner to take corrective action, and specifies a timetable for completion. Under the act, EPA is to intervene and take enforcement action once it is notified that a violation has occurred and that the state has not taken appropriate action after 30 days. Similarly, EPA regions should take timely and appropriate enforcement actions in states with EPA-managed programs. According to EPA's 1987 Reporting Requirements—Underground Injection Control Program Guidance (Program Reporting),[3] EPA uses the 7520-4 forms to evaluate the timeliness and appropriateness of a state or EPA-managed program's enforcement response; EPA regions receive 7520-4 forms from their state programs, and EPA headquarters collects information on the 7520-4 forms from programs managed by EPA regions.

We then assessed a sample of violations, using EPA's definition of timely and appropriate resolution from its Strategy and Program Reporting guidance, to determine if EPA receives information on individual significant violations that may have the potential to threaten underground sources of drinking water. We selected a nongeneralizable sample of 134 notices of violation, issued from 2008 through 2013 (the most recent years of data available when we began our audit work), from the seven state and EPA-programs we reviewed and compared the data to enforcement data provided to EPA on the 7520-4 forms.[4] We selected a nongeneralizable sample of at least six notices of violation in each of the seven states in our sample based on the significance of the violation; the type of enforcement action taken; and the number of days between when the operator was notified and when the violation was resolved, termed

[3]EPA, Office of Drinking Water, *FY 1987 Reporting Requirements—Underground Injection Control Program Guidance (UICP) Guidance #53* (Washington, D.C.: December 1986).

[4]For the purposes of this report, we refer to all written notifications to operators that they are in violation of state or EPA requirements as notices of violation. During our review of seven states, we noted that state or EPA-managed programs may initiate a single enforcement case against an operator for multiple violations, so a single notice of violation may cover more than one violation.

returning to compliance with applicable requirements. We also obtained the 7520-4 forms for fiscal years 2008 through 2013 to identify what violations had been reported on these forms. We analyzed the number of days that each significant violation in our sample had been open and compared this to the number of days (90) established by EPA as timely.[5] We then analyzed each violation to determine if a formal action had been taken. We identified 93 violations that were open for more than 90 days and compared these to the information reported on the 7520-4 form by the appropriate state. We then interviewed EPA, regional, and state officials to determine how they reported the information on the 7520-4 form.

Because our sample of violations is nongeneralizable, our results cannot be generalized to other states and violations; however, they do provide detailed information on the violations that should have been reported by state and EPA-managed programs. To assess the reliability of the violation and enforcement information we obtained, we interviewed EPA headquarters officials about their processes for collecting and managing the information and tested the information for completeness by looking for missing information. We determined that the information from EPA's reporting forms was reliable for purposes of reporting individual state results.

To analyze the activities EPA conducts to assess whether state and EPA-managed programs protect underground sources of drinking water, we reviewed several EPA guidance documents that describe activities EPA is to take to oversee state and EPA-managed programs. EPA's 1983 guidance document, Interim Guidance for Overview of the Underground Injection Control Program, states that EPA is supposed to conduct annual on-site evaluations of state and EPA-managed programs.[6] EPA's UIC regulations describe activities that EPA is supposed to conduct to ensure that it can enforce state program requirements, if necessary. EPA's 1984 guidance, Guidance for Review and Approval of State Underground Injection Control Programs and Revisions to Approved State Programs,

[5]Significant violations, or significant noncompliance, are violations that in general, pose a threat to underground sources of drinking water.

[6]EPA, Office of Drinking Water, *Interim Guidance for Overview of the Underground Injection Control (UIC) Program, Groundwater Program Guidance #30* (Washington, D.C.: June 1983).

describes the activities that EPA is to conduct to review changes to state program requirements.[7] We reviewed the extent to which EPA conducted the first two activities in our June 2014 report on the UIC program.[8] We met with EPA headquarters officials to discuss our findings from that report and EPA's efforts to implement our recommendations.

To analyze the extent to which EPA has carried out activities to review and approve aquifer exemptions for state and EPA-managed programs, we reviewed EPA guidance documents on aquifer exemptions. We then interviewed EPA headquarters officials about EPA's progress developing and maintaining a database on aquifer exemptions. To analyze the extent to which EPA applied best practices for workforce planning and strategic human capital management to the management of the UIC program, we reviewed GAO reports specifying best practices for strategic human capital management. We then interviewed EPA's headquarters officials about EPA's efforts to apply those best practices to the UIC program.

We conducted this performance audit from October 2014 to February 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[7]EPA, Office of Drinking Water, *Guidance for Review and Approval of State Underground Injection Control (UIC) Programs and Revisions to Approved State Programs GWPB Guidance #34* (Washington, D.C.: July 1984).

[8]GAO-14-555.

Appendix IV: Information on Inspections Conducted by Selected State and EPA-Managed Programs

The Safe Drinking Water Act requires states to include inspection requirements in their programs. In a 1987 document titled Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions (Strategy), the Environmental Protection Agency (EPA) provides guidance on the types of inspections and the frequency at which they should be conducted.[1] The types of inspections include routine inspections, well construction inspections, mechanical integrity tests witnessed, emergency and complaint response, enforcement follow-up, and plugging and abandonment verification.

According to the Strategy, the goal of an inspection program is to determine that a well is in compliance with applicable requirements and to detect any violations of those requirements. It directs programs to adopt minimum priority standards for each type of inspection and gives the programs discretion to consider additional priorities, such as environmental risks, population risks, and well construction, when determining which wells to inspect. The Strategy ranks inspection types, including those for class II wells, by priority, as shown in table 4.

Table 4: Types of Class II Well Inspections and EPA-Recommended Annual Inspection Goals by Percentage of Wells Inspected or Frequency of Inspections

Inspection type	Priority (1 = high; 4 = low)	Description	Recommended annual inspection goals by percentage or frequency
Emergency and complaint response	1	Response to an emergency situation that constitutes imminent hazard or to citizen complaints where the program has reason to believe there is potential endangerment to underground sources of drinking water.	100%
Mechanical integrity tests witnessed	2	Witness tests to ensure that there are no significant leaks from well and no significant fluid movement into underground sources of drinking water.	25%

[1]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions* (Washington, D.C.: Mar. 31, 1987).

Inspection type	Priority (1 = high; 4 = low)	Description	Recommended annual inspection goals by percentage or frequency
Enforcement inspection	2	Inspections to support enforcement activity, including follow-up to enforcement actions.	100%
Plugging and abandonment verification	3	Verification that the owner/operator has complied with all program requirements associated with plugging and abandoning a well.	25%
Well construction inspection	3	Verification of adequate well construction and engineering prior to start-up to ensure that new and reconditioned wells are in compliance with program requirements.	As resources allow
Routine inspection	4	Inspection performed routinely or in response to a complaint to ensure that the well operator is in full compliance with program requirements.	At least once every 5 years

Legend: EPA = Environmental Protection Agency.

