

**Oilfield Impacts and the  
North Dakota Department of Health  
Environmental Health Section**

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Environmental Health Section  
North Dakota Department of Health  
918 East Divide Avenue  
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# Oilfield Impacts and the North Dakota Department of Health Environmental Health Section

## I. Background

The Environmental Health Section of the North Dakota Department of Health (NDDoH) is responsible for safeguarding North Dakota’s air, land and water resources. The section, which has 174 employees, works closely with local, state and federal entities to address public and environmental health concerns and implement protection policies and programs. The section has a Chief’s Office and five divisions: Air Quality, Laboratory Services, Municipal Facilities, Waste Management and Water Quality.

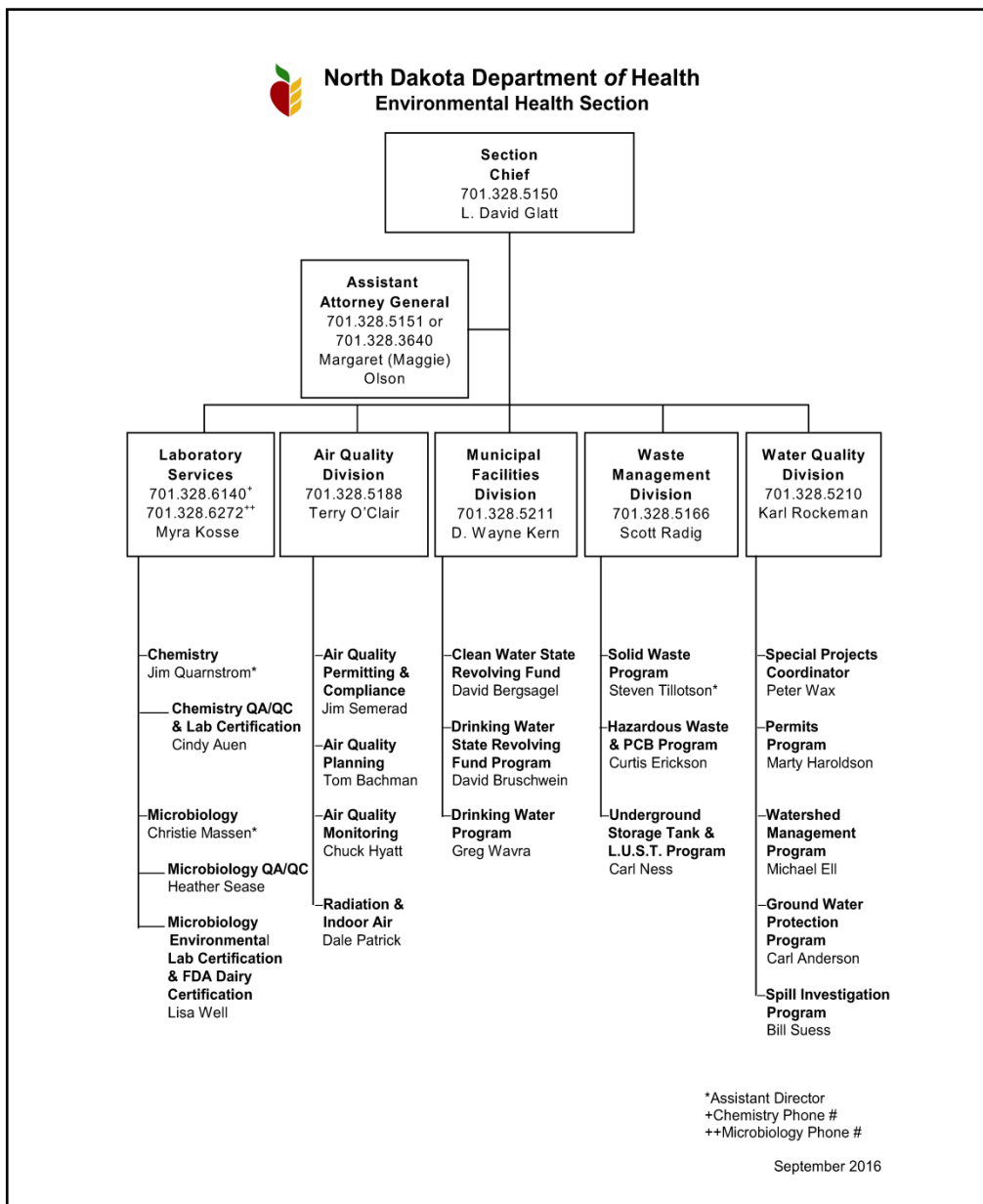


Figure 1. Environmental Health Section Organizational Chart

## **A. Division of Air Quality**

The Division of Air Quality consists of two major programs with 36 full-time positions and one half-time position. There are 23.5 environmental scientist positions, one environmental sciences administrator, and six environmental engineers which all require the minimum of a four-year degree. In addition, there are three electronic technicians and one data processing coordinator who have two-year technical degrees, and two administrative support staff.

### Air Pollution Control Program

This program promotes clean air activities, conducts compliance activities and initiates enforcement actions to correct air pollution problems. Program staff responsibilities include implementing the Clean Air Act, evaluating permit applications, conducting computer modeling of potential impacts to air quality, issuing permits that restrict emission levels to ensure standards are met and operating an ambient air quality monitoring network.

### Radiation Control and Indoor Air Quality Program

This program performs two major functions: (1) regulating the development and use of ionizing and non-ionizing radiation sources to protect North Dakotans and the environment, and (2) evaluating and mitigating asbestos, radon, lead and other indoor air quality concerns, as well as implementing a public awareness and education program concerning these health risks.

Field activities supporting the above programs include inspecting facilities to ensure compliance, enforcing laws, investigating air pollution complaints and operating a statewide ambient air quality monitoring network.

## **B. Division of Laboratory Services**

The Division of Laboratory Services has two principal support programs. There are 35 full-time employees. Twenty-six are professional microbiologists or chemist positions requiring the minimum of a four-year degree, and nine are support staff, including four medical laboratory technicians and two chemistry laboratory technicians who have two-year degrees.

### Chemistry

The chemistry laboratory provides analytical chemistry data to environmental protection, public health, agricultural and petroleum regulatory programs in the state. The laboratory also maintains a certification program for North Dakota laboratories that provide environmental testing services. The department's environmental protection programs use laboratory data to monitor and/or regulate air quality; solid and hazardous waste; municipal wastewater; agricultural runoff; surface, ground and drinking water quality; petroleum products; and other media of environmental or public health concern.

### Microbiology

The microbiology laboratory (i.e., the public health laboratory) performs testing in the areas of bacteriology, mycology, parasitology, immunology, virology, molecular diagnostics, bioterrorism response, and dairy and water bacteriology. The laboratory is responsible for providing rapid, accurate detection and identifying organisms that may threaten public health.

### **C. Division of Municipal Facilities**

The Division of Municipal Facilities administers three programs. There are 31 full-time employees. Fifteen are environmental scientists, and 13 are environmental engineers requiring the minimum of a four-year degree. There is one grants/contract officer position, which also requires a four-year degree, and two administrative support personnel.

#### Public Water Supply Supervision (PWSS)

This program works with the public water systems (PWS) in North Dakota (currently 571) to ensure drinking water meets all standards established by the Safe Drinking Water Act (SDWA). This is accomplished by monitoring drinking water quality and providing technical assistance. Currently, 96.8 percent of community water systems are meeting all applicable health-based standards under the SDWA – one of the highest compliance rates in the region and country (EPA goal for 2015 is 92 percent nationwide).

Training and certification is provided for operators of water treatment and distribution facilities and wastewater collection and treatment plants. There are about 1,141 certified operators in the state. A total of 93 percent of public water systems are meeting operator certification requirements for water treatment (no EPA goal). There are 79 percent of community water systems meeting operator certification requirements for water distribution (no EPA goal).

Staff administer the fluoridation program and provide technical assistance to private systems. A total of 68 communities add fluoride to their drinking water. Of the population served by these communities, 95 percent (about 619,054) receive optimally fluoridated drinking water (no EPA goal).

#### Drinking Water State Revolving Loan Fund (DWSRF)

This program provides low-interest loans to help public water systems finance the infrastructure needed to comply with the SDWA. Since program inception (1997) through December 31, 2015, loans totaling about \$424 million have been approved. Staff members also review drinking water projects to ensure compliance with state design criteria before construction and provide technical assistance.

#### Clean Water State Revolving Loan Fund (CWSRF)

This program provides low-interest loans to fund conventional wastewater and nonpoint source pollution control needs. Since program inception (1990) through December 31, 2015, loans totaling about \$825 million have been approved. Staff members also review wastewater projects to ensure compliance with state design criteria before construction and provide technical assistance.

Field activities supporting the above programs include: (1) inspecting about 606 public water and wastewater systems to ensure compliance with all public health standards, (2) inspecting State Revolving Loan Fund construction projects to ensure they meet state and federal requirements, and (3) investigating complaints.

### **D. Division of Waste Management**

The Division of Waste Management works to safeguard public health through four programs. There are 25 full-time positions and one half-time position, consisting of 15.5 environmental scientist positions, five environmental engineers, one environmental sciences administrator, the division director (all of which require the minimum of a four-year degree), and three administrative support staff.

### Hazardous Waste Program

This program regulates 760 facilities that generate, store, treat, dispose or transport hazardous waste. The program also coordinates assessments and cleanups at Brownfield sites (properties underdeveloped due to actual/perceived contamination) and performs inspections at sites known or suspected to have equipment containing polychlorinated biphenyls (PCBs).

### Solid Waste Program

This program regulates the collection, transportation, storage and disposal of nonhazardous solid waste. Resource recovery, waste reduction and recycling are promoted. The program helps individuals, businesses and communities provide efficient, environmentally acceptable waste management systems. There are 448 facilities under this program and about 880 permitted waste transport companies.

### Underground Storage Tank Program

This program regulates petroleum and hazardous substance storage tanks, establishes technical standards for the installation and operation of underground tanks, maintains a tank notification program, establishes financial responsibility requirements for tank owners and provides for state inspection and enforcement. The program works with retailers and manufacturers to ensure specifications and standards for petroleum and antifreeze are met. There are 935 facilities currently regulated under this program. In addition, the UST Program supervises the cleanup of any leaking underground storage tank facility and other petroleum product releases.

### Abandoned Motor Vehicle Program

The Abandoned Motor Vehicle Program focuses on assisting political subdivisions in the cleanup of abandoned motor vehicles and scrap metal.

Field activities supporting the above programs includes compliance assistance, sampling, training, site inspections and complaint investigations.

## **E. Division of Water Quality**

The Division of Water Quality protects water quality through five programs. There are 38 full-time positions, consisting of 29 environmental scientists, four environmental sciences administrators, four environmental engineers (all of which require the minimum of a four-year degree) and one administrative assistant.

### North Dakota Pollutant Discharge Elimination System (NDPDES) Permit Program

This program issues the federally required National Pollutant Discharge Elimination System (NPDES) permits for discharge of pollutants to surface waters. This may include pollutants carried by stormwater, in addition to direct discharge of wastewater. Many industries and municipalities require these permits. This program also issues permits to septic tank pumpers regulating the collection and proper disposal of domestic wastewater. The permits may be individual permits issued to one facility or general permits where multiple facilities are covered under one permit.

### Watershed Management Program

This program monitors the health of North Dakota watersheds through sampling and analysis of water quality and aquatic life in lakes, rivers, streams and reservoirs. For those water bodies that are not usable for their designated use, plans are developed to achieve improvements in water quality. These

plans are implemented in conjunction with the local conservation districts and landowners. This program also provides cost share assistance, information and education to help meet water quality goals.

#### Ground Water Protection Program

This program includes the (1) Wellhead and Source Water Protection Programs to define the susceptibility of public water systems to contaminant sources, (2) Underground Injection Control (UIC) Program which helps prevent contamination of drinking water by injection wells, and (3) Ambient Ground Water Monitoring Program which assesses the quality of ground water resources with regard to agricultural and oilfield-related chemical contamination. In addition, trained personnel provide immediate response to emergency spills and continued investigation/enforcement if necessary to fully address environmental impacts. Program staff also fulfill open records requests typically received as part of property transactions or as Freedom of Information Act requests from the general public.

#### Spill Investigation Program

This program receives and reviews all the spill reports for the state, and responds with the assistance of other EHS divisions and other agencies. The response may include the collection of additional information, assignment to other agencies, field inspection and on-scene coordination. Staff with this program collect environmental samples of soil and water, and work with the responsible party to ensure spills are remediated and waters of the state, both ground and surface water, are protected. To provide a timely response to a critical incident, this program maintains two staff in the field five days a week and one staff person on call weekends and holidays. One staff person maintains phone coverage 24 hours a day, seven days a week in case of an incident. Staff members also work with various industries to help prepare for response to an incident and to educate them on proper remediation and assessment of a spill.

