

Exhibit 6

Response to General Comments

Response to General Comments on Permits
WY-0020338, WY-0024953, WY-0024945, WY-0025232, WY-0025607
March 9, 2015

Beginning on June 10, 2013, EPA took public comment on five National Pollutant Discharge Elimination System (NPDES) permits for the discharge of produced water during the same public comment period. Many comments were applicable to all five permits. Those general comments and responses are represented in this document.

Hydraulic Fracturing:

EPA received a significant number of comments addressing various issues related to hydraulic fracturing or fracking. These issues can be broadly summarized as comments regarding the permitting process, permit implementation and permit enforcement.

Several commenters posed questions or raised concerns about the adequacy of EPA's permitting process as it relates the regulation of discharges from oil and gas operations that engage in hydraulic fracturing. One commenter stated that EPA should require oil and gas operators to prove that a discharge is not unsafe before permitting a discharge. Some commenters questioned what authorities EPA relies upon to write NPDES permits for these operations; others questioned the process employed to develop permit limitations. Other commenters raised concerns about the protectiveness of the permits and the long term consequences on human health and the environment, including effects on air quality and the human food chain.

Response:

NPDES Permitting Authority: EPA's authority to issue NPDES permits derives from authorities granted to the Administrator by Congress in the Clean Water Act (CWA). These authorities are not unlimited, and NPDES permits may only include conditions that implement the requirements of the CWA and its implementing regulations.

CWA Section 301(a) prohibits the discharge of any pollutant by any person except in compliance with certain requirements of the CWA, including Sections 301 and 402. CWA Section 402 authorizes EPA to issue permits for discharges of pollutants that meet all applicable requirements under Section 301, among other provisions. CWA Section 501 authorizes EPA to promulgate regulations to carry out the function of the CWA.

Section 301(b) requires point sources to achieve two different types of effluent limits. Section 301(b)(1)(A), which applies to non-municipal point sources such as oil and gas operations, requires point sources to achieve technology based effluent limitations (TBELs) established pursuant to CWA Section 304(b). Section 304(b) authorizes EPA to publish effluent limitation guidelines (ELGs) for classes and categories of point sources. Under this provision, EPA has promulgated a wide variety of ELGs that establish limitations for pollutants discharged by the industry covered by a particular ELG. The ELGs EPA has developed to-date for different industries are contained in 40 CFR parts 425-471.

When EPA has promulgated an ELG, Section 301(b)(1)(A) requires the effluent limits it contains to be incorporated into a NPDES permit for a point source subject to the ELG. EPA has promulgated an ELG that applies to oil and gas facilities on the Wind River Indian Reservation at 40 CFR Part 435, Subpart E – Agricultural and Wildlife Water Use Subcategory.

Section 301(b)(1)(C) requires all point sources to implement controls necessary to achieve ‘any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations, . . . or required to implement any applicable water quality standards established pursuant to this chapter.’ Effluent limitations based on these types of requirements are known as water quality based effluent limitations (WQBELs), and are included in permits if ‘any more stringent limitation’ beyond TBELs is required under Section 301(b)(1)(C). The Eastern Shoshone and Northern Arapaho Tribes (the Tribes) of the Wind River Indian Reservation have adopted water quality requirements into Tribal law, and EPA has included WQBELs based on these requirements under section 301(b)(1)(C) and principles of tribal sovereignty.

NPDES Permit Process: EPA’s authority to issue NPDES permits derives from CWA Sections 402 and 301, as described above. The procedures for issuing NPDES permits are found in 40 CFR Parts 122, 124 and 125. The permitting process begins when an operator of a point source submits an individual permit application pursuant to 40 CFR § 122.21. Existing oil and gas operations must include the information required by 40 CFR §§ 122.21(f)-(g) in their permit application. Upon receipt of a permit application, the permit writer uses information in the permit application to identify the pollutants of concern in the discharge, and to characterize their nature and quantity in the effluent.

Having characterized the effluent discharge, the permit writer then develops technology-based effluent limits for those pollutants. For the permits being issued today, the TBELs are based on the ELG at 40 CFR Part 435, Subpart E. This ELG provides at 40 CFR § 435.50 that produced water may only be discharged if it is 1) of good enough quality to be used for wildlife or livestock watering or other agricultural uses, and 2) it is actually put to that use. Thus, for purposes of developing conditions for these permits, the permit writers relied upon research and data concerning the effects of produced water on livestock and wildlife to determine what level of effluent could be considered ‘of good enough quality.’