Source: GAO analysis of EPA guidance. | GAO-16-281

The seven state and EPA-managed programs we reviewed establish goals for each of the inspection types identified in the Strategy based on program priorities and available inspection resources.[2] Table 5 shows state and EPA-managed program inspection goals by inspection type. Some states have goals to inspect all of their wells monthly or quarterly. For example, North Dakota program officials told us that their goal is to conduct routine inspections at all class II injection wells monthly, and Ohio has a goal of inspecting 100 percent of its wells quarterly, according to program officials. Other programs we reviewed do not set specific annual goals for individual types of well inspections. For example, according to EPA Region 4 officials, EPA Region 4 has a goal of conducting routine inspections of all of the class II wells in Kentucky at

[2]We included seven states in our analysis of inspection and enforcement data because we dropped one of the state programs from our initial sample of eight state and EPA-managed programs. We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements.

least once every 5 years and does not set inspection goals for observing well plugging and well construction. Some state and EPA program officials told us that when states do not have the resources to inspect all wells annually, type and frequency of inspections are prioritized based on risk factors such as the operator's history of compliance with state or EPA requirements or danger to the general public. For example, Oklahoma officials told us that inspectors will inspect an operator more frequently if the inspector determines the well operator is violating state requirements and will also prioritize inspections in areas of the state where there is a history of illegal disposal activity. Similarly, EPA Region 3 officials told us that they do not set annual inspection goals by inspection type, but prioritize inspections based on factors such as danger to the general public, emergency response, and the availability of inspection staff.

Table 5: Reported Annual Inspection Goals for Selected Programs by Class II Well Inspection Type by Percentage of Total Inspected or Number of Inspections Conducted

State	Emergency and complaint response	Mechanical integrity tests witnessed	Enforcement	Well pluggings witnessed	Well constructions witnessed	Routine inspections
EPA Strategy	100%	25%	100%	25%	As resources allow	At least once every 5 years
Colorado	100%	100%	100%	100%	100%	100%
Kentucky	100%	100%	100%	None	None	At least once every 5 years
North Dakota	100%	100%	100%	100%	100%	100%
Ohio	100%	100%	100%	100%	Highest possible percentage	100%
Oklahoma	100%	90%	100%	As resources allow	As resources allow	At least 10,000
Pennsylvania	None	None	None	None	None	None
Texas	100%	8,000	100%	65%	1,896	None[a]

Legend: EPA = Environmental Protection Agency; Strategy = Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions.

Source: GAO analysis of EPA and selected state data. | GAO-16-281

Notes: We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Kentucky and Pennsylvania are EPA-managed programs.

[a]Texas has an annual goal of 118,800 routine well inspections, which includes but is not limited to class II wells.

Generally, according to state officials, state inspection staff in the five state programs we reviewed are responsible for inspecting both production and class II injection wells in the state. According to state officials, staff may inspect only class II or production wells or may inspect

both. For example, of the 47 staff members conducting inspections in Ohio, 4 conduct inspections on class II wells full-time and 8 to 10 split responsibilities between production and class II wells. Similarly, inspection staff in EPA regions we reviewed are responsible for inspecting all classes of injection wells managed by the region.[3] For example, according to EPA Region 4 officials, Region 4 has approximately 3 program staff members and 2 contractors to conduct inspections of all classes of injection wells in the region.

State agencies and EPA regional offices responsible for managing or overseeing programs in the seven states we selected vary in the inventory of wells they manage and the staffing resources dedicated to inspect those wells. For example, according to North Dakota officials, North Dakota has 35 staff members to inspect 14,158 production and class II injection wells in the state. According to Oklahoma officials, Oklahoma has 62 staff members to inspect the state's almost 190,000 production and class II wells. EPA regions managing programs in states we selected have comparatively fewer inspection staff to inspect the injection wells they manage. For example, according to EPA officials, Region 3 has 1 full-time inspector and 3 part time inspectors to inspect the almost 29,000 injection wells it manages region-wide, including over 1,800 class II wells in Pennsylvania.

[3]EPA regulates six classes of underground injection wells. Class II wells are used to inject brines and other fluids associated with oil and gas production, and hydrocarbons for storage, and are the focus of this report. Class I wells are used to inject hazardous wastes, industrial nonhazardous liquids, or municipal wastewater beneath the lowermost underground drinking water sources. Class III wells are used to inject fluids associated with solution mining of minerals beneath the lowermost underground drinking water source. Class IV wells are used to inject hazardous or radioactive wastes into or above underground drinking water sources (these wells are banned unless authorized under a federal or state groundwater remediation project). Class V wells, in general, are used to inject nonhazardous fluids into or above underground drinking water sources and are typically shallow, on-site disposal systems. Class VI wells are used to inject carbon dioxide for long-term storage.

Appendix V: Information on Enforcement Actions Taken by Selected State and EPA-Managed Programs

This appendix contains information on the enforcement process used by selected state programs and programs managed by the Environmental Protection Agency (EPA), the enforcement tools available to programs, and our analysis of a sample of enforcement cases that we reviewed. We selected a nongeneralizable sample of at least six enforcement cases in each of the seven states in our sample,[1] based on the significance of the violation, the type of enforcement action taken, and the number of days between when the operator was notified and when the violation was resolved—defined as returning to compliance—with applicable requirements.

Enforcement Process

According to EPA's Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions (Strategy), state and EPA-managed programs should escalate their enforcement response if compliance is not achieved in a timely manner.[2] The enforcement action taken can depend on a number of factors, including the severity of the violation and its potential to contaminate underground sources of drinking water. Our analysis of enforcement actions taken by select state and EPA-managed programs found that the programs have generally similar enforcement processes to respond to class II Underground Injection Control (UIC) violations.

A violation can be discovered a number of ways, including through an inspection, administrative review of a well file, or reports by citizens or others.[3] According to EPA and state officials, the enforcement process generally begins when program officials notify a well operator that the well is in violation of applicable requirements. Six of the seven programs we reviewed generally issue a written notice of the violation to the well operator, but North Dakota program officials told us that they instead give

[1]We included seven states in our analysis of inspection and enforcement data because we dropped one of the state programs from our initial sample of eight state and EPA-managed programs. We dropped California from our analysis of inspection and enforcement data because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements.

[2]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions* (Washington, D.C.: Mar. 31, 1987).

[3]A violation can be reported to the state or EPA-managed program by a citizen or citizen group. Also, a well operator may self-report a violation to its respective class II program.

a verbal notification and then, depending on the severity of the violation, will allow a 30-day grace period before initiating a formal enforcement action. For the state and EPA-managed programs we reviewed, notices of violation can include one or more violations in a single notice. If the operator does not take action to resolve a significant violation—that is, return the well to compliance with all state and federal regulations—in a timely manner, EPA's 1987 Strategy directs state and EPA-managed programs to take formal enforcement actions to ensure that compliance is achieved.[4] Formal enforcement actions can include the following:

Administrative orders. Administrative orders are legally enforceable orders, the terms of which can either be dictated by the program or negotiated with the well operator in violation (which may be referred to as a consent order or consent agreement).[5] Administrative orders may enjoin the well operator from taking certain actions, may require the well operator to take corrective action, and may impose monetary penalties.

Civil judicial action. Civil judicial actions are lawsuits filed against an operator that has failed to comply with, for example, statutory or regulatory requirements or an administrative order. Civil actions are generally taken when administrative enforcement actions have been unsuccessful in achieving compliance and resolving the violation, according to EPA officials.