Field activities supporting the above programs include inspecting wastewater treatment facilities and septic tank pumpers, and compliance audits/sampling to ensure permit requirements are met; inspecting construction and industrial site stormwater controls; meetings with local/state entities to assess nonpoint source project goals; ambient monitoring of lakes and rivers; evaluating domestic water sources for potential contaminant sources; annual collection/analysis of samples from vulnerable aquifers; overseeing remediation of spills with potential to reach water sources; and responding to complaints.

#### **F. Section Chief's Office**

Division activities are coordinated by the Section Chief's Office, which has 8.25 full-time employees (FTEs) and an attorney assigned by the Office of Attorney General. Employees oversee quality assurance procedures; help coordinate public information efforts; assist with staff training; and coordinate computer and data management activities, emergency response efforts, enforcement of environmental regulations and funding requests. The Chief's Office works with the section's divisions, various government agencies, industry and the public to set environmental protection policy and ensure the proper implementation of environmental protection programs.



## II. Impacts of Oilfield Activity

### A. Division of Air Quality

Expanded activity in the oilfield has increased the workload in the division due to the number of licensing/permitting, inspection, enforcement and air quality complaint response activities.

The number of air pollution sources in the state has increased due to oil activity, resulting in an increase in workload (Figures 2, 3, 4 and 5). The number of oil wells registered in the state has risen from less than 2,000 to nearly 10,000 (Figure 6). Similar increases have been seen in the number of regulated crude oil storage tanks, compressor stations and gas plants.

The increase in the number of regulated air pollution sources, as well as increasing regulatory requirements/complexity, has resulted in the continued need for significant staff expertise and resources.

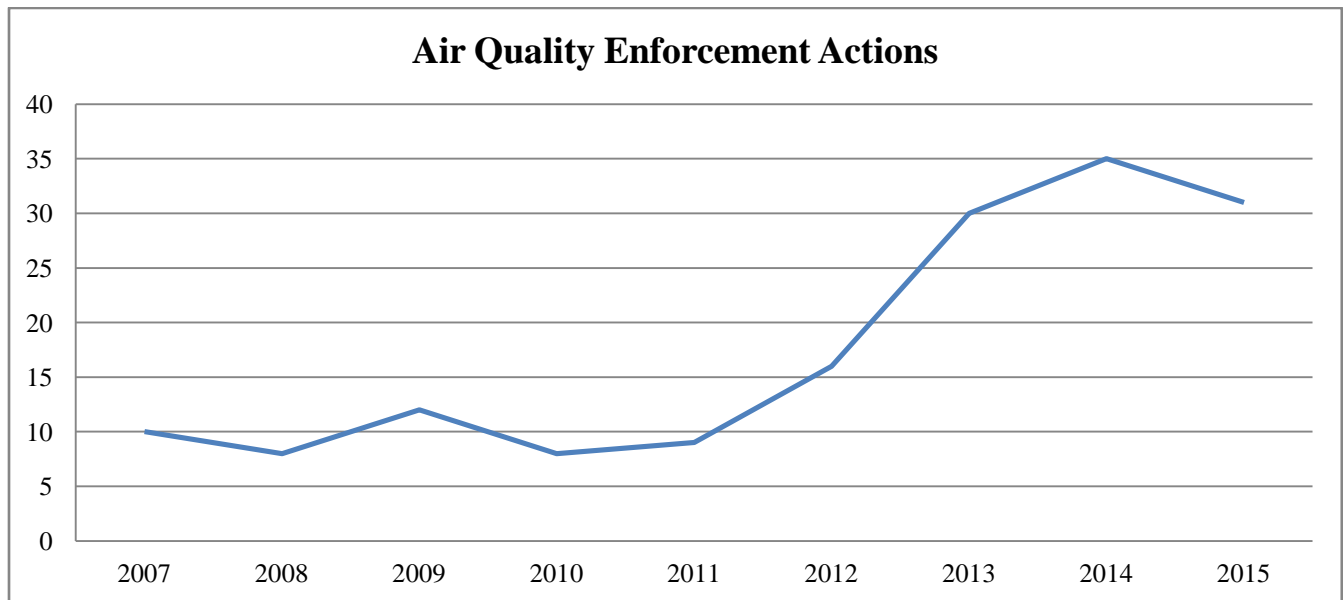
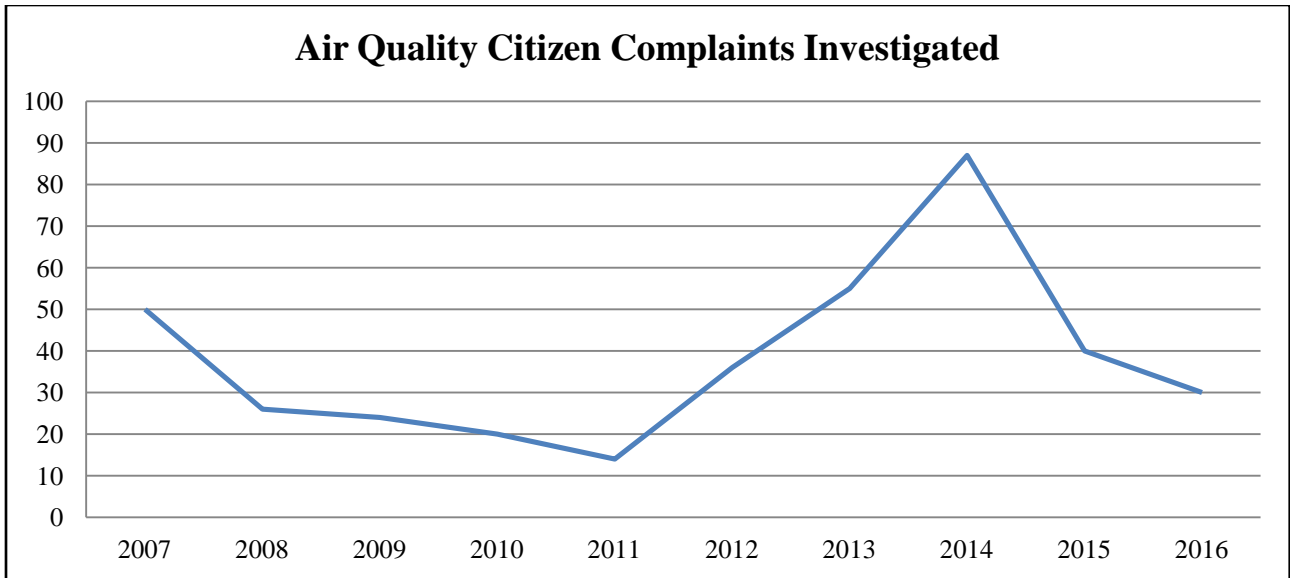
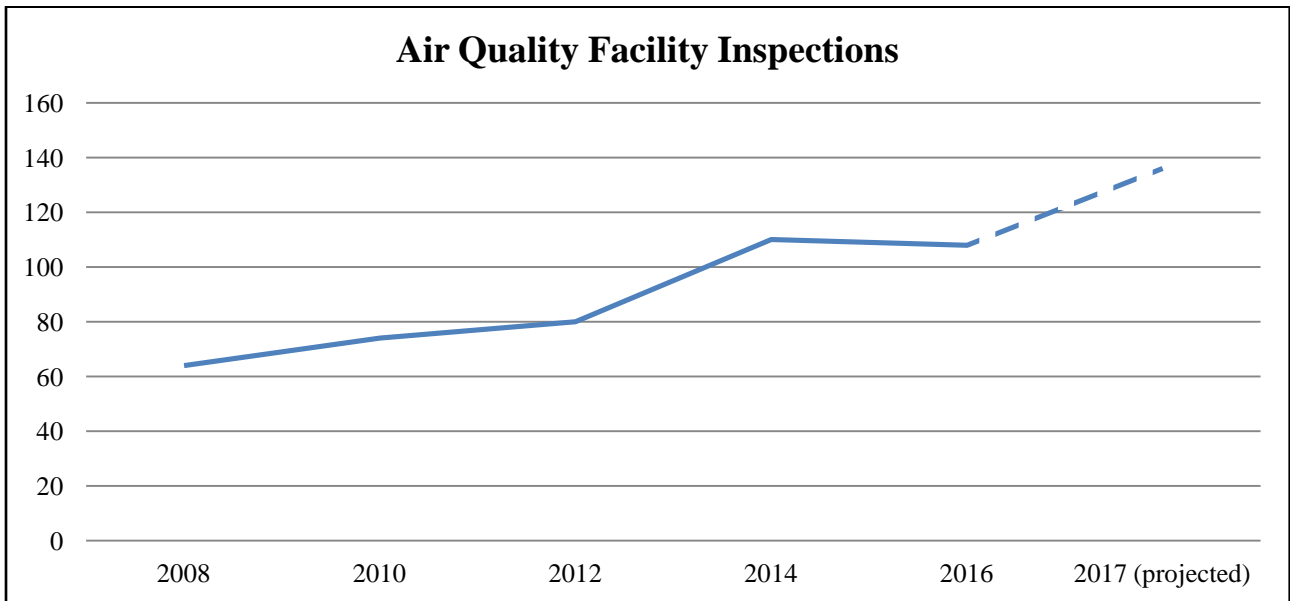


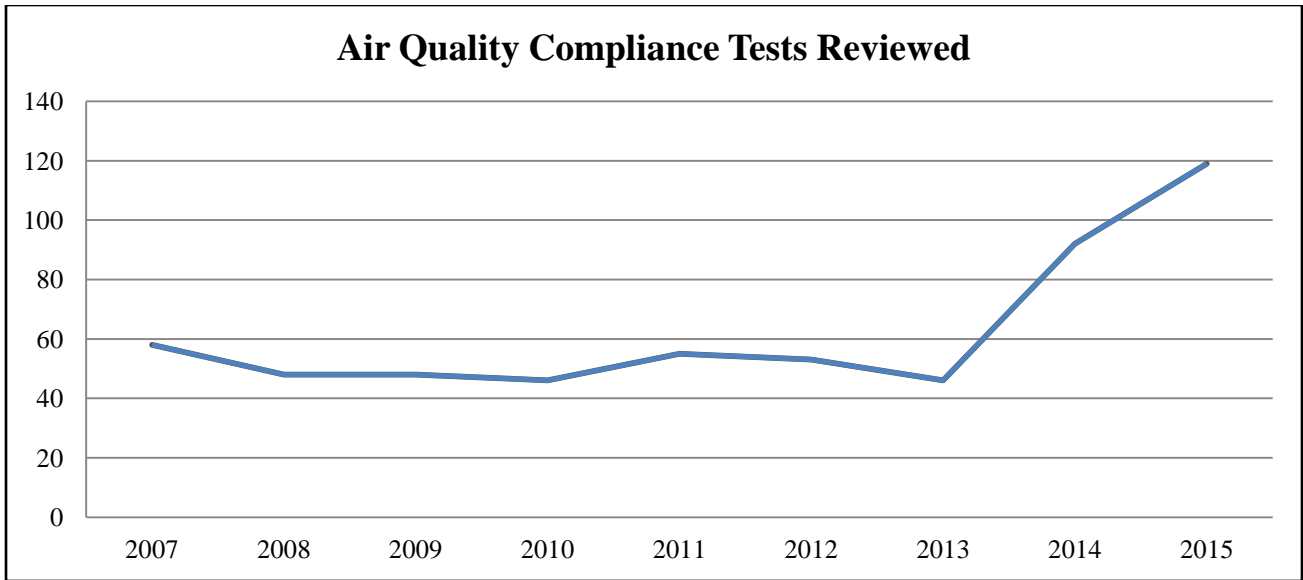
Figure 2. Air Quality Enforcement Actions