Once the permit writer has developed TBELs, they must then determine whether any ‘more stringent limitation’ is necessary to protect water quality under section 301(b)(1)(C).

To begin the WQBEL development process, the permit writer must identify the applicable water quality requirements that address the pollutants of concern in the discharge. Typically, these are State water quality standards composed of designated uses for the receiving water and the pollutant-specific criteria necessary to protect the designated uses. For the permits being issued today, the applicable water quality requirements are found in Tribal law adopted by the Tribes. These Tribal requirements also contain designated uses and pollutant-specific criteria. Once the water quality requirements are identified, the permit writer then determines whether dilution is available in the receiving stream, and what concentrations of each pollutant are expected in-stream under critical low-flow conditions.

If this analysis demonstrates that in-stream concentrations are reasonably expected to exceed the criterion for a pollutant contained in the water quality requirements, then the permit writer must translate the applicable criteria into a WQBEL for that pollutant.

Having established effluent limits for a permit, the permit writer must determine what monitoring and reporting requirements will be included in the permit. The regulatory bases for establishing such requirements are found at 40 CFR §§ 122.41(j)-(l), 122.42(a), 122.44(i), 122.45(e)-(f), and 122.48. Permit monitoring requirements have three primary purposes: 1) determining compliance with effluent limits, 2) creating a basis for enforcement decisions, and 3) other goals such as characterizing effluents and assessing treatment efficiency. The permit writer must establish monitoring locations, monitoring frequency, and sampling and analytical methods. Finally, most permits require monitoring results to be reported to EPA using a Discharge Monitoring Report (DMR).

Permit writers also include standard conditions and, as necessary, special conditions in permits. Standard conditions, which are found at 40 CFR §§ 122.41 & 122.42, are included in every permit and provide the means by which the permit is implemented and enforced by the permittee and EPA. Special conditions are included as necessary to address unique situations. Special conditions may include pretreatment requirements, compliance schedules, and additional monitoring or special studies to be used in the development of future limitations. The permits being issued today include special conditions relating to compliance schedules for certain parameters and additional monitoring for toxics and mercury.

The permit development process outlined above applies to all NPDES permits, including permits for discharges that may contain hydraulic fracturing wastes. Thus, EPA followed the process outlined above in drafting the permits that are the subject of this document. The permitted facilities submitted timely permit renewal applications containing the information required by 40 CFR §§ 122.21(f) & (g). While EPA has not required the permittees to prove that their discharges are not unsafe, it has – as it would in any permit development process – relied on the information and research at its disposal to develop appropriate permit limits consistent with the CWA and its implementing regulations. As described in the Statement of Basis, EPA developed the effluent limits in these permits using a number of technical documents, as well as information in similar Wyoming oil and gas permits and the Tribes' water quality requirements. In instances where information necessary to develop an effluent limitation is unavailable, EPA has included monitoring requirements to gather sufficient information for the development of such limits in future permit cycles. EPA is confident that the permit development process for these permits fully accords with the statutory and regulatory requirements of the CWA, and disagrees that this process is or was inadequate.

Permit Protectiveness/Long-Term Consequences: EPA developed these NPDES permits using the authorities and process described above. The permits include TBELs based on the Subpart E - Agricultural and Wildlife Water Use ELG, and WQBELs based on the Tribes' water quality requirements adopted into Tribal law. The TBELs EPA has developed for sulfate, specific conductance, chloride and TDS are based on the latest research, contained in the administrative record, concerning the effects of these pollutants on agricultural and wildlife use. The limits ensure that animal consumption of the discharged water will not cause acute or chronic health effects that would render the water unsuitable for agricultural or wildlife use.

The remaining effluent limitations in the permits are WQBELs written to protect the quality of the receiving waters for these discharges. EPA has treated each of these receiving waters, four of which are not classified in the Tribal water quality requirements, as Class 3B waters. Class 3B waters are defined in tribal water quality requirements as follows:

(ii) Class 3B. Class 3B waters are tributary waters including adjacent wetlands that are not known to support fish populations or drinking water supplies and where those uses are not attainable. Class 3B waters are intermittent and ephemeral streams with sufficient hydrology to normally support and sustain communities of aquatic life including invertebrates, amphibians, or other flora and fauna which inhabit waters of the Reservation at some stage of their life cycles.