Criminal judicial action. A program may also refer a case to the criminal justice system if an action is willfully committed. A criminal court conviction can result in fines or imprisonment.

Enforcement Tools Available to State and EPA-Managed Programs

State and EPA-managed programs have various tools available to facilitate a return to compliance with applicable requirements and deter future violations. According to EPA officials, state and EPA-managed programs can vary in their approaches to enforcing UIC program requirements as long as the programs are effective at protecting underground sources of drinking water. Six of the seven state and EPA-

[4]EPA, Office of Drinking Water, *Underground Injection Control Program Compliance Strategy for Primacy and Direct Implementation Jurisdictions*.

[5]Consent orders offer terms that are generally agreed upon by the program and the well operator.

managed programs in our review have authority to assess monetary penalties. Table 6 details the types of administrative, civil, and criminal monetary penalty authority available at the state and federal levels for the selected states in our review.

Table 6: Penalties for Violations of Selected State and EPA-Managed Program Requirements

State	Administrative penalty	Civil penalty	Criminal penalty/imprisonment
Colorado	Maximum penalty of $15,000 per violation per day.	None specified.	Maximum penalty of $5,000, 6 months' imprisonment, or both.
Kentucky	Up to $10,000 fine per violation per day up to a maximum of $125,000.	Maximum penalty of $25,000 fine per violation per day.	Maximum penalty of $25,000 fine per violation per day, 3 years' imprisonment, or both. Additional penalties can be imposed under Title 18 of the United States Code.
North Dakota	Maximum penalty of $12,500 per violation per day.	None specified.	Maximum penalty of $10,000, 5 years' imprisonment, or both.
Ohio	None identified.	$2,500 to $20,000 per violation per day for disposal wells; up to $10,000 per violation per day for enhanced recovery wells.	$10,000, 6 months' imprisonment, or both for the first disposal well offense; $20,000, 2 years' imprisonment, or both for subsequent offenses.
Oklahoma	Maximum penalty of $5,000 per violation per day.	None specified.	Maximum penalty of $5,000, 5 years' imprisonment, or both.
Pennsylvania	Up to $10,000 fine per violation per day up to a maximum of $125,000.	Maximum penalty of $25,000 fine per violation per day.	Maximum penalty of $25,000 fine per violation per day, up to 3 years' imprisonment, or both. Additional penalties can be imposed under Title 18 of the United States Code.
Texas	Maximum penalty of $10,000 per violation per day.	Maximum penalty of $5,000 per act of noncompliance per day.	Maximum penalty of $10,000 per violation per day. Falsification of applications, reports, or documents or tampering with gauges may also carry a $10,000 penalty, imprisonment of 2 to 5 years, or both.

Legend: EPA = Environmental Protection Agency.

Source: GAO analysis of selected state and EPA-managed program requirements. | GAO-16-281

Notes: We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Kentucky and Pennsylvania are EPA-managed programs.

While six of the seven programs we reviewed have the legal authority to assess monetary penalties, some do not regularly use these authorities for various reasons. For example, North Dakota's program has administrative authority to assess a monetary penalty, but the state prefers to employ a more cooperative approach to get operators to bring wells back into compliance, according to North Dakota officials. According to Colorado officials, Colorado's program has also historically employed a

cooperative approach, but the state recently revised its regulations to require a more prescriptive approach to enforcement. Ohio program officials told us that they do not have an administrative process for assessing a monetary penalty, and the penalty must instead be pursued through the civil judicial process. In turn, Ohio officials told us that they consider the advantages and disadvantages of resolving a violation through negotiated consent agreement before referring the case to the state's attorney general to pursue civil penalties.

Other tools available to selected state and EPA-managed programs to enforce program requirements may include the following:

Well shut-in. Some programs we reviewed may temporarily close down a well until a violation is resolved. For example, Oklahoma officials can shut-in a well if an operator is out of compliance with its financial assurance requirements.

Pipeline severance. A program may also have the authority to sever an operator's access to oil and gas pipelines. For example, if an operator uses a well that has been shut-in for violations, Texas may take the further step of refusing to renew certain documents the operator needs to do business in the state. If the disposal well operator also has production wells in the state, this would prevent the operator from producing oil and gas. According to EPA officials, this can be an effective enforcement tool given that a company's income is generated on the production side.

Permit revocation or temporary suspension. A program may have the authority to revoke or temporarily suspend existing UIC permits, thereby making it illegal for an operator to continue injecting into a well or group of wells covered under the permit. For example, North Dakota may revoke permits after notice and hearing if the well operator fails to comply with the terms and conditions of its permit or any applicable rule or law, and the state may suspend permits for good cause.

Moratorium on new or renewed permits. A program may be able to refuse to issue new permits to an operator with a history of noncompliance. For example, Oklahoma program officials can seek an order denying a permit to an operator with an unsatisfactory compliance history.

Bond forfeiture. A program may require well operators to post a bond to ensure compliance with requirements applicable to the well. If an operator fails to comply with these terms, a state may be able to seize the bond to

cover the costs of returning the well to compliance. For example, if Ohio officials find that an operator has failed to comply with, among other things, certain orders, regulations, or its permit, it may declare the operator's bond to be forfeit.

Timely and Appropriate Enforcement of State and EPA Requirements

Under the Safe Drinking Water Act, EPA must enforce state requirements if violations have not been enforced by states in a timely and appropriate manner. EPA's Strategy sets forth standards for timely and appropriate enforcement action in response to significant violations. Specifically, state and EPA-managed programs are expected to resolve significant violations within 90 days of discovering the violation or take a formal enforcement action against the well operator. According to the Strategy, a formal enforcement action, among other things, is legally enforceable, explicitly requires the well owner to take corrective action, and specifies a timetable for completion. When EPA becomes aware that an operator is violating a state program requirement, a provision in the act requires EPA to notify the state and, if the state does not take appropriate action within 30 days, to intervene by issuing an administrative order or commencing a civil action. Similarly, EPA regions should take timely and appropriate enforcement actions in states with EPA-managed programs.

State and EPA-managed programs are required to submit periodic reports to EPA headquarters with information on enforcement actions taken against well operators. One of the required reports is to provide quarterly information on individual significant violations by well operators that have not been resolved and that may have the potential to threaten underground sources of drinking water. EPA uses the 7520-4 form to collect this information.[6] According to EPA's 1987 Reporting Requirements—Underground Injection Control Program Guidance (Program Reporting),[7] EPA uses the 7520-4 forms to evaluate the timeliness and appropriateness of a state or EPA-managed program's enforcement response.

[6]According to EPA officials, the information that ultimately gets reported on the 7520-4 form is based on a quarterly calculation of how long the well has been out of compliance; however, according to the officials, EPA only requires state and EPA-managed programs to submit 7520-4 forms to EPA semiannually.

[7]EPA, Office of Drinking Water, *FY 1987 Reporting Requirements—Underground Injection Control Program Guidance (UICP) Guidance #53* (Washington, D.C.: December 1986).

Our analysis of a sample of significant violations from selected state and EPA-managed programs found that a subset of significant violations that should have been reported on the 7520-4 forms were not reported, and that the forms contained incomplete and inconsistent information. Specifically, we sampled 134 notices of violation from selected state and EPA-managed programs, of which 93 included significant violations (see app. VI for a list of the enforcement cases we reviewed in the seven state and EPA-managed programs).[8] Table 7 shows the number and types of violation notices we assessed from our sample of 134 notices of violation, for fiscal years 2008 through 2013, for each state and EPA-managed program in our review.