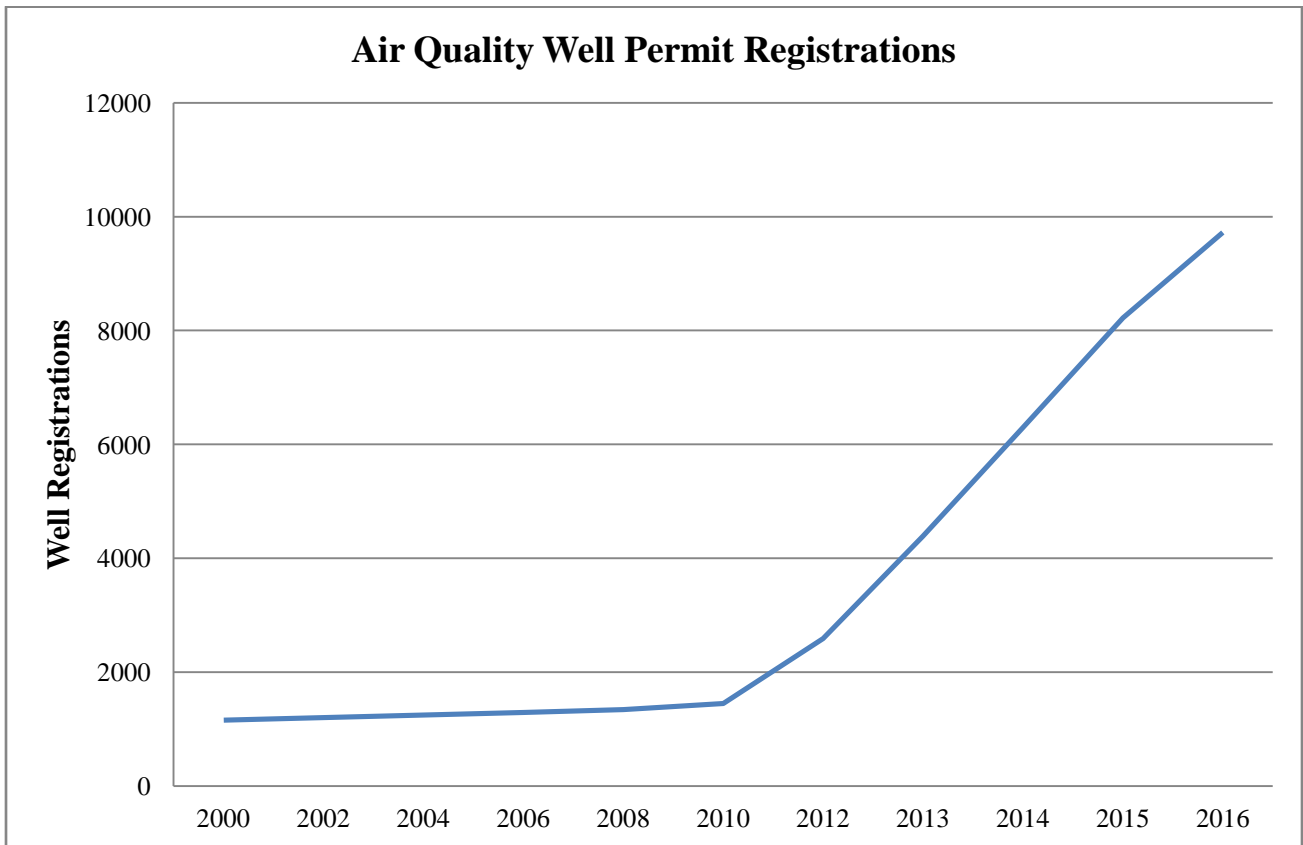
**Figure 3. Air Quality Citizen Complaints Investigated**



**Figure 4. Air Quality Facility Inspections**



**Figure 5. Air Quality Compliance Tests Reviewed**

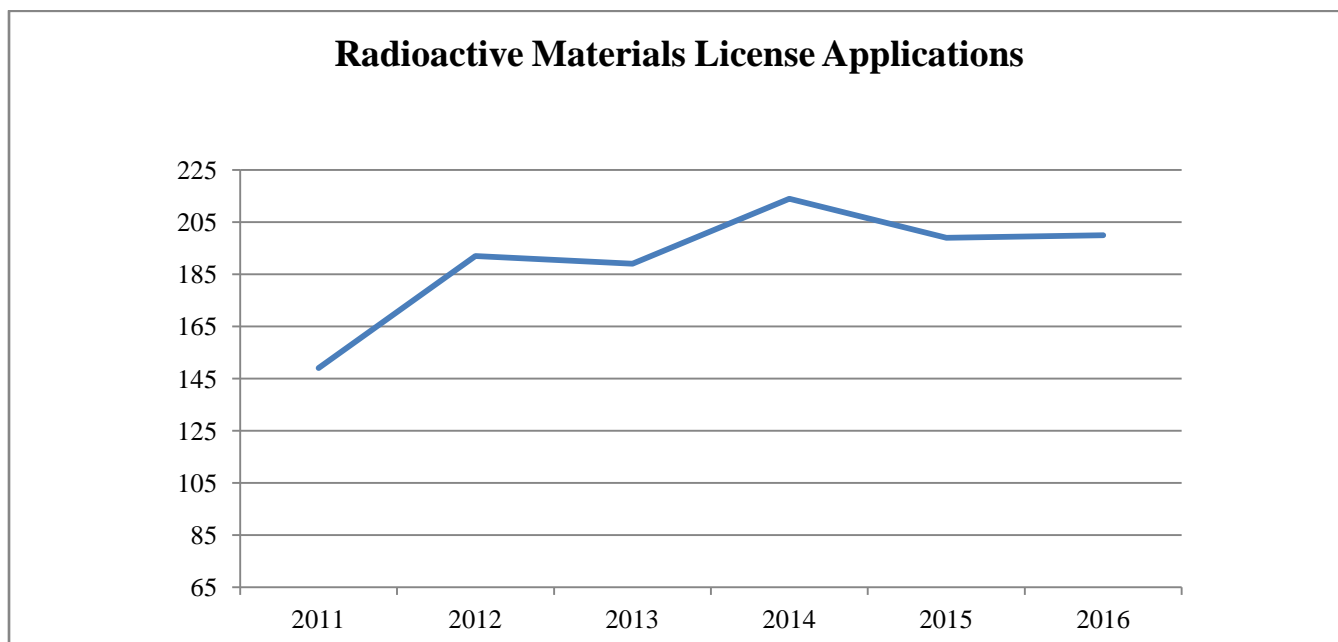


**Figure 6. Air Quality Well Permit Registrations**

Many companies in the oilfield use instrumentation technologies containing radioactive material, and there has been a large increase in the number of companies actively using such materials. Several operators have been identified as improperly using these materials, potentially placing members of the public and the environment at risk. In response, the NDDoH has investigated an increasing number of allegations regarding improper handling of radioactive materials.

Radioactive materials license activities have stabilized to about 200 per year since 2014 (Figure 7). This is partly due to the impact of the recent downturn in oil and gas exploration and production activities.

The NDDoH published TENORM (Technologically Enhanced, Naturally Occurring Radioactive Materials) rules, which became effective January 1, 2016. As a result, the NDDoH has increased the number of public and industry informational workshops it conducts. In addition, increased workload demands have been placed upon the division as a result of the licensure of all TENORM radioactive waste transporters, the increase in the number of facilities that treat TENORM and the increased frequency in inspections of these facilities.



**Figure 7. Radioactive Materials License Applications**

Additional direct and indirect impacts on the division include:

- Expansion of the Tesoro Refinery, plus permitting work for proposed diesel refineries and a full-scale gasoline refinery.
- Increased compliance activities (inspections, testing/report reviews, etc.) relating to the new Dakota Prairie Refining diesel refinery.
- Increased permitting and compliance activities relating to gas plants, compressor stations and oil storage terminals.
- Extensive effort on Bakken Pool Permitting and Compliance Guidance Document for oil wells.
- Increased telephone and email inquiries pertaining to air pollution control requirements.

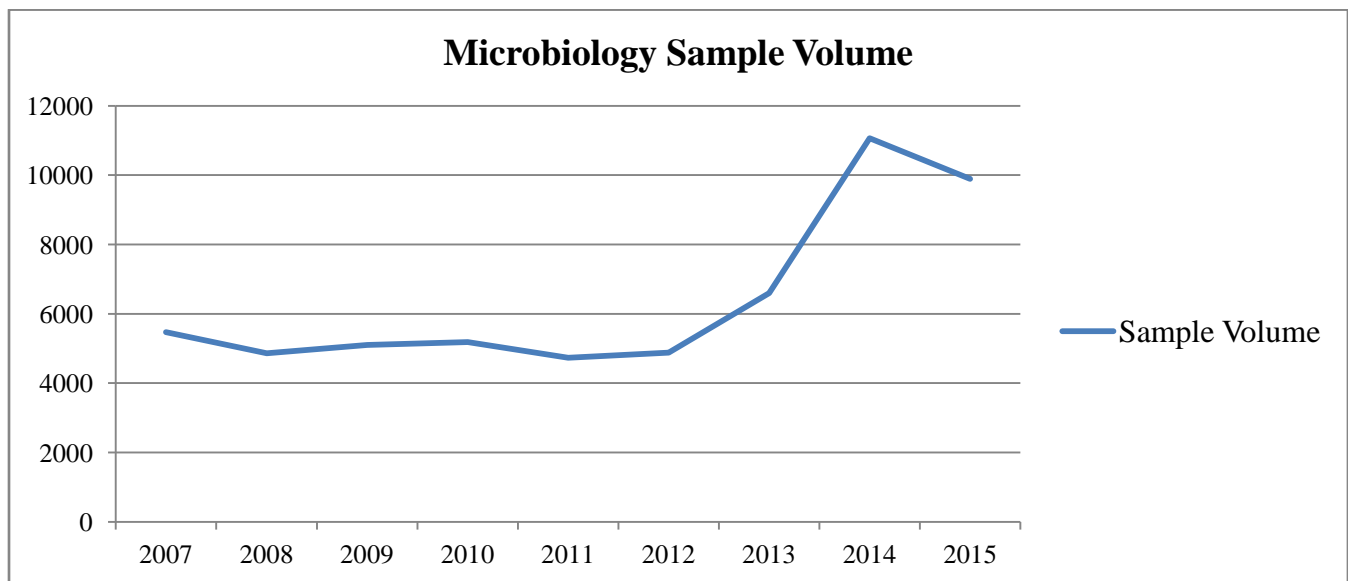
- Increased oil- and gas-related complaints and inquiries from public.
- Operating of a new Williston monitoring site to measure air quality.
- Inspections and study of radiation from frack sand and drilling mud.
- Increased permitting activity, along with increased particulate control inspections of more rock, sand and gravel plants (three times higher than in the past), due to greater demand for these materials in the oilfield.
- Road dust has become a significant source of air pollution.
- New Environmental Protection Agency regulations directed at energy development.
- Expansion of the Tioga Gas Plant

## B. Division of Laboratory Services

### Microbiology

Testing volumes from 2007-2015 were evaluated from oil-impacted communities in the western half of North Dakota. Communities included principal private (clinics and hospitals) and public health entities in the Dickinson, Williston, Watford City, Minot, Bismarck, Hettinger, Mott and New England areas.

The total testing volume from these communities showed a steady increase over the period 2007-2014. The volumes for 2015 decreased slightly; however, when compared to the average volumes of 2007 through 2012, the total sample volume is still significantly higher.



**Figure 8. Microbiology Sample Volume**

### Chemistry

The chemicals regulated and monitored in the oil patch remain at a high level. For the 2012 through 2015 time period, about 470 samples per year were analyzed for oilfield-related parameters. That includes two major projects in 2015: the Blacktail Creek event (294 samples) and the Smishek Lake event (78 samples). Samples for 2016 are projected to be around 510.

Since July of 2015, parameters most commonly requested are complete mineral chemistry (including bromide), diesel range organics (DRO), gasoline range organics (GRO), and benzene, toluene, ethylbenzene and xylenes (BTEX).

Figure 9 depicts, if the Blacktail Creek and Smishek Lake events are excluded, the number of samples analyzed annually by the Chemistry laboratory for the 2014-2016 period has remained consistent.