Uses designated for Class 3 waters in tribal water quality requirements, generally, include aquatic life other than fish, recreation, wildlife, industry, agriculture and scenic value. As the Class 3B definition, and information in the permit applications regarding livestock watering, makes clear, the primary uses of the receiving water for these permits are aquatic life and livestock watering. There are no drinking water or primary or secondary contact recreation uses. Thus, the WQBELs are written to meet criteria that protect the designated aquatic life and livestock watering uses, not other uses (e.g., human health, food chain, etc.) that commenters suggest should be the basis for the WQBELs. WQBELs cannot be written to meet designated uses that have not been adopted for the waterbody. Similarly, these are NPDES permits for discharges of pollutants to water, and thus written to meet the requirements of the CWA and implementing regulations – not to address potential air quality impacts of these facilities subject to regulation under the Clean Air Act.

Several commenters had questions about permit implementation, and the permittees' responsibility to treat wastewater from fracking, to self-monitor, and restore water impacted by drilling and fracking. One commenter asked for the amount of water polluted per well fracked.

Response: *As described above, EPA develops NPDES permits with TBELs and WQBELs that set limits on the concentrations of pollutants in the discharge. Permittees have to ensure their discharges meet those limits, but EPA does not specify the treatment that must be used. The permits require the permittees to monitor for pollutants at regular frequencies to ensure that the effluent limits are being achieved and to gather data which may be used in future permits. These monitoring provisions, which are discussed in greater length in the Statement of Basis for each permit, include the Self-Monitoring Requirements (Part 1.3.2), the Toxic Pollutants Screen (Part 1.3.4), the Acute Whole Effluent Toxicity (WET) Monitoring (Part 1.3.6), and the Chemical Inventory Reporting Requirement (Part 1.3.9). The permittees submit the sampling and analysis results of the self-monitoring quarterly; the Toxic Pollutants Screen results on the 1st, 3rd and 5th years of the permit cycle; and the WET results quarterly or annually depending on the frequency of the testing. The permittees submit the chemical formulation, concentration and discharge volume of well treatment chemicals in their chemical inventory only in event of a discharge of such chemicals. The effluent limits in NPDES permits are developed to protect the designated uses. As a result, there are no restoration requirements in NPDES permits and EPA lacks the authority to include them.*

The amount of pollutants permitted to be discharged by a well subject to hydraulic fracturing is a function of the concentration of pollutants discharged and the volume of discharge. This varies by well.

Several commenters asked about permit enforcement, and how EPA will hold the permittees accountable for environmental damage from hydraulic fracturing. Commenters specifically mentioned environmental restoration, restitution, and bonding. They also asked how EPA will ensure transparency of the fracturing process, assess environmental damage, and correlate human health issues with fracking.

Response: *As described above, the CWA gives EPA the authority to regulate the discharge of pollutants in wastewater. Thus, with these permits, EPA is not regulating the process of hydraulic fracturing, or directly monitoring that process or its effects. Rather, these NPDES permits are written to conform to EPA's CWA authority and regulate the discharge of produced water from the five oil and gas facilities to surface waters. The effluent limits in the permits were developed to protect water quality and the designated uses.*

EPA evaluates effluent data from the facilities and inspects them to ensure compliance with the permit. In the event of NPDES permit violations, EPA can order the permittee to take steps to return to compliance and levy substantial fines. A permittee who has violated the law can voluntarily agree to conduct a supplemental environmental project to offset part of the fines; these environmentally beneficial projects relate to the violation in some way, but must be beyond what the permittee is required to do by the law.

For members of the public wishing to obtain additional information regarding the nature of discharge from these facilities, the permit applications, permits, and effluent data are publicly available on EPA's Envirofacts website. The information on this website is updated periodically as permittees submit effluent data.

Other commenters state that the science used to make determinations for these permits is outdated and asks EPA to consider pending [unspecified] WQS to address fracking.