Table 7: Summary of Types of Violations in 134 Notices of Violation from Selected State and EPA-Managed Programs Reviewed for Fiscal Years 2008 through 2013

State	Unauthorized injection	Mechanical integrity	Injection over pressure	Failure to plug	Violation of formal order	Pollution	Reporting
Colorado	1	9	1	1	0	0	3
Kentucky	18	11	1	1	0	0	2
North Dakota	1	19	1	4	0	0	1
Ohio	0	16	1	2	0	6	0
Oklahoma	17	21	1	0	1	1	16
Pennsylvania	4	2	0	0	0	0	0
Texas	3	17	0	16	0	0	0
Total	**44**	**95**	**5**	**24**	**1**	**7**	**22**

Legend: EPA = Environmental Protection Agency.

Source: GAO analysis of EPA and selected state data. | GAO-16-281

Notes: Although California was one of the eight states we selected, we chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA program requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Some state or EPA-managed programs may initiate a single enforcement case against an operator for multiple violations, so a single enforcement case may cover more than one type of violation, which may result in more violations

[8]For the purposes of this report, we refer to all written notifications to operators that they are in violation of state or EPA requirements as notices of violation. During our review of seven states, we noted that state or EPA-managed programs may initiate a single enforcement case against an operator for multiple violations, so a single notice of violation may cover more than one violation.

than enforcement cases from each program. Kentucky and Pennsylvania are EPA-managed programs.

To establish which of those 93 violations should have been reported on the 7520-4 form, we used EPA's 1987 Strategy and 1986 Program Reporting guidance, which call for state and EPA-managed programs to report information on significant violations that were not resolved within 90 days of discovery and also did not have a formal enforcement action taken against the well operator. To determine the 90-day allowable time frame, we calculated the number of days between the date the operator was notified of the violation and the date a formal enforcement action was taken,[9] and found that 29 significant violations had gone longer than 90 days without formal enforcement action and should have been reported on the 7520-4 form (see table 8). We then compared the results of our calculation to 7520-4 forms we obtained from EPA for fiscal years 2008 through 2013, and found that 7 of the 29 were reported by the respective program.

Table 8: Selected State and EPA-Managed Programs' Significant Violation Enforcement Actions from Fiscal Year 2008 through Fiscal Year 2013 and 7520-4 Reporting

State	Operator notification date[a]	First formal action date	Number of days from notification until formal action	Reported on 7520-4	Resolution Date
KY	12/11/2012	6/19/2014	555	Yes	9/8/2014
KY	9/11/2012	10/10/2013	394	Yes	Unresolved
KY	9/27/2012	10/22/2013	390	Yes	Unresolved
KY	9/16/2009	9/8/2010	357	Yes	Unresolved
KY	2/22/2012	11/27/2012	279	Yes	3/26/2014
KY	12/1/2012	8/28/2013	270	Yes	11/4/2013
KY	8/27/2013	3/7/2014	192	Yes	8/26/2014
OH	6/22/2004	3/16/2009	1,728	No	12/21/2009
OH	6/11/2008	12/12/2011	1,309	No	Unresolved
PA	8/13/2010	6/6/2011[b]	297	No	8/27/2012
PA	2/17/2009	7/1/2009	134	No	8/18/2009
PA	8/19/2011	12/22/2011	125	No	4/19/2012

[9]EPA's 1987 *Strategy* calls for state or EPA-managed programs to take action within 90 days of identifying the significant violation. GAO calculated this time frame using the number of days from the time the operator was notified of the significant violation to when the state or EPA-managed program took formal enforcement action, as defined by the *Strategy*. Using this calculation provides the most conservative estimate of the time that a program took to determine if the violation should have been reported to EPA on the state's appropriate 7520 form.

State	Operator notification date[a]	First formal action date	Number of days from notification until formal action	Reported on 7520-4	Resolution Date
TX	1/24/2007	2/9/2011	1,477	No	12/29/2014
TX	7/28/2008	10/19/2011	1,178	No	11/18/2013
TX	10/5/2009	7/12/2012	1,011	No	8/31/2013
TX	6/6/2008	10/8/2010	854	No	4/30/2014
TX	11/7/08	1/14/2011	798	No	Unresolved
TX	8/3/2006	5/12/2008	648	No	5/25/2012
TX	11/3/2010	4/5/2012	519	No	11/27/2012
TX	11/23/2010	4/20/2012	514	No	2/28/2014
TX	2/13/2008	5/28/2009	470	No	3/31/2012
TX	3/23/2011	4/30/2012	404	No	5/31/2013
TX	12/10/2009	12/15/2010	370	No	4/30/2012
TX	12/10/2009	12/15/2010	370	No	4/30/2012
TX	10/7/2010	9/14/2011	342	No	Unresolved
TX	4/10/2007	12/18/2007	252	No	8/31/2012
TX	9/14/2009	5/21/2010	249	No	5/9/2011
TX	2/11/2009	8/31/2009	201	No	10/31/2014
TX	9/28/2007	2/8/2008	133	No	12/29/2014
KY	12/11/2012	6/19/2014	555	Yes	9/8/2014

Legend: EPA = Environmental Protection Agency; KY = Kentucky, OH = Ohio, PA = Pennsylvania, TX = Texas.

Source: GAO analysis of EPA and selected state data. | GAO-16-281

Notes: We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Kentucky and Pennsylvania are EPA-managed programs.

[a]The operator notification date is the first documented date that the operator was notified of the violation.

[b]In reviewing a draft of this report, EPA stated that this date did not account for the earlier conclusion of a criminal case. The file we reviewed did not include documentation of an earlier criminal case, however.

Appendix VI: Information on Sample Enforcement Cases from Selected State and EPA-Managed Programs

Table 9: Summary of Enforcement Case Information in Selected State and EPA-Managed Programs We Reviewed