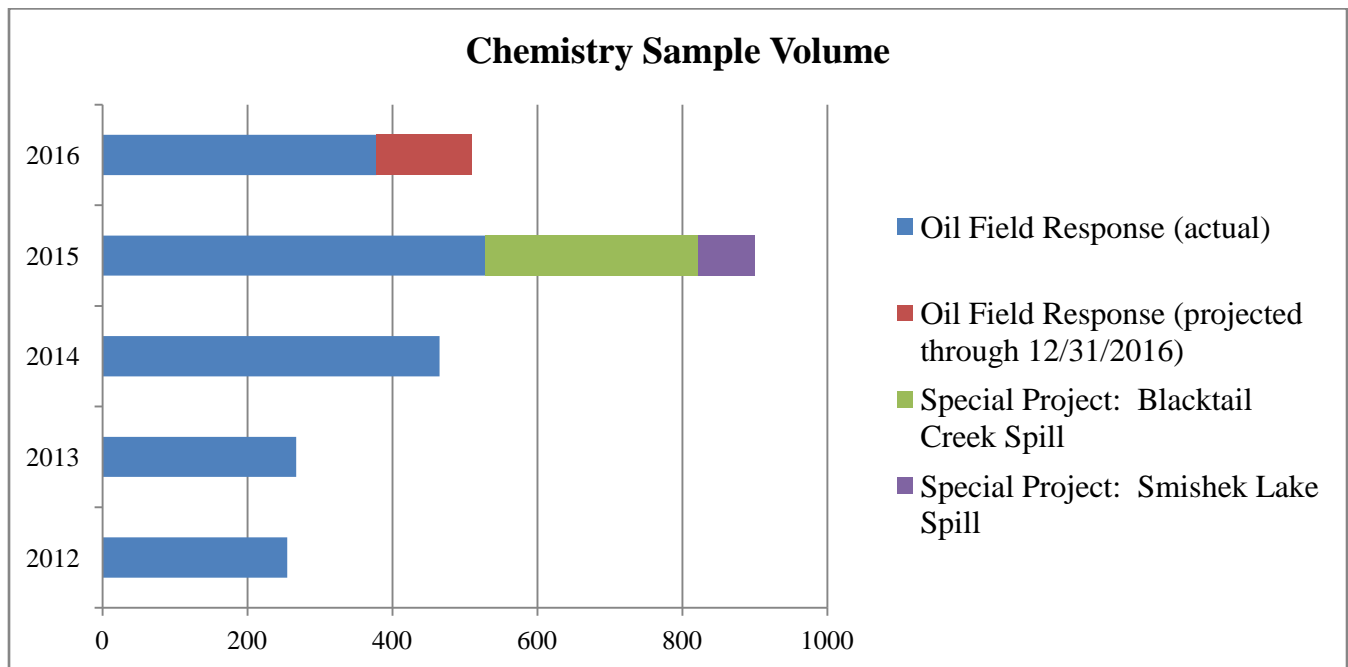


Figure 9. Chemistry Sample Volume

### C. Division of Municipal Facilities

Keeping pace with the new drinking water and wastewater facilities in oil-impacted areas has been a challenge. Figure 10 shows that the total number of PWSs regulated by the division significantly increased from 2010 through 2014. It goes on to show a decrease in the number of PWSs tracked over the last year. However, the division still continues to monitor these systems to ensure that, as oil activities and PWSs become active once again, they continue to meet all SDWA requirements.

Figure 11 shows the total number of SDWA violations had been increasing since 2010. It also shows a decrease in the number of violations over the last year. This decline in the number of violations is due to smaller PWSs becoming consecutive users of larger providers, allowing them to return to compliance. The closing of others in oil-impacted counties has also had an impact on compliance rates. However, even with the decline, the long-term average is still double when compared to 2008 through 2010. Implementation of the Revised Total Coliform Rule during 2016 will further impact the division's workload and compliance rates in the future.

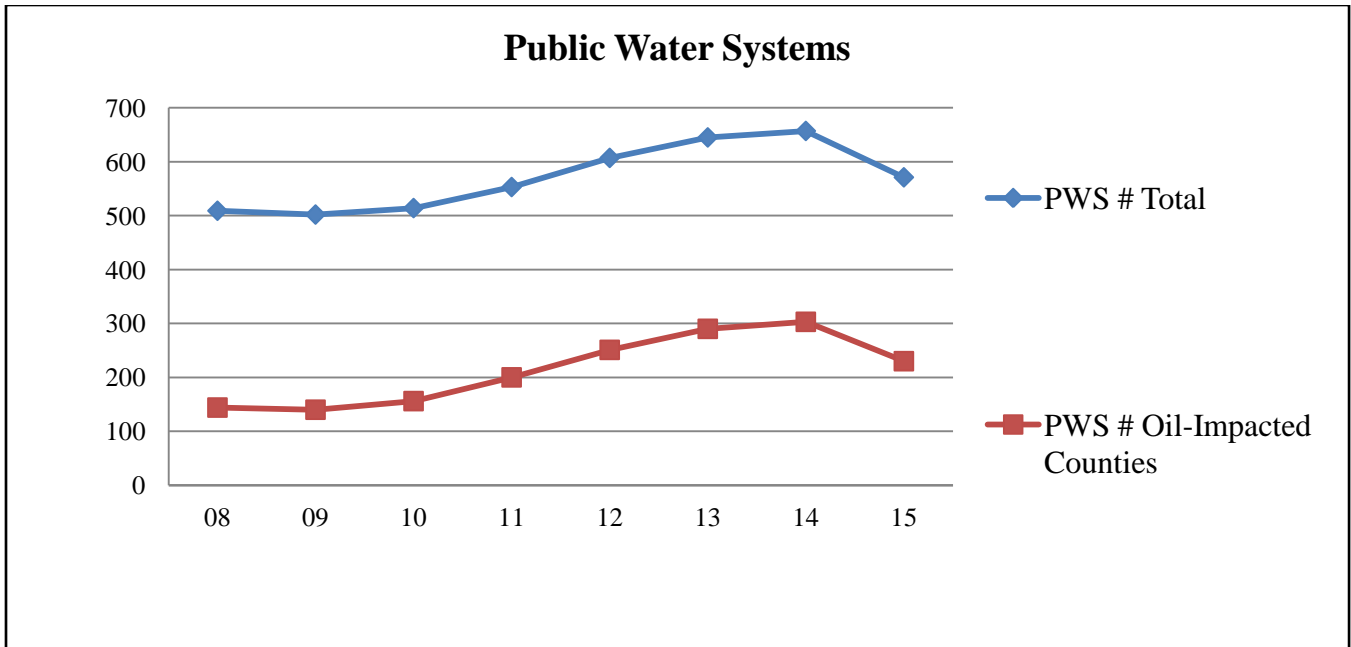


Figure 10. Public Water Systems

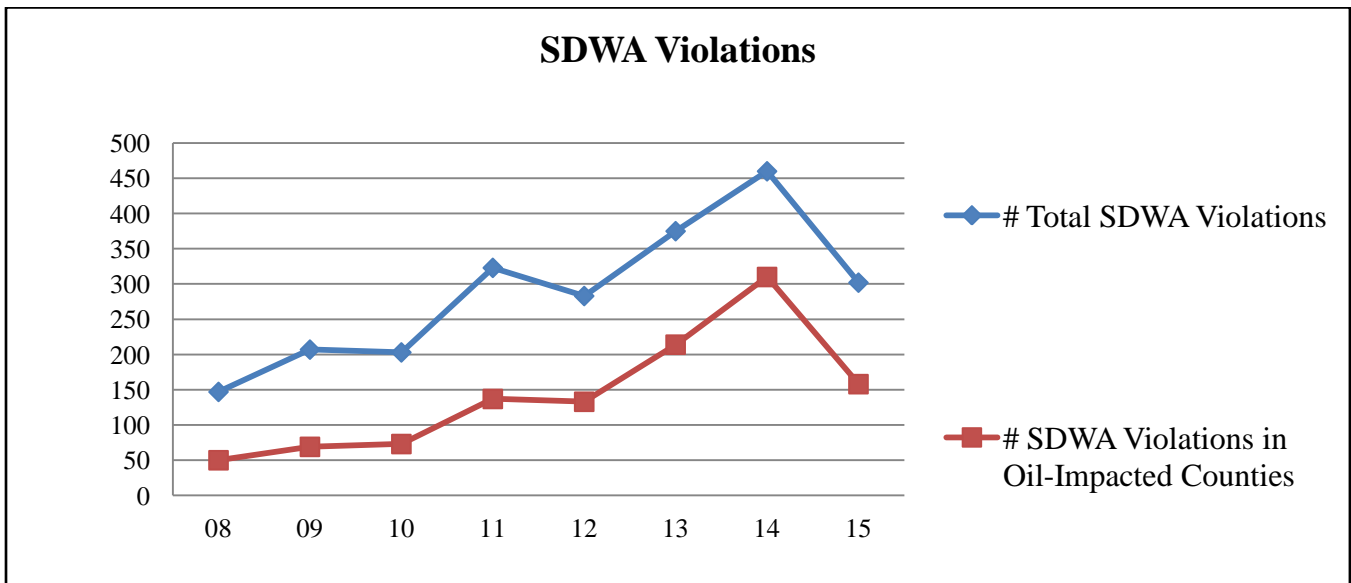


Figure 11. SDWA Violations

Under state law (North Dakota Century Code 23-26), all persons operating water and wastewater systems, with some exceptions, must be certified by the NDDoH. Figure 12 generally shows decreased numbers of water distribution operators being certified since 2011. Two principal factors have been responsible for the decrease in certification: (1) operator turnover (certified operators leaving for higher paying jobs in the oilfield); and (2) new systems that do not have a certified operator. Both of these factors still exist, but higher-paying oilfield jobs may be harder to find. Through training and site inspections, the division continues to stress the importance of having a certified operator. In oil-

impacted counties, the primary need has been for water distribution operators because most new systems obtain drinking water from other regulated sources (no treatment required) and either haul wastewater to another permitted system or provide on-site wastewater disposal. Compliance with operator certification requirements for water treatment and wastewater collection/treatment also may decrease if more systems choose to develop/treat their own drinking water sources or treat/discharge wastewater.

Figure 13 shows a large increase in plans and specifications submittals/approvals since 2010, largely due to projects in the oilfield. Project submittals decreased in 2015, but remained high and required extended review time. Many were submitted by out-of-state engineering firms (120 to date) unfamiliar with North Dakota requirements, resulting in extended review time. Many had mechanical wastewater treatment plants and/or large on-site disposal systems which require additional time for review and approval. On-site disposal systems have not historically been used or addressed by the division. Finally, many involved as-built situations which require more time to resolve design and construction issues. Considerable time also is spent: (1) evaluating and addressing noncompliant or failing wastewater systems, many of which were built and expanded without local or state approval and which have undergone numerous ownership or management changes; and (2) developing new design standards and policies to address issues primarily related to projects in the oilfield.

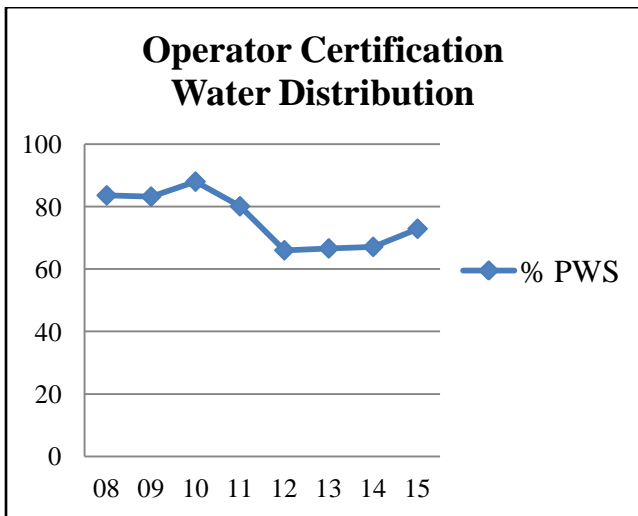


Figure 12. PWS Meeting Operator Certification Requirements (Water Distribution)

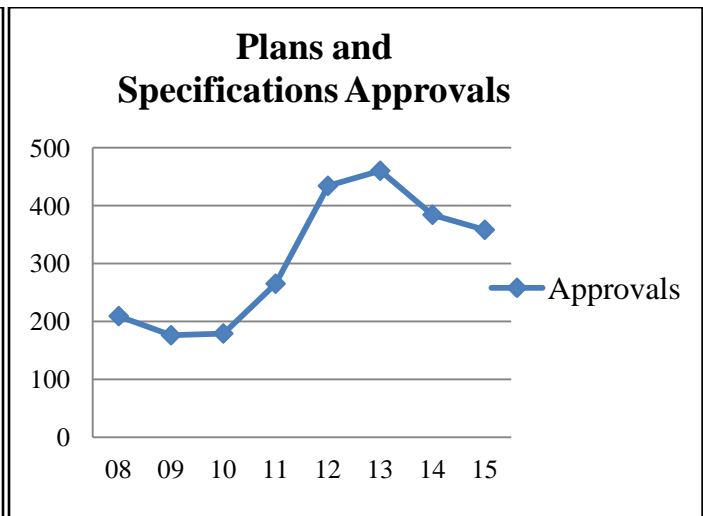


Figure 13. Plans and Specifications Approvals - Water and Wastewater Projects

Figure 14 shows the number of projects/dollar value on the CWSRF and DWSRF lists increased significantly since 2010. For 2016, the preliminary dollar value of projects is \$669 million for the DWSRF and \$516 million for the CWSRF. This will result in a large number of SRF projects to implement, increasing workload on top of attempting to keep pace with more technical reviews for non-SRF and oilfield projects.