Response: *The EPA considered tribally adopted existing uses as well as designated uses for determining appropriate criteria for use in establishing water quality based permit limitations. Commenters did not provide enough information about the other WQS to which they were referring to evaluate the comment any further.*

Beneficial Use:

Commenters stated that if the facilities decide to cease discharging, local ranchers will lose access to the facilities' surface water discharges, which provide rangeland resources where there is little or no other water available. Commenters also assert that loss of the surface water discharge will have a negative effect on wildlife, tribal livestock ranching operations, and riparian wetland habitat, as well as cause damage to stream channels. Commenters argue that the loss of water for cattle will force ranchers out of the livestock business.

Some commenters stated that the discharged water supports beneficial uses and is of good enough quality for use by wildlife and livestock.

Other commenters stated concerns regarding the damage that hydraulic fracturing-related activities will cause on both surface water and groundwater sources, and voiced concerns over potential harm that hydraulic fracturing waste products may cause to indigenous species and aquatic habitat. Additionally, commenters asserted that hydraulic fracturing could cause earthquakes.

Response: EPA notes that commenters provided both negative and positive comments on the beneficial use of produced water. EPA did not write the five permits to guarantee or prohibit the ongoing discharge of that water. Rather, EPA developed the permit limitations in each permit to meet the technology-based requirements of 40 CFR Part 435, Subpart E, which prohibits the discharge of produced water unless “it is of good enough quality to be used for wildlife or livestock watering, or other agricultural uses.” EPA also included permit limitations to ensure that discharges meet the tribally adopted water quality requirements that apply to the receiving water. EPA developed the permit limitations and monitoring requirements after a thorough evaluation of available information sources including the tribally adopted water quality criteria for pollutants present in the discharge, and available data on the effects of these types of pollutant discharges on wildlife, aquatic life and livestock. The administrative record for the final permits includes all references used in the evaluation. The resulting limitations that are included in the final permits ensure that the discharged produced water is good enough quality for wildlife and livestock use, and will not exceed the tribal water quality criteria for protection of aquatic life.

It is important to note that EPA's rules and policies for preparing NPDES permits do not include a process for the direct accounting of the economic impacts of particular permit decisions. Instead, economic impacts are considered during the development of effluent guidelines such as 40 CFR Part 435 under Section 304 of the CWA and WQS under Section 303 of the CWA.

One commenter stated that the proposed discharges from the five permitted facilities do not qualify for the agricultural and wildlife use exemption contained in 40 CFR Part 435, Subpart E because the discharges are not composed exclusively of produced water. The commenter stated that EPA regulations and supporting technical documents indicate that fracking flowback and used well treatment fluids do not qualify as produced water, based on the regulatory text and supporting technical documents. The commenter concluded that EPA did not consider the presence of fracture chemicals in produced water while developing 40 CFR Part 435, Subpart E, and did not expect them in waste streams.

Response: *The ELG in 40 CFR Part 435, Subpart E – Agriculture and Wildlife Water Use Subcategory, is applicable to onshore oil and gas facilities in the continental United States west of the 98th meridian that generate produced water that has a use in agriculture and wildlife propagation. If an oil and gas facility is so situated, then its produced water may be discharged subject to the requirements of 40 CFR § 435.52.*

Section 435.52 establishes two limitations related to produced water: a numeric limitation and a narrative limitation. The numeric limitation on produced water is an oil and grease limit of 35 mg/L. The narrative limitation is a broad prohibition, with one exception, against the discharge of waste pollutants from oil and gas facilities. It provides:

“There shall be no discharge of waste pollutants into navigable waters from any source (other than produced water) associated with production, field exploration, drilling, well completion, or well treatment (i.e., drilling muds, drill cuttings, and produced sands).”

The regulation identifies five activities undertaken at oil and gas facilities: production, field exploration, drilling, well completion, and well treatment. The regulation also identifies, in parentheses, four sources of pollutants associated with oil and gas activities: produced water, drilling muds, drill cuttings, and produced sands. EPA has historically read the parentheses in the regulation to identify the sole four pollutant sources associated with oil and gas activities subject to Subpart E. Thus, all pollutants must be identified with a particular source. If a pollutant is contained in drilling muds, drill cuttings or produced sands, it may not be discharged. If a pollutant is contained in produced water, it may be discharged. Because the list of pollutant sources in Section 435.53 is fairly limited, for the purposes of permitting, produced water may contain a variety of pollutants including those present in the formation water and those arising out of well treatment activities. Such pollutants may be discharged with the produced water so long as that water is of good enough quality for wildlife or livestock water, or other agricultural uses (i.e., “is of good enough quality”), and is actually put to that use.