State	Violation type[a]	Significant violation	Operator notification date[b]	Date formal action started	Formal action(s) taken[c]	Date violation resolved	Monetary penalty
CO	Failure to plug	No	2/19/2010	8/2/2010	Admin	Unresolved[d]	No
CO	Mechanical integrity	No	6/17/2009	N/A	None	4/2/2010	No
CO	Mechanical integrity	No	8/30/2010	N/A	None	4/26/2011	No
CO	Mechanical integrity	No	7/7/2011	N/A	None	7/16/2013	No
CO	Reporting	No	3/18/2009	N/A	None	8/15/2013	No
CO	Injection over pressure; reporting	No	10/23/2012	2/11/2013	Consent	11/28/2012	Yes
CO	Mechanical integrity	No	4/17/2008	N/A	None	1/20/2010	No
CO	Mechanical integrity	No	1/31/2012	N/A	None	6/12/2013	No
CO	Reporting	No	3/18/2009	N/A	None	8/15/2013	No
CO	Mechanical integrity	No	6/4/2008	N/A	None	7/10/2009	No
CO	Mechanical integrity	No	4/17/2008	N/A	None	3/18/2009	No
CO	Mechanical integrity	No	8/30/2010	N/A	None	4/20/2011	No
CO	Mechanical integrity	No	11/20/2013	12/16/2013	Consent	1/27/2014	Yes
CO	Unauthorized injection	Yes	4/22/2013	7/8/2013	Consent	4/22/2013	Yes
KY	Unauthorized injection	Yes	9/11/2012	3/5/2014	Admin, Consent, Criminal	Unresolved	Yes
KY	Unauthorized injection	Yes	9/27/2012	10/22/2013	Consent	Unresolved	Yes
KY	Unauthorized injection	Yes	9/16/2009	9/8/2010	Consent	Unresolved	Yes
KY	Reporting	No	4/26/2010	1/19/2011	Consent	1/3/2011	Yes
KY	Unauthorized injection	Yes	3/25/2014	4/17/2014	Admin, Consent	1/7/2014	No
KY	Unauthorized injection	Yes	5/21/2009	5/21/2009	Admin, Consent, Criminal	2/18/2013	Yes
KY	Unauthorized injection; mechanical integrity; failure to plug	Yes	2/22/2012	11/27/2012	Consent	3/26/2014	Yes
KY	Pollution	Yes	12/11/2012	6/19/2014	Consent	9/8/2014	No
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	2/29/2008	5/22/2008	Admin, Consent	9/9/2009	Yes
KY	Mechanical integrity	Yes	6/13/2008	6/13/2008	Consent	9/9/2009	No

State	Violation type[a]	Significant violation	Operator notification date[b]	Date formal action started	Formal action(s) taken[c]	Date violation resolved	Monetary penalty
KY	Unauthorized injection	Yes	6/22/2009	6/22/2009	Admin	9/14/2010	No
KY	Unauthorized injection	Yes	4/6/2009	4/6/2009	Admin, Consent	4/6/2010	Yes
KY	Unauthorized injection; mechanical integrity	Yes	8/27/2013	3/7/2014	Admin	8/26/2014	No
KY	Unauthorized injection	Yes	8/8/2013	8/8/2013	Admin, Consent, Civil, Criminal	2/24/2014	Yes
KY	Unauthorized injection	Yes	8/8/2013	8/8/2013	Admin, Civil, Criminal	1/14/2014	No
KY	Unauthorized injection	Yes	12/18/2012	12/18/2012	Admin, Consent	5/16/2013	Yes
KY	Unauthorized injection	Yes	8/17/2011	8/17/2011	Admin, Consent	12/22/2011	Yes
KY	Unauthorized injection	Yes	11/10/2009	11/10/2009	Admin	2/16/2010	No
KY	Unauthorized injection	Yes	2/25/2011	11/15/2011	Consent	3/16/2011	Yes
KY	Unauthorized injection	Yes	8/17/2010	8/17/2010	Admin, Criminal	8/30/2010	No
KY	Unauthorized injection	Yes	6/2/2009	6/2/2009	Admin	6/9/2009	Yes
KY	Unauthorized injection	Yes	6/7/2010	6/7/2010	Admin	6/12/2010	No
KY	Injection over pressure	Yes	12/1/2012	8/28/2013	Consent	11/4/2013	Yes
ND	Mechanical integrity	No	Missing data	N/A	None	11/5/2009	No
ND	Mechanical integrity	No	12/21/2008	N/A	None	4/23/2009	No
ND	Mechanical integrity; reporting	No	4/1/2008	N/A	None	7/16/2008	No
ND	Mechanical integrity	No	11/19/2010	N/A	None	3/13/2012	No
ND	Mechanical integrity	No	3/10/2008	N/A	None	9/17/2008	No
ND	Mechanical integrity	No	6/2/2009	N/A	None	11/16/2009	No
ND	Mechanical integrity	No	3/25/2010	N/A	None	11/9/2010	No
ND	Mechanical integrity	No	11/17/2008	N/A	None	7/20/2009	No
ND	Mechanical integrity	No	9/17/2008	N/A	None	6/15/2009	No
ND	Injection over pressure	No	7/9/2009	N/A	None	07/27/2009	No
ND	Mechanical integrity	No	8/23/2011	N/A	None	10/2/2012	No
ND	Mechanical integrity	No	7/22/2011	N/A	None	11/16/2012	No
ND	Mechanical integrity	No	9/17/2008	N/A	None	2/11/2010	No
ND	Mechanical integrity	No	10/7/2013	N/A	None	8/3/2015	No
ND	Mechanical integrity; failure to plug	No	5/22/2013	N/A	None	Unresolved	No
ND	Mechanical integrity; failure to plug	No	10/10/2012	N/A	None	9/10/2015	No
ND	Mechanical integrity; failure to plug	No	9/6/2012	N/A	None	12/31/2014	No

State	Violation type[a]	Significant violation	Operator notification date[b]	Date formal action started	Formal action(s) taken[c]	Date violation resolved	Monetary penalty
ND	Mechanical integrity; failure to plug	No	9/30/2011	N/A	None	9/2/2014	No
ND	Unauthorized injection; mechanical integrity	No	2/3/2012	11/16/2012	Criminal	2/16/2012	Yes
ND	Mechanical integrity	No	7/30/2010	N/A	None	7/15/2015	No
OH	Failure to plug	Yes	6/11/2008	12/12/2011	Admin, Civil, Criminal	Unresolved	In Process
OH[d]	Failure to plug	Yes	6/22/2004	3/16/2009	Admin	12/21/2009	No
OH[d]	Mechanical integrity	Yes	3/16/2009	3/16/2009	Admin	6/25/2010	No
OH	Pollution	No	5/12/2011	6/21/2011	Admin	11/28/2012	Yes
OH	Pollution	No	5/24/2011	6/8/2011	Admin	2/16/2012	No
OH	Pollution	No	8/8/2011	8/9/2011	Admin	8/16/2011	No
OH[e]	Pollution	No	2/6/2013	2/6/2013	Admin, Civil, Criminal	2/6/2013	No
OH	Mechanical integrity	Yes	6/18/2008	6/19/2008	Admin	9/8/2009	No
OH	Mechanical integrity; pollution	Yes	5/4/2012	5/10/2012	Admin	9/4/2012	No
OH	Mechanical integrity	Yes	3/19/2009	3/19/2009	Admin	7/16/2009	No
OH	Mechanical integrity	Yes	12/4/2008	12/9/2008	Admin	3/5/2009	No
OH	Mechanical integrity	Yes	11/17/2009	11/19/2009	Admin	1/19/2010	No
OH	Mechanical integrity	Yes	12/29/2008	12/29/2008	Admin	2/20/2009	No
OH	Mechanical integrity	Yes	12/29/2008	12/29/2008	Admin	2/17/2009	No
OH	Mechanical integrity	Yes	2/2/2010	2/5/2010	Admin	3/23/2010	No
OH	Mechanical integrity	Yes	4/4/2011	4/4/2011	Admin	5/23/2011	No
OH	Mechanical integrity; injection above pressure	Yes	3/25/2009	3/26/2009	Admin	4/20/2009	No
OH	Mechanical integrity	Yes	11/17/2011	11/21/2011	Admin	12/12/2011	No
OH	Mechanical integrity	Yes	10/11/2012	10/22/2012	Admin	10/26/2012	No
OH	Mechanical integrity	Yes	11/1/2010	11/1/2010	Admin	11/16/2010	No
OH	Mechanical integrity	Yes	4/1/2008	4/1/2008	Admin	4/8/2008	No
OH	Mechanical integrity; Pollution	Yes	10/12/2007	10/15/2007	Admin	10/17/2007	No
OK	Unauthorized injection; Mechanical integrity; Reporting	Yes	10/10/2013	10/10/2013[f]	Pending[g]	Unresolved	Pending
OK	Unauthorized injection; mechanical integrity; reporting	Yes	3/16/2012	3/16/2012	Admin	9/21/15	No