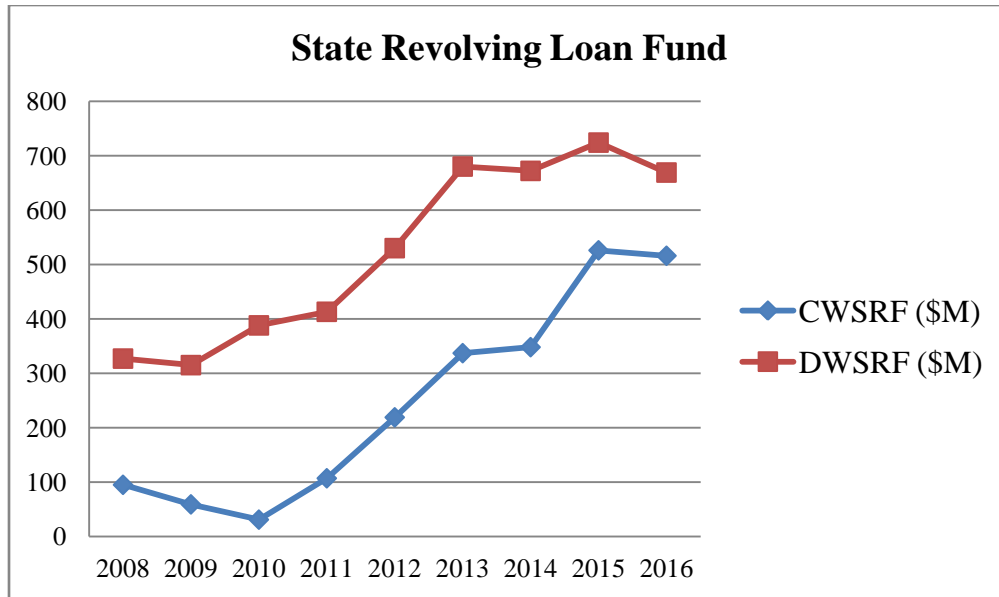


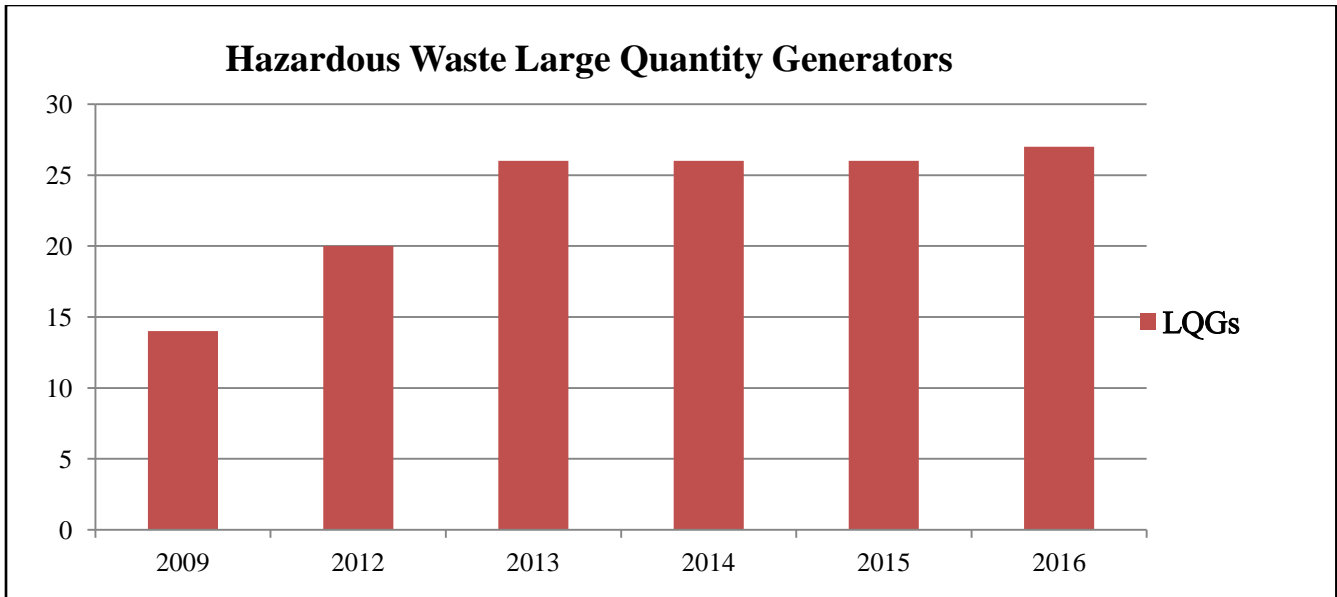
Figure 14. State Revolving Loan Fund - Total Project Amount from Intended Use Plans

Additional workload impacts to those shown in the above tables include: educating systems on SDWA requirements, implementing/enforcing the requirements, and compliance/technical assistance in addressing SDWA violations; responding to complaints; answering calls and emails about proposals for new/expanded housing facilities; addressing vendor/engineer inquiries; and attending visits and presentations on alternative wastewater treatment systems and project proposals.

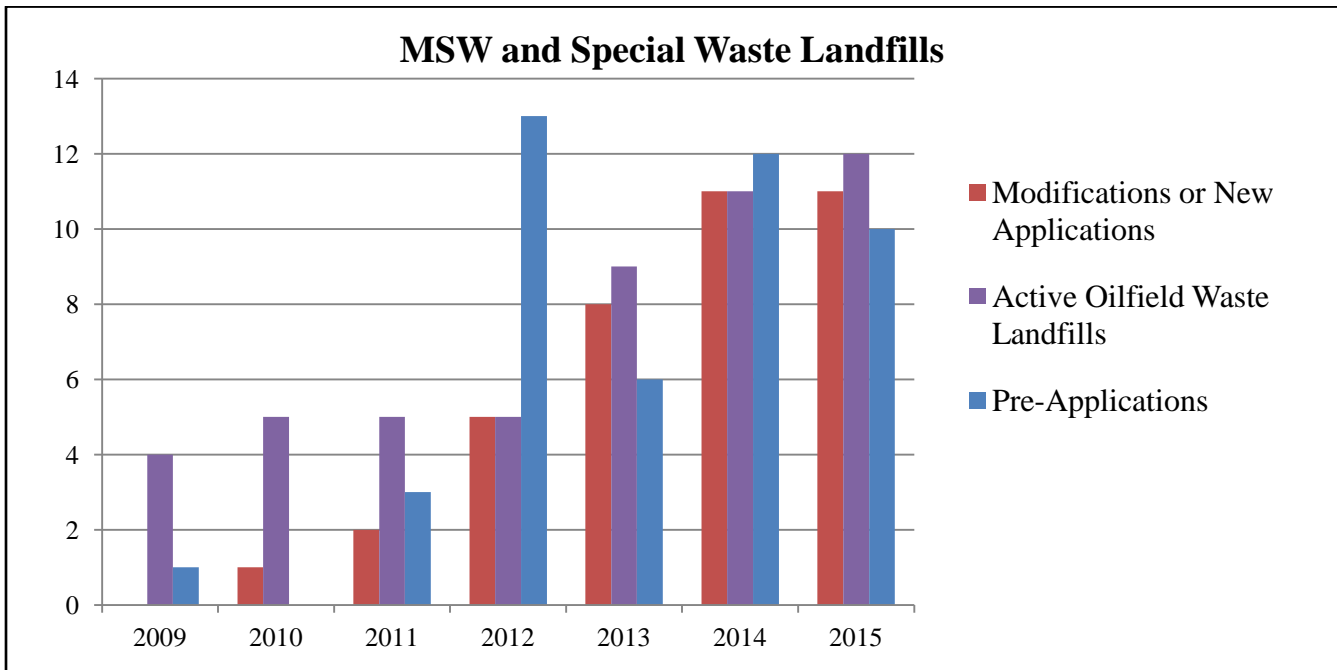
#### D. Division of Waste Management

Oilfield activity has significantly increased the workload, from facilities directly operated by oilfield-related businesses and from peripheral businesses supporting the increasing general population. There are more oilfield service companies generating large quantities of hazardous waste and other support businesses, such as tank manufacturers generating more hazardous waste. Even with the slowdown in oil well drilling activity, the service and support companies remain active. There has been no decrease in the number of large quantity generators of hazardous waste or the overall quantity of hazardous waste generated. New gas stations and truck stops are being built or expanded. Both municipal landfills and oilfield special waste landfills are dealing with new types and greatly increased volumes of waste.

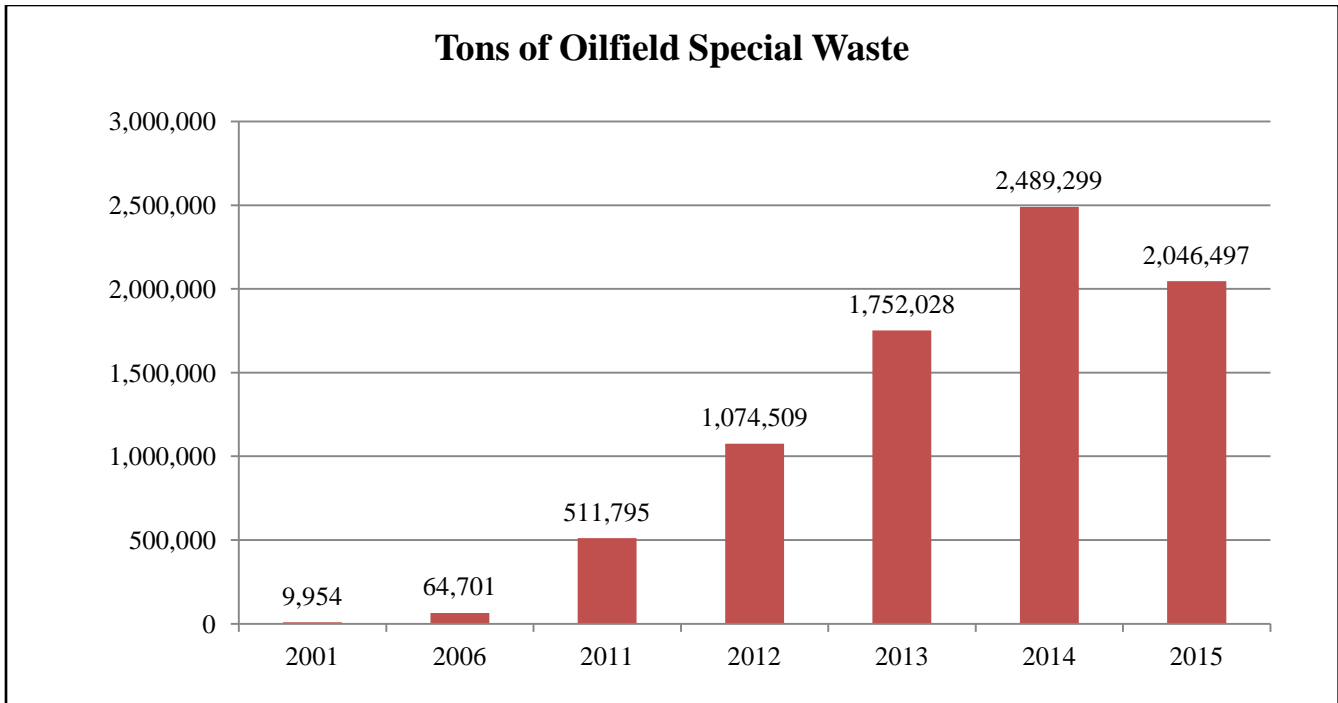
Figures 15 through 20 show the changes in hazardous waste large quantity generators (LQGs), municipal solid waste (MSW) and special waste landfills, tons of oilfield special waste, number of solid waste inspections, new or expanded underground storage tank (UST) facilities, and new waste transporter permits. The division also has three staff members on the EHS Division of Water Quality spill response team, which requires considerable field work and office follow-up. Figure 22 on page 19 of this report shows spill response numbers.