The commenter challenges EPA’s long-standing interpretation of the regulatory text of Subpart E to allow the discharge of produced water that contains well treatment wastes, so long as it is of good enough quality. The commenter includes citations to some sections of the technical development document (TDD) EPA issued in September 1976 as it prepared to promulgate the interim final rules for Part 435. The TDD, titled “Development Document for Interim Final Effluent Limitations Guidelines and Proposed New Source Performance Standards for the Oil and Gas Point Source Category,” compiled EPA’s findings concerning the nature and treatment of wastewater discharges from oil and gas operations, both onshore and offshore. Among other things, the TDD divided the oil and gas industry into the different sub-categories currently found in Part 435, and recommended ELGs for each category. In doing so, the TDD characterized the waste streams generated by these different industry categories.

EPA agrees that certain parts of the TDD appear to state that well treatment and well workover fluids are a separate waste stream from produced water. However, the TDD is not uniform in this regard, and ultimately EPA has treated well treatment and well workover wastes as part of the production waste stream, which includes produced water. The TDD provides support for this approach. In characterizing these waste streams in the TDD, EPA clearly understood that well treatment and well workover wastes are similar to those produced by drilling and production activities. TDD, p. 41. More specifically, EPA anticipated that spent well acidizing and fracturing fluids are wastes that “are moved through the production, process and treatment systems after the well begins to flow again. Therefore initial production from the well will contain some of these fluids.” TDD, p. 23. Ultimately, EPA concluded that spent acid and fracturing fluids “do not appear as a discrete waste source.” TDD, p. 96. For most onshore oil and gas operations (i.e., those covered by Subpart C), this finding has no effect, as those operations are prohibited from discharging pollutants associated with produced water. However, because Subpart E does allow the discharge of pollutants in produced water, this finding supports EPA’s historic understanding of the regulatory language at Subpart E allowing discharge of well treatment wastes that appear in produced water, as long as it is of good enough quality to be used for wildlife or livestock watering or other agricultural uses and that produced water is actually put to such use during periods of discharge.

In the context of the TDD, the text of the regulatory language makes sense. While well treatment is a separate activity from the basic process of production, the waste streams are similar. Production entails the flow of oil and produced water from the well bore. When such flows wane, sands, acids, and other fluids are pumped down the well bore to stimulate additional production. Depending on rates of mixing, residence time downhole, and other factors specific to the well bore and the producing formation, the chemicals placed downhole return to the surface over time along with produced water and oil. For this reason, both the onshore ELG (i.e., Subpart C) and the agriculture and wildlife use ELG (i.e., Subpart E) do not refer to well treatment as a separate source of wastes. The onshore ELG prohibits discharge of all wastes, and the agriculture and wildlife ELG require treatment of wastes to ensure that the produced water is of good enough quality before it can be discharged.

Several commenters requested that EPA not renew the permits. Some suggested they should not be renewed because the water cannot be of good enough quality for wildlife.

Response: *EPA disagrees that the water cannot be of good enough quality for wildlife. Beyond the good enough quality issue commenters did not provide any specific reason why EPA should not renew these permits. EPA can only terminate an NPDES permit or deny permit renewal for specific reasons outlined at 40 CFR § 122.64, including noncompliance by the permittee with the permit; a determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit termination or modification; or a change in condition that requires temporary or permanent reduction or elimination of the discharge such as plant closure or termination of the discharge by connection to a publicly-owned treatment works.*

Clean Water Act:

Commenters stated that EPA has ignored its CWA NPDES authority by failing to require the five permitted facilities to disclose or list chemicals used in the oil and gas extraction process.

Response: *The NPDES authority under Section 402 of the CWA and implementing regulations under 40 CFR Part 122 control the discharge of pollutants. In response to comments received on chemical usage at these facilities, EPA has added a new permit condition including a chemical inventory requirement to maintain records on the types, quantities and chemical formulations used in well treatment and workover activities and an additional reporting requirement for well treatment and workover fluids if these fluids are discharged.*

Comments stated that the NPDES regulations for Oil and Gas Production in 40 CFR Part 435 Subpart E are outdated and did not consider fracking chemicals. Comments stated that fracking-related activities are exempt from major environmental laws that currently protect the public and the oil and gas industry does not have to comply with key provisions of the CWA. Other comments suggested that EPA should ban all fracking.