State	Violation type[a]	Significant violation	Operator notification date[b]	Date formal action started	Formal action(s) taken[c]	Date violation resolved	Monetary penalty
OK	Unauthorized injection; mechanical integrity; pollution; reporting	Yes	11/19/2012	11/19/2012	Admin	11/4/2014	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	6/25/2012	6/25/2012	Admin	4/23/2013	No
OK	Unauthorized injection; mechanical integrity; reporting	Yes	12/30/2013	12/30/2013	Admin	10/7/2014	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	6/17/2013	6/17/2013	Admin	3/20/2014	Yes
OK	Unauthorized injection; reporting	Yes	1/6/2014	1/6/2014	Admin	10/2/2014	No
OK	Unauthorized injection; mechanical integrity; reporting	Yes	7/12/2013	7/12/2013	Admin	4/1/2014	Yes
OK	Mechanical integrity	Yes	6/8/2012	6/8/2012	Admin	1/15/2013	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	6/7/2012	6/7/2012	Admin	1/10/2013	Yes
OK	Mechanical integrity; violation of formal order; reporting	Yes	5/9/2011	5/9/2011	Admin	11/15/2011	Yes
OK	Mechanical integrity	No	11/14/2013	11/14/2013	Admin	10/1/2015	Yes
OK	Mechanical integrity	No	11/14/2013	11/14/2013	Admin	7/14/2014	No
OK	Mechanical integrity	Yes	4/26/2013	4/26/2013	Admin	10/22/2013	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	11/5/2013	11/5/2013	Admin	3/18/2014	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	6/17/2013	6/17/2013	Admin	10/10/2013	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	4/30/2013	4/30/2013	Admin	8/22/2013	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	3/13/2012	3/13/2012	Admin	6/28/2012	No
OK	Unauthorized injection; mechanical integrity; reporting	Yes	5/9/2011	5/9/2011	Admin	8/18/2011	Yes

State	Violation type[a]	Significant violation	Operator notification date[b]	Date formal action started	Formal action(s) taken[c]	Date violation resolved	Monetary penalty
OK	Unauthorized injection; mechanical integrity; reporting	Yes	6/23/2010	6/23/2010	Admin	9/30/2010	Yes
OK	Unauthorized injection; mechanical integrity; injection over pressure; reporting	Yes	3/8/2012	3/8/2012	Admin	5/31/2012	Yes
OK	Unauthorized injection; mechanical integrity; reporting	Yes	3/31/2011	3/31/2011	Admin	5/10/2011	Yes
PA	Mechanical integrity	No	5/21/2008	5/25/2010	Admin, Consent	6/17/2014	No
PA	Unauthorized injection	Yes	5/12/2011	5/12/2011	Admin	4/1/2014	No
PA	Unauthorized injection	Yes	8/13/2010	6/6/2011[h]	Admin, Consent, Criminal	8/27/2012	Yes
PA	Mechanical integrity	Yes	8/19/2011	12/22/2011	Admin, Consent	4/19/2012	Yes
PA	Unauthorized injection	Yes	2/17/2009	7/1/2009	Admin, Consent	8/18/2009	Yes
PA	Unauthorized injection	Yes	9/24/2010	9/24/2010	Admin, Consent	9/27/2010	Yes
TX	Mechanical integrity; failure to plug	Yes	11/7/2008	1/14/2011	Admin, Civil	Unresolved	Yes
TX	Mechanical integrity; failure to plug	Yes	10/7/2010	9/14/2011	Admin, Civil	Unresolved	Yes
TX	Unauthorized injection; failure to plug	Yes	2/11/2009	8/31/2009	Admin, Civil	10/31/2014	Yes
TX	Mechanical integrity; pollution	Yes	6/8/2009	8/18/2009	Admin, Civil	8/25/2011	Yes
TX	Mechanical integrity; failure to plug	Yes	1/24/2007	2/9/2011	Admin, Civil	12/29/2014	Yes
TX	Mechanical integrity; failure to plug	Yes	9/28/2007	2/8/2008	Admin, Civil	12/29/2014	Yes
TX	Mechanical integrity; failure to plug	Yes	6/6/2008	10/8/2010	Admin, Civil	4/30/2014	Yes
TX	Failure to plug	Yes	8/3/2006	5/12/2008	Admin, Civil	5/25/2012	Yes
TX	Mechanical integrity; failure to plug	Yes	4/10/2007	12/18/2007	Admin, Consent, Civil	8/31/2012	Yes
TX	Mechanical integrity	Yes	7/28/2008	10/19/2011	Admin, Civil	11/18/2013	Yes
TX	Mechanical integrity; failure to plug	Yes	7/15/2009	10/8/2009	Admin, Civil	1/15/2014	Yes
TX	Mechanical integrity; failure to plug;	Yes	2/13/2008	5/28/2009	Admin, Civil	3/31/2012	Yes
TX	Mechanical integrity; failure to plug	Yes	10/5/2009	7/12/2012	Admin, Civil	8/31/2013	Yes

State	Violation type[a]	Significant violation	Operator notification date[b]	Date formal action started	Formal action(s) taken[c]	Date violation resolved	Monetary penalty
TX	Mechanical integrity; failure to plug	Yes	11/23/2010	4/20/2012	Admin, Civil	2/28/2014	Yes
TX	Failure to plug	Yes	12/10/2009	12/15/2010	Admin, Civil	4/30/2012	Yes
TX	Mechanical integrity; failure to plug	Yes	12/10/2009	12/15/2010	Admin, Civil	4/30/2012	Yes
TX	Mechanical integrity; failure to plug	Yes	3/23/2011	4/30/2012	Admin, Civil	5/31/2013	Yes
TX	Mechanical integrity; unauthorized injection	Yes	11/3/2010	4/5/2012	Admin, Consent	11/27/2012	Yes
TX	Mechanical integrity	Yes	9/14/2009	5/21/2010	Admin, Consent, Civil	5/9/2011	Yes
TX	Mechanical integrity; failure to plug	Yes	10/9/2012	10/9/2012	Admin, Consent	12/31/2013	Yes

Legend: EPA = Environmental Protection Agency; CO = Colorado; KY = Kentucky; ND = North Dakota; OH = Ohio; OK = Oklahoma; PA = Pennsylvania; TX = Texas; N/A = not applicable, Admin = administrative order; Consent = consent agreement; Civil = civil judicial action; Criminal = criminal judicial action.