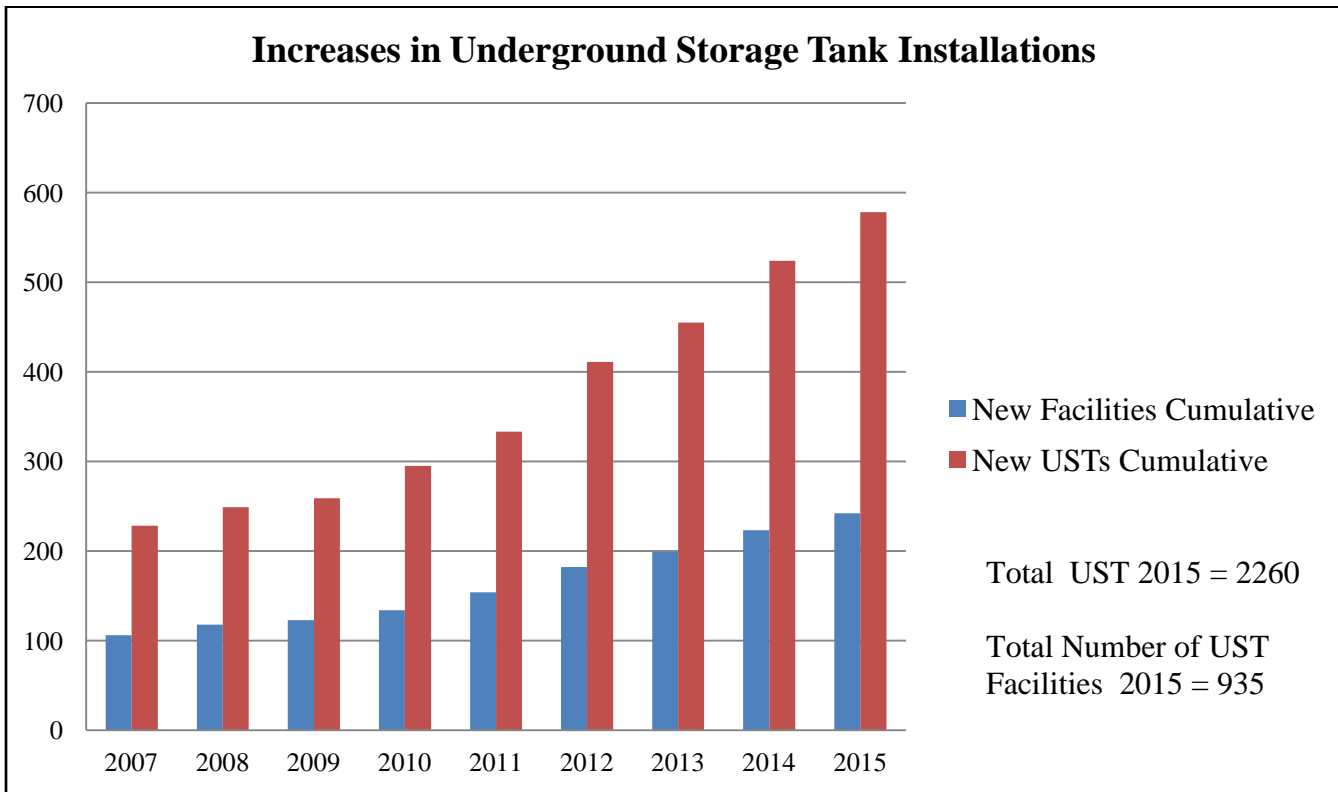
**Figure 15. Hazardous Waste Large Quantity Generators**



**Figure 16. MSW and Special Waste Landfills**



**Figure 17. Tons of Oilfield Special Waste Generated**



**Figure 18. Increases in Underground Storage Tank Installations**

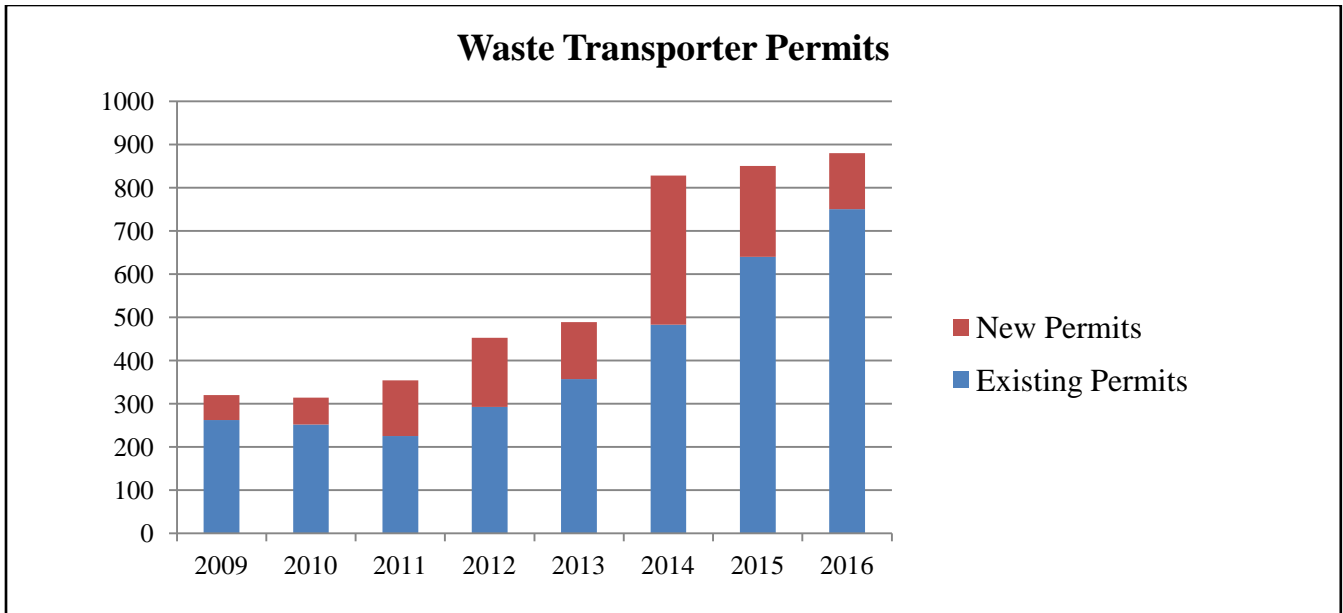


Figure 19. Waste Transporter Permits

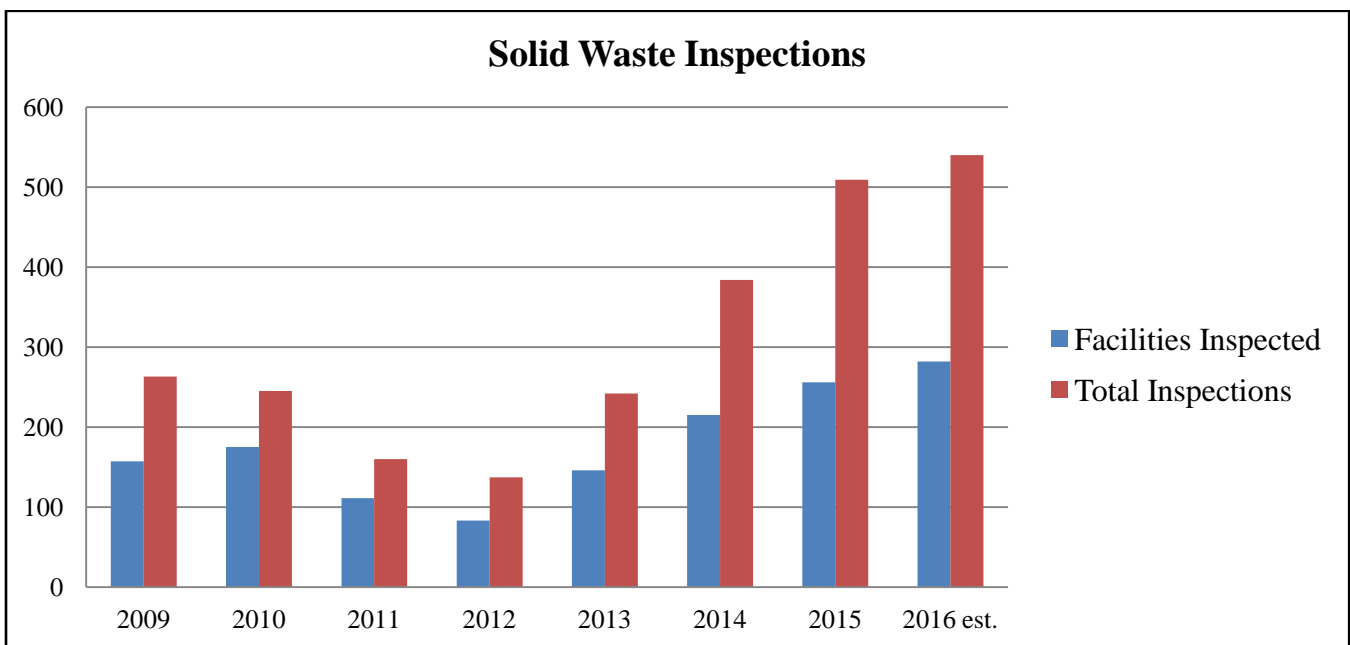


Figure 20. Solid Waste Inspections

The significant increase in the number of pre-applications and applications for new or expanding landfills, both municipal solid waste and oilfield special waste, has greatly increased the workload of the Solid Waste Program. These applications are very detailed, highly technical documents, usually more than a thousand pages in length, that require expertise in soils, hydrogeology, plant science and engineering to review. North Dakota solid waste rules have a 120-day limit in which the department is required to complete the review. However, that has been increasingly difficult to achieve due to the

volume of applications and inquiries received. At the same time, there is an increased need for inspections at the existing facilities and site visits to the new facility locations, which also takes significant staff time. This has resulted in a backlog for inspections and permits for other regulated solid waste facilities around the state. All of the programs in the Division of Waste Management have been affected by oilfield activities, but the Solid Waste Program has been affected the most.

Two new oilfield and industrial waste landfills were permitted, and two were significantly expanded in 2015. The Solid Waste Program conducted 505 inspections of 254 facilities and followed up on 154 reports of prohibited waste rejected by solid waste disposal facilities. Five pre-application reviews were completed for proposed oilfield/industrial waste landfills in 2015.

In 2016, three permits were issued, one for a new oilfield/industrial waste landfill and two for expansions of existing facilities. Permits for expansion of two MSW landfills in the west (McKenzie County and Williston) have been approved, and a pre-application for the Dickinson MSW landfill expansion was approved.

By the end of September 2016, the Solid Waste Program had conducted 356 inspections of 186 facilities and followed up on 130 reports of waste rejected by solid waste disposal facilities due to prohibited waste (including potential radioactive materials). In 2016, the division issued a contract with the Upper Missouri District Health Unit and McKenzie County for up to \$100,000 from the Abandoned Auto Program Fund to address the problem of campers, trailers and mobile homes abandoned due to the decline in oilfield activity.

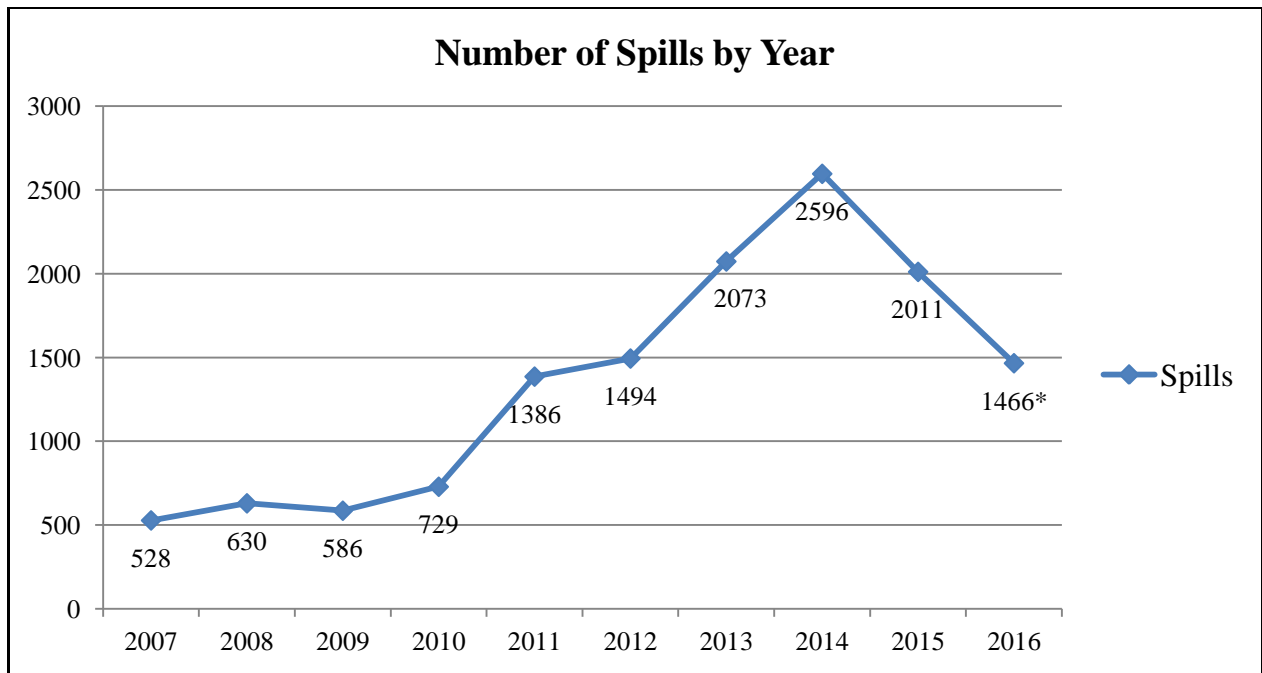
An entirely new issue arose during the Bakken oil boom regarding the generation and proper management of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM). TENORM is low-level radioactive waste that is generated primarily in oilfield exploration and production activities. It includes materials such as filter socks, tank bottom sludge and pipe scale. Responding to illegal dumping and improper management incidents has taken considerable staff time, as TENORM is a major concern of the public. The division is overseeing rejected waste loads at landfills and the cleanup of illegal dump sites, although the number of incidents has decreased since implementation of requirements for TENORM waste containers on all well sites. The division worked with Argonne National Laboratory to study the risks to oilfield workers and the general public. New administrative rules regarding the proper handling, recordkeeping, reporting and disposal of TENORM have been approved and are being implemented. Three landfill applications for managing TENORM have been received for review.