Response: *EPA takes note of these comments, but is not responding. These comments are outside the scope of the NPDES permitting process.*

Compliance Schedules for Sulfide:

One commenter stated that the permits do not protect the aquatic life use and are contrary to the CWA because the permits provide a three-year compliance schedule to achieve compliance with the WQBEL for sulfide.

***Response:** EPA has long interpreted CWA Section 301(b)(1)(C) as allowing compliance schedules for WQBELs if a State has indicated that it intends to allow them. See In the Matter of Star-Kist Caribe, Inc., 3 E.A.D. 172, 175, 177 (1990). The Tribes have adopted water quality requirements that include a provision authorizing the use of compliance schedules. Thus, because the effluent limit for sulfide is a WQBEL written to protect the aquatic life use of the receiving water, the compliance schedule for sulfide is consistent with the CWA and EPA's regulations.*

Monitoring/Disclosure of Toxic Chemicals:

Several commenters noted that toxic chemicals from fracking and well maintenance are not listed in the permit, expressed concern that EPA is not addressing the toxicity from these chemicals, and stated that effluent limits should be established. Commenters specifically questioned the lack of limitations to protect public health for the chemicals glycol, xylene, ethylene glycol, benzyl chloride, isopropanol, and naphthalene. Commenters also noted that the health effects for many of these chemicals are unknown and therefore the permit limits don't protect public health. Commenters also stated the permits should mandate the testing of chemicals that, while not listed in the Tribes' water quality requirements, have material safety data sheet information indicating they could pose animal and human health risks. Commenters also noted that the chemicals the companies used are proprietary and are not released for review. A related comment states that only one permit (Phoenix-Sheldon Dome) listed the trade names of the maintenance fluids used and that it is dangerously inconsistent for the other Wind River permits to exclude this similar product information.

Commenters stated that Wyoming requires operators to provide a full list of chemicals they propose to use in fracturing and requires operators to disclose the chemical abstract service numbers for all additives used along with the concentrations of those additives.

Comments expressed concern that the WET monitoring frequency and the toxics pollutant screen frequency do not adequately represent the discharge, particularly related to well maintenance and fracking. Comments suggest that monitoring should be tied to fracking or well treatment events.

***Response:** EPA is providing below a more detailed rationale with respect to permit discharge limitations and/or monitoring requirements associated with on-site activities which include well maintenance, produced water treatment, and well treatment (stimulation).*

***Well Maintenance and Produced Water Treatment:** Produced water is generated by the operation as long as the well is in production. The amount of produced water varies depending on many individual factors at the well. In some cases, produced water from one individual oil production well is treated and discharged while in other cases, produced water from multiple wells is comingled and sent to a common treatment system and then discharged.*

Some activities such as produced water treatment occur on a continuous basis. Some activities such as well maintenance occur at frequent regular intervals, e.g. biweekly. Due to the physical layout of the produced water treatment systems in place (emulsion breaking, heat treating, oil water separation, and holding ponds) the produced water discharge has a high probability of containing pollutants originating from both well maintenance activities and produced water treatment activity at any time.

EPA evaluated material safety data sheet (MSDS) chemical information for produced water treatment and well maintenance with usage frequency for one facility, Phoenix Production Sheldon Dome (WY-0024953). The information was used to evaluate if there was reasonable potential (RP) to cause an excursion above Tribal water quality criteria for any of the chemical substances listed in the MSDS sheets. EPA found there were only two pollutants in the maintenance and produced water treatment fluids that may occur at a concentration in the discharge which demonstrated RP to exceed water quality criteria established by the Tribes or published EPA water quality criterion established under Section 304(a) of the CWA. As explained in the Statement of Basis for that proposed permit, those pollutants were zinc and trimethyl benzene. A limitation was placed in that permit for zinc. For trimethyl benzene, an appropriate monitoring method could not be established due to the lack of an approved analytical method under 40 CFR Part 136 or other readily available analytical method. Only one potential solid waste analytical method was found that required a procedure modification to quantify trimethyl benzene. EPA determined the use of this method with the modification would be impractical and costly for the permittee to implement as part of a regular monitoring requirement.