Source: GAO analysis of EPA and selected state data. | GAO-16-281

Notes: We chose not to include California in our detailed analysis of inspection and enforcement information from the states because EPA determined in July 2014 that California's program was not in compliance with state and EPA requirements. The results of our review of inspection and enforcement information reflect the seven remaining state and EPA-managed programs we reviewed. Kentucky and Pennsylvania are EPA-managed programs.

[a]This table includes only the most serious violations from each enforcement case.

[b]The operator notification date is the first documented date that the operator was notified of the violation.

[c]Formal actions taken can include administrative orders—both unilateral (admin) and negotiated (consent); civil judicial referrals (civil); and criminal judicial referrals (criminal). The ordering of the actions listed does not represent the order in which those actions took place in the enforcement process.

[d]According to Colorado officials, the well in violation is scheduled to be plugged by the state in 2016.

[e]Ohio's program requested EPA's assistance in this enforcement case. According to Ohio officials, with EPA's assistance, the violation was resolved.

[f]According to Ohio program officials, EPA pursued criminal judicial action, and Ohio's Environmental Protection Agency pursued civil judicial action, against the operator.

[g]According to Oklahoma program officials, after discovering a violation, the program will issue a citation ordering the well operator to appear before an administrative law judge. The citation does not conform to EPA's definition of a formal enforcement action. However, because in many cases Oklahoma did not issue a formal order for 1 to 2 more years following the citation, and because those orders tended to be final orders memorializing the fact that the violation had already been resolved, we used the citation date as the date that formal enforcement action began.

[h]The well operator went out of business prior to Oklahoma issuing an administrative order or consent order.

[i]In reviewing a draft of this report, EPA stated that this date did not account for the earlier conclusion of a criminal case. The file we reviewed did not include documentation of an earlier criminal case, however.

Appendix VII: Comments from the Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Mr. J. Alfredo Gomez
Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

FEB 10 2016

Dear Mr. Gomez:

Thank you for the opportunity to review and comment on the Government Accountability Office's Draft Report GAO-16-281, "DRINKING WATER: EPA Needs to Collect Information and Consistently Conduct Activities to Protect Underground Sources of Drinking Water." In this draft report, GAO reviewed the U.S. Environmental Protection Agency's oversight of state and EPA Class II Underground Injection Control programs (i.e., pertaining to oil and gas-related injection fluids). GAO evaluated the EPA's collection of inspection and enforcement records to determine whether the agency is conducting the oversight activities needed to assess the Class II UIC program's protection of underground sources of drinking water. The purpose of this letter is to provide the EPA's response to your findings, conclusions and recommendations. We also provide technical comments in a separate document.

The agency has an important role in oversight of the UIC programs administered by the states and directly implemented by EPA Regions, and is continually working to improve its oversight to ensure protection of underground sources of drinking water. Oversight of state UIC programs is the joint responsibility of several EPA offices, including the EPA Headquarters' Office of Water and Office of Enforcement and Compliance Assurance as well as the EPA Regional water program and enforcement offices. In addition to their state program oversight responsibilities, the EPA Regional offices are also responsible for direct implementation of the UIC program in states that do not have primary enforcement responsibility. Additionally, although all state UIC programs have the goal of effectively protecting USDWs, Class II injection regulations differ by state according to their geology, hydrology and injection needs. Therefore, each state program may have requirements and solutions tailored to its individual circumstances. While GAO's investigation focused on UIC activities associated with oil and gas, the agency's efforts encompass all six well classes, including more than 650,000 injection wells, which are overseen by 59 state agencies and the 10 EPA Regional offices. Any discussion of oversight responsibilities and resource needs will be relevant to the entire UIC program.

The agency acknowledges that oversight and data management are two long-term challenges, especially in light of significant variations in state Class II programs, as allowed by the Safe Drinking Water Act. The agency is in the process of modernizing EPA's well inventory and compliance data collection and focusing its oversight resources on priority risks to public health. The agency's oversight helps ensure that the states, tribes and territories, who have been granted primacy under the SDWA for the UIC program, are implementing their programs consistent with the statute and relevant state and federal UIC regulations. The statute and regulations require that Class II UIC programs permit underground injection wells in a manner that is protective of USDWs. As noted above, the EPA Regional water and

enforcement programs conduct the primary oversight of state UIC programs. In addition to a significant level of informal coordination, the EPA's state UIC program oversight consists of the following efforts, conducted annually:

- Setting state/regional targets, tracking progress and reporting for EPA's National Water Program Activity Measures;
- Collecting, reviewing and confirming state UIC Annual Program Reports and well inventories;
- Collecting, reviewing and compiling compliance and enforcement reports (EPA 7520 forms);
- Developing a grant workplan with each state to target UIC program needs with funds and activities;
- Collecting and reviewing UIC program grant expenditure reporting; and
- Conducting an informal evaluation of state/tribal UIC program performance against workplan objectives and targets during the grant year to identify and resolve any performance issues.

EPA Regional UIC programs work with states to improve their UIC programs with the information collected annually through the above activities, as well as with the knowledge developed through informal exchanges, such as compliance assistance and program and policy updates. The EPA Regions also provide training, technical support and guidance to states on issues of national significance in coordination with EPA Headquarters. States develop and prioritize UIC annual activities with agency input to optimize UIC program implementation. This approach allows for frequent interaction between states and the EPA as well as the flexibility for the agency to target oversight efforts in quick response to emerging UIC issues.

As needed, Regional EPA UIC programs conduct more extensive, formal evaluations of state UIC programs. Some evaluative efforts are broad in scope, covering the entire program. Other evaluations are more targeted toward specific concerns such as injection induced seismicity. EPA Headquarters may participate actively in either broad or targeted evaluations. Both types of evaluations require extensive planning and coordination between the states and the agency. Some Regions incorporate compliance and enforcement into a broader program review, while others evaluate them separately, depending on how the regional water and enforcement offices are organized. Once the agency completes the review and analysis of information in concert with the state agency, the EPA prepares a document that includes recommendations, as appropriate, to help the state more effectively implement its UIC program. All of these efforts are designed to ensure regulatory safeguards are in place, and to improve implementation and understanding of state and EPA UIC programs across the nation.

EPA agrees with GAO that having high quality data is an important part of these oversight activities. Collection of well-specific data continues to be a key goal for the EPA. Although we do not think that it makes sense now to require the states to submit well-specific data, we will continue to work with our state partners to improve both the collection and the quality of the data currently required and to expand EPA's access to additional state data. The agency also agrees that continued improvement in collection and consistency of data via the 7520-4 form would be valuable to more effective oversight. The agency created a standard operating procedure for 7520 forms in response to GAO's 2014[1] report to improve consistency in reporting. The agency will provide additional materials to states and Regions to clarify how they should complete the 7520-4 form to further ensure the information is consistent and complete.

[1] *Drinking Water: EPA Program to Protect Underground Sources from Injection of Fluids Associated with Oil and Gas Production Needs Improvement*, GAO-14-555 (Washington, DC: June 27, 2014)

The agency disagrees with GAO's assessment that the EPA is deficient in its duties to maintain aquifer exemption records. The draft report presents incomplete information as to which materials are held at the EPA Headquarters and Regional levels and the roles and objectives that EPA Headquarters and the Regions play regarding aquifer exemptions and the use of data. The GAO asserts that, "EPA does not have sufficient information on aquifer exemptions to oversee state and EPA-managed programs and assess whether programs are protecting underground sources of drinking water." This statement is incorrect. The EPA Regions hold the most current and comprehensive data on aquifer exemption requests and approvals for their states to support their review and approval. EPA Headquarters is collecting selected data from the Regions on approved aquifer exemptions throughout the nation to develop a national data set that it plans to release publicly in 2016.