## **E. Division of Water Quality**

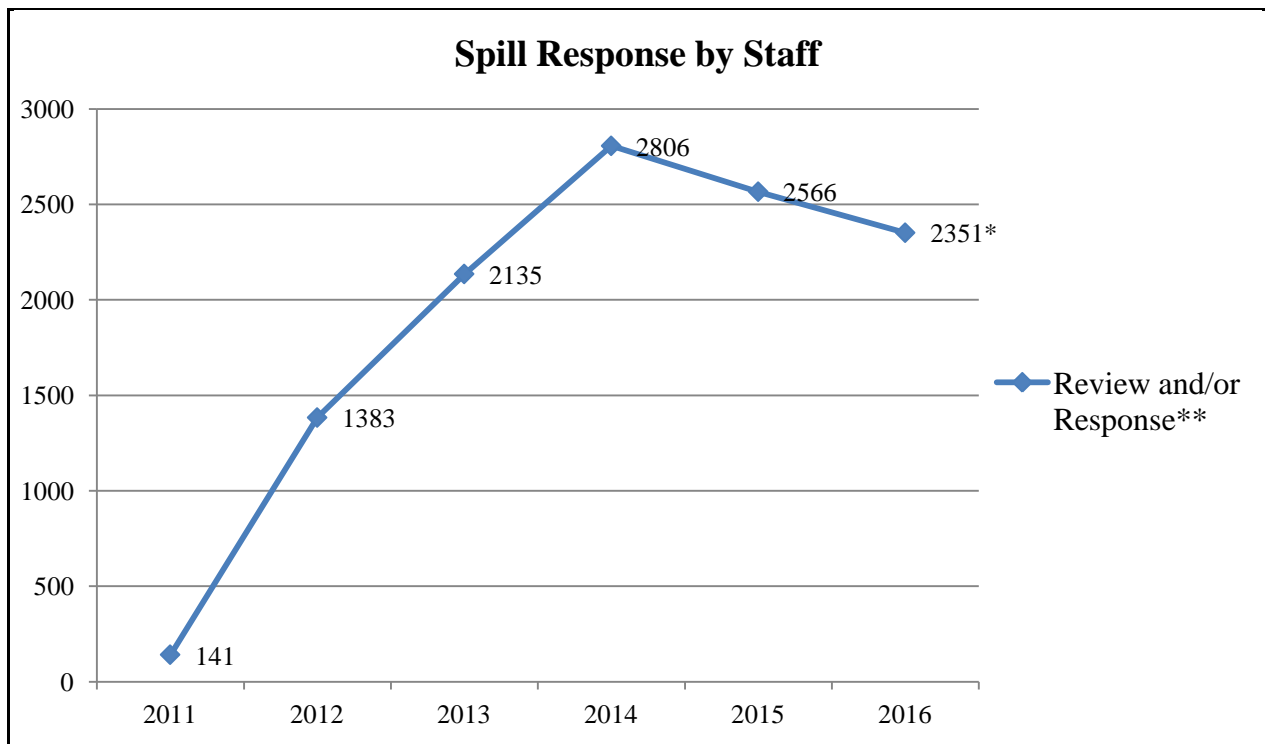
### **Spill Investigation Program**

This program is primarily responsible for responding to spills with the potential to impact waters of the state and following up on appropriate remediation. The program handles two different types of spills: oilfield and non-oilfield related. Of the spills that have been reported since July 1, 2015, there are currently less than 20 oilfield-related spills and less than 20 non-oilfield related spills awaiting initial inspection. Between July 1, 2015 and September 27, 2016, the program reviewed 1,967 total spills and has responded to 810, assigning the rest to other agencies. Of the 810 spills inspected, there are 371 that need additional on-site follow-up. Spills with the greatest potential to adversely impact the environment are evaluated as soon as possible. As the number of oil and gas facilities increase, the potential for the

number of spills is expected to increase as well. Figures 20 and 21 illustrate the change in number of spills reported and the response by staff for each calendar year.



**Figure 21. Number of Spills by Year** \*Estimate at end of 2016



**Figure 22. Spill Response by Staff** \* Estimate at end of 2016 \*\*Response may include several actions (e.g., review to determine if follow-up is necessary, phone conversations and inspections).

### NDPDES Program

Figure 23 shows there is still a high demand for the issuance of new permits. Except for septic system servicers, all of the following are federally required permits.

- Construction stormwater
- Dewatering and hydrostatic testing (including pipelines and tanks)
- Industrial stormwater
- Wastewater general permits (typically small domestic wastewater treatment facilities)
- Wastewater individual permits (typically major municipalities and industries)
- Septic system servicers

The continued overall increase in permits has resulted in additional inspections of septic tank servicers, stormwater controls, and crew camp and hauled wastewater treatment facilities. Even though numbers for new permits have started to decline, items like complaints of abandoned facilities that may need cleanup are on the rise. In addition, growth in the production of oil and natural gas has resulted in increased interest in facilities to use these products. The permits can be complex and require more staff time than most typical permits, and the interest in petrochemical manufacturing is expected to grow.

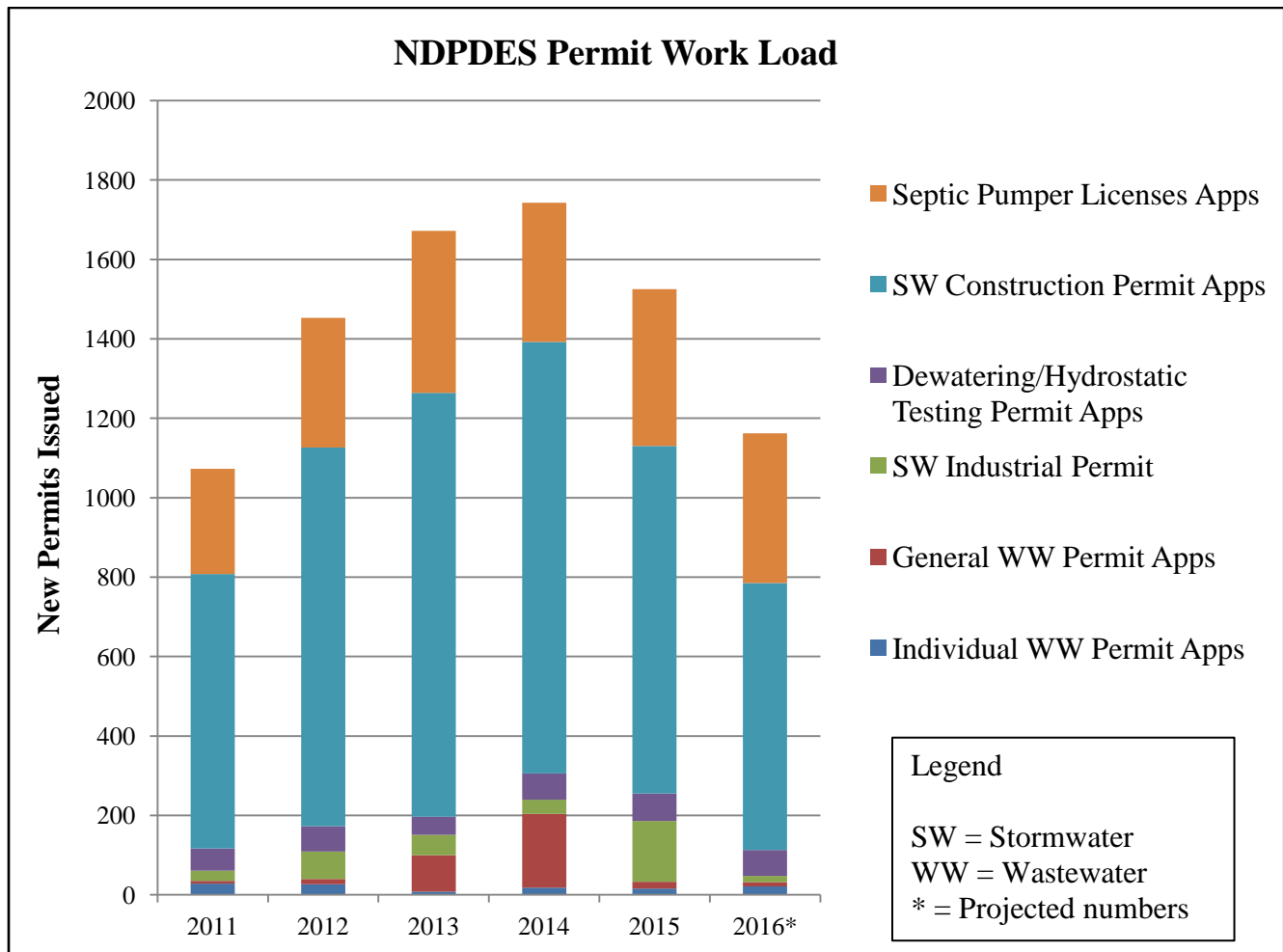


Figure 23. NDPDES Permits Workload

### Ground Water Protection Program

The oil boom has significantly increased the water appropriation applications received by the State Water Commission for review (Figure 24), primarily related to industrial uses of ground water. Approximately 64 water appropriation permit reviews were completed in 2015, and it is estimated that 100 reviews will be completed in 2016.

Figure 24 also shows significant impact on the Underground Injection Control (UIC) Program. The number of potential UIC sites (crew camps, oil service companies, vehicle repair businesses, etc.) continues to increase. In 2015, it was estimated that approximately 325 businesses in western North Dakota may have Class V wells and therefore require inspection. Available staff was able to inspect approximately 35 facilities in 2015. In 2016, it is estimated approximately 350 facilities may warrant inspection. Additional potential UIC sites have yet to be evaluated. The program has responded to many requests for information about Class I injection wells and is in the process of permitting two Class I wells. One new Class I well is projected for permitting in 2016. Many proposed oilfield waste disposal sites are also considering Class I wells, and some facilities are evaluating injection of treated wastewater as a disposal option.

The number of public water systems in the oilfield has significantly increased, and each system requires the completion of a Wellhead Protection Area report. This report includes the delineation of the protection area, completion of a contaminant source inventory and a susceptibility analysis (Figure 25). In the last year, 32 reports have been prepared, including four reports for new non-community water systems. It is estimated that 65 reports will be prepared in 2016.

A significant number of calls have come from the public related to sampling of private wells (e.g., how to sample, where to send samples, what to analyze, perceived impacts to wells, etc.). Workload related to siting reviews for landfills and facilities, such as confined animal feeding operations (CAFOs), has increased significantly (Figure 25). Before the oil boom, one or two landfill pre-applications were received per year. In 2015, two oilfield special waste landfill pre-applications were received and reviewed by program staff. If the facilities obtain zoning approval, they will move through the application process requiring review by program staff. It is estimated that approximately 10 landfill and CAFO siting evaluations will be completed in 2016.

A number of Freedom of Information Act open-records requests (194) were processed by program staff during 2015 (Figure 24). In 2014, 180 requests were processed. It is anticipated that approximately 239 requests will be processed by program staff in 2016. Due to the past growth in oil and gas production, North Dakota is known nationwide as a large oil- and gas-producing state, and this has resulted in increased information requests from across the country. Many of these requests are broad in scope and take additional staff time to compile.

The Western Ground Water Monitoring Program was implemented in 2013 to evaluate ground water conditions in selected aquifers within the oil-producing areas of northwestern North Dakota. Approximately 135 observation wells in 20 aquifers are sampled as part of the Western Program. The initial round of sampling was completed between fall of 2013 and 2015. Sampling is currently being conducted on a 1.5-year rotation; approximately 45 wells are sampled each spring and each fall. Based on the results obtained as the sampling program progresses, wells may be added or deleted from the sampling program. The Western Program is conducted separately from the Agricultural Ground Water



Monitoring Program that was implemented in 1992, and it adds more workload for Ground Water Protection Program staff.

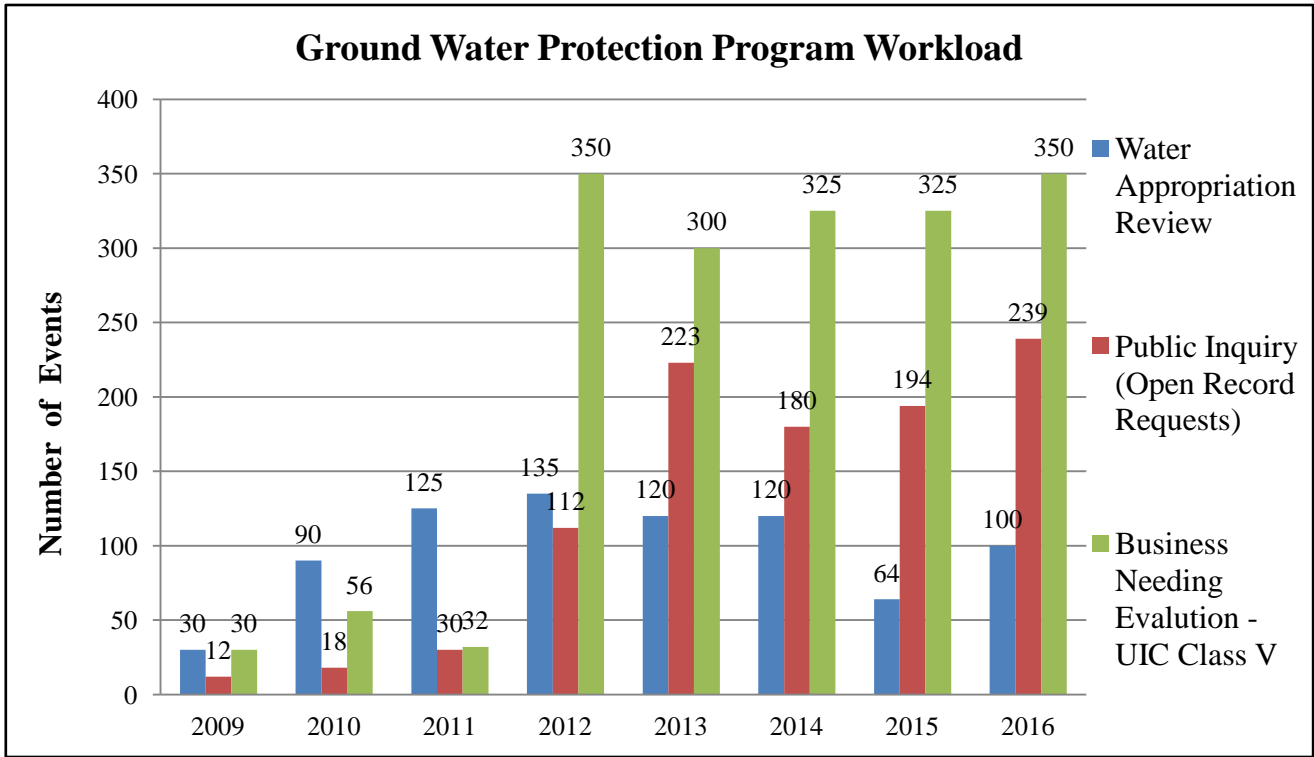


Figure 24. Ground Water Protection Program Workload (2009-Present)

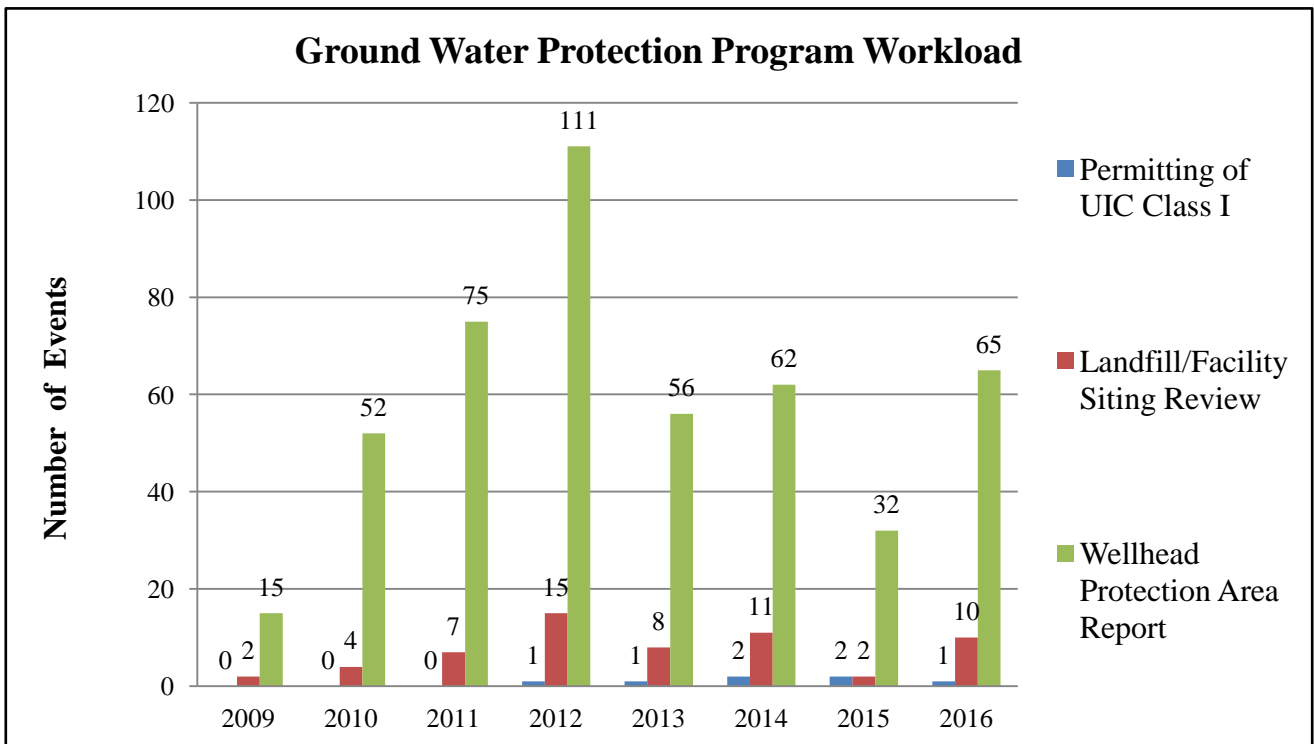


Figure 25. Ground Water Protection Program Workload (2009-Present)

Figure 26 shows formal enforcement actions relating to violations of environmental statutes from 2010 to date. Enforcement actions require considerable staff time relating to case investigation, technical evaluation, monitoring and compliance reviews.

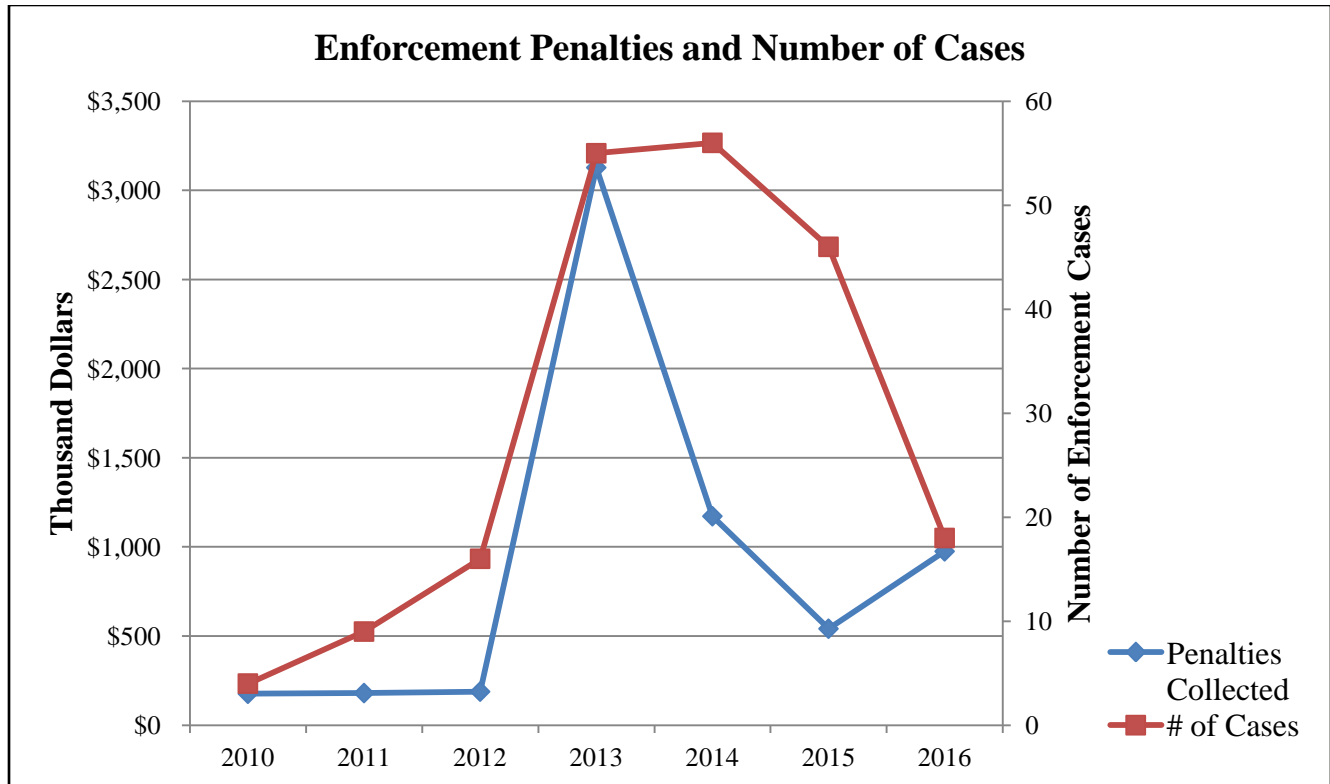


Figure 26. Enforcement Penalties and Number of Cases (as of 10/19/16)

### **III. Current Challenges**

#### **A. Division of Air Quality**

Given the increased level of workload and complexity of the rules and regulations implemented and enforced, the division will be challenged to maintain its level of regulatory oversight and air quality monitoring.

#### **B. Division of Laboratory Services**

The division will be exploring ways to preserve the capabilities of the laboratory within existing budgets. Maintenance of instruments and replacement or upgrading of equipment and supplies are crucial to continued laboratory proficiency.

#### **C. Division of Municipal Facilities**

The division continues to experience increases in workload due to oilfield development activities. The increased workload is compounded by implementation of new and revised SDWA and State Revolving Loan Fund (SRLF) Program requirements; heightened community interest in using the SRLF programs for financial assistance to address infrastructure needs; and stagnant or reduced federal funding which impacts the division's ability to maintain state delegation for its programs. These challenges are not short-term but long-term.

#### **D. Division of Waste Management**

The significant increase in the number of pre-applications and applications for new or expanding landfills, both municipal solid waste and oilfield special waste, has greatly increased the workload. At the same time, there is an increased need for inspections at existing facilities and site visits to the new facility locations, which also takes significant staff time. Responding to illegal dumping and improper TENORM management incidents has also taken considerable staff time. At current budget levels, the division intends to address the existing workload with current staff.

#### **E. Division of Water Quality**

The Division of Water Quality continues to address both current and past spills to ensure appropriate cleanup. Continued oversight of ongoing remediation projects will require the retention of existing trained staff and the training of replacements due to turnover. Current budget level restraints will necessitate using existing positions. Enforcement actions and field/permitting activities will be prioritized.