While the EPA agrees that oversight is an important aspect of ensuring an effective UIC program, a workforce analysis is not necessary to better assess the resources needed to oversee the implementation of the UIC Class II program. Rather, we will assess and, if necessary, expand our current evaluation of UIC program oversight to include elements of inspection and enforcement. Once the evaluation is complete, we would look to improve the effectiveness of state and EPA UIC oversight if needed.

GAO Recommendations and EPA Response:

To help ensure protection of underground sources of drinking water from the injection of fluids associated with domestic oil and gas production, GAO recommends that EPA take four actions.

Recommendation 1: ***Require and collect well-specific data on inspections from state and EPA-managed programs, including when the wells were inspected, the types of inspections conducted, and the results of the inspections in order to track progress toward state and EPA-managed annual inspection goals.***

EPA Response: The agency's goal is to obtain high quality data to understand program activities at the well-specific level, and we are working toward establishing a complete, regularly updated data set. While we agree that this information is important, we are mindful of the need to think carefully about instituting new reporting requirements. Such requirements could necessitate state UIC programs to direct limited resources to develop new reporting structures and additional data input, potentially distracting from the inspection work in the states. The existing approach was developed with the input from state regulators who are closest to the ground, and any change in approach should continue to take advantage of state knowledge and expertise. Because we agree that this type of information is valuable, we will continue to explore options to improve collection of data and use of existing tools in accordance with reporting requirements and work to expand the agency's access to well-specific inspection and enforcement data. If the agency were to consider further changes to the 7520 reporting forms in the future, we would continue to work with state co-regulators to make sure that reporting is as efficient and useful as possible.

The current mechanism for required reporting from the states is the set of 7520 forms for summary information. In its previous report, GAO identified room for improvement in this collection activity and the agency has taken steps to address these gaps, including developing standard operating procedures for submission and review of the data forms and revising instructions to increase consistency in reporting the data to the EPA. As a result of these efforts, we expect improved information from future submissions to allow for better assessment of program activities.

We also continue to increase the inventory of well-specific data in our National UIC Database. We have made data collection from EPA-managed programs a priority and currently have well-specific inspection data for EPA-managed programs in all EPA Regions. Additionally, we continue to work with state programs to encourage them to share well-specific inspection data. While GAO correctly notes that the only non-EPA Class II programs currently using the database as their official database of record are the State of Montana and the Navajo Nation, there are other states working towards e-reporting status and we welcome and encourage further participation. Finally, we continue to work with the Ground Water Protection Council and the Department of Energy as they develop a National Oil and Gas Gateway for well-specific state data. Although the Gateway does not include inspection data, its well-specific inventory data is valuable to the agency's ability to understand and help improve states' Class II primacy programs.

Recommendation 2: ***Complete the aquifer exemption database and a way to update it to provide EPA headquarters and Regions with sufficient information of aquifer exemptions to oversee state and EPA-managed programs.***

EPA Response:

EPA Headquarters is engaged in an effort to collect, standardize and centralize aquifer exemption boundaries and other key data from the EPA Regional offices. The agency initiated this effort to better understand the number, the locations and the nature and quality of aquifers exempted by the UIC program. Our intent is also to share key information with the public to improve transparency. The EPA Regional offices hold the most comprehensive and current data on aquifer exemptions as they conduct the final review of exemption requests and must approve all exemptions.

We expect to release a public data set by the end of 2016, which will include data current through 2015, with the exception of Region 9's data for the State of California. The public data set will show the approved aquifer exemption boundaries in two dimensions as well as information such as depth of injection, surrounding geology and injectate characteristics. We anticipate adding Region 9's aquifer exemption data for California as the Region works with the state to clarify the boundaries of the agency's historic approvals and takes action on the state's requests for new exemptions. EPA plans to update the central public data set annually, and the Regions will continue to hold the most current data. Public notification in the local area, including the exemption request documentation and the opportunity for public comment, accompanies all new requests for aquifer exemptions. The public will retain the ability to obtain information about aquifer exemptions from the EPA Regions between annual updates of the national data set.

Recommendation 3: ***Clarify guidance on what data should be reported on the 7520-4 form to help ensure that the data collected are complete and consistent across state and EPA-managed programs and to provide the information EPA needs to assess whether to take enforcement action.***

EPA Response: The 7520-4 form is used to track specific wells in significant non-compliance, which a primacy program has not addressed with an enforcement action or that have not returned to compliance for two or more quarters. The agency agrees that the form is a tool for obtaining important information used in assessing enforcement activities and that providing guidance on the 7520-4 could be valuable to improve the quality of information the agency receives. The current 7520 standard operating procedures that the EPA created in response to GAO's previous report reminds reviewers that wells in significant

non-compliance for two or more quarters should remain listed on the 7520-4 until the issue is resolved. This procedure was established to address an area where reporting has been inconsistent. The agency will provide further materials to UIC data submitters, to improve completeness and consistency of the data a UIC program reports on form 7520-4, within six months of GAO's final report.

Recommendation 4: ***EPA should conduct a workforce analysis to identify the resources EPA needs to conduct program oversight.***

EPA Response: The EPA agrees that oversight is an important aspect of ensuring an effective UIC program; however, a workforce analysis is not necessary to better assess the resources needed to oversee the implementation of the UIC Class II program. In response to GAO's previous report, we are working with the UIC program managers to evaluate the effectiveness of our current oversight activities. The EPA believes the best approach is to expand this evaluation to include elements of inspection and enforcement. Once the evaluation is complete, we would look to improve the effectiveness of state and EPA UIC oversight if needed. For example, piloting a project that would explore the potential to assure program implementation by use of remote approaches, such as data collection, data analysis, targeting and priority ranking, and public transparency, may provide a viable option for increased oversight.

The agency appreciates the efforts that GAO expended in conducting this review. The agency generally agrees with GAO's analysis and findings on the UIC Class II program as reflected in our responses. Thank you for the opportunity to provide comments on the draft report. The EPA looks forward to working collaboratively with GAO to continue to protect drinking water sources and public health. If you have any questions, please contact Holly Green at (202) 566-0651 or Gwendolyn Spriggs at (202) 564-2439.

Sincerely,

Cynthia Giles
Assistant Administrator
Office of Enforcement and Compliance Assurance

Joel Beauvais
Deputy Assistant Administrator
Office of Water

Enclosure

cc: EPA GAO Liaison Team
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Appendix VIII: GAO Contact and Staff Acknowledgments

GAO Contact:

J. Alfredo Gómez, (202) 512-3841 or gomezj@gao.gov

Staff Acknowledgments

In addition to the contact named above, Susan Iott (Assistant Director), Mark Braza, Antoinette Capaccio, John Delicath, John Hocker, Rich Johnson, Micah McMillan, Maria Stattel, Kiki Theodoropoulos and Breanna Trexler made key contributions to this report.

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