For the other four permits, no specific information on chemicals used in the well maintenance and produced water treatment was provided in the permit applications. EPA did evaluate the permit application information and previous self-monitoring conducted by the permittees to determine whether they contain pollutants that have associated water quality criteria. Where the data indicated the presence of pollutants subject to water quality criteria, EPA sought to determine if the pollutants were present at levels that would cause or contribute to an excursion of water quality criteria. However, without the information from monitoring required in the renewal permit, a decision to include (or not) new permit limitations would be based on insufficient data (e.g. one point). Due to the lack of sufficient information on potential pollutant concentrations and the variability of those pollutants in the discharge, all the proposed permits contain monitoring requirements for metals, volatile and semi-volatile organics, and WET. These sample results will be sufficient to allow EPA to further characterize the pollutants in the discharge and, if necessary, establish limits to prevent the discharge of toxic substances in toxic amounts.

As explained above, chemicals associated with well maintenance activities and produced water treatment activity have a high probability of being in the discharge at any particular time. Therefore, the monitoring frequencies established in the proposed permits are appropriate to characterize the discharge of potential toxic pollutants which may be present as a result of added produced water treatment and well maintenance chemicals. Because of the likelihood that any pollutants in the well maintenance and produced water treatment fluids will be present at times during the monitoring event, the resulting monitoring data will be representative of the actual discharge.

Well Treatment: For other infrequent activities such as well treatment (e.g., acidizing, stimulation), EPA did not have sufficient information on quantities and concentrations of chemical substances either provided by the permittee or available from publically available information sources (e.g., websites such as FracFocus), to assess whether any of the pollutants potentially present in the well treatment fluids will cause or contribute to an excursion of Tribal water quality requirements or cause toxicity in the produced water discharge. In order to gather more information on chemical usage in well treatment and workover activities as discussed above, EPA has added a new chemical inventory requirement. The chemical inventory requires the permittee to maintain records on the types, quantities and chemical formulations used in well treatment and workover activities; as well as instituting an additional reporting requirement for well treatment and workover fluids if these fluids are discharged.

In some cases where EPA was able to identify what pollutants are present in well treatment fluids, EPA nonetheless lacked sufficient information to develop effluent limitations. EPA evaluated well treatment chemical quantity and concentration information provided by Phoenix Production to determine whether those chemicals had RP to exceed WQS pursuant to 40 CFR § 122.44(d)(1)(i). However, EPA did not find any applicable water quality requirements established by the Tribes, or a published EPA water quality criterion established under Section 304(a) of the CWA, for the substances identified in Phoenix Production's well treatment fluids and, as a result, could not complete a RP determination.

The ability of the permittees to collect samples at the frequencies specified in the renewal permits is achievable, but can be challenging because of geographical location and physical site conditions. The locations of the facilities are very remote and are not staffed 24 hours per day. Meeting sample holding times and performing on-site testing can be difficult also due to these conditions.

Commenters suggested that monitoring requirements be tied specifically to well treatment events. Additional monitoring to try and specifically monitor (i.e., target) a produced water discharge containing well treatment fluids after a treatment was performed would require a highly complex and very expensive testing scheme that would not guarantee accurate or representative results. Targeting those discharges would require calculating, or otherwise determining, when the produced water impacted by a treatment event would actually discharge from the outfall. The presence of well treatment related pollutants at the outfall would depend on a number of site specific factors at each facility that affect hydraulic detention times and mixing characteristics, which in turn greatly influence the potential pollutant concentrations that will be present in a facility's discharge. These site-specific factors include the physical layout of the wells, the produced water treatment system in place, and the presence of final holding ponds prior to the actual discharge. EPA considered different methods of detecting well treatment pollutants in facility discharges including requiring the inclusion of "tracer" substances in the well treatment fluids, or requiring enhanced monitoring of an indicator substance such as Total Dissolved Solids (TDS) before, during and after well treatment events. These approaches could provide some indication of when the well treatment fluids and formation water mixture was actually being discharged; however, neither approach proved workable. Requiring the inclusion of a "tracer" substance in well treatment mixtures to be injected downhole would require a complex special study and extensive modeling.

Moreover, EPA does not have CWA authority to require the addition of substances or pollutants into an actual industrial operation, such as an oil and gas well, and such activity may require modification of an Underground Injection Well (UIC) permit. Enhanced sampling of an indicator substance would require extended and frequent sampling which, given the factors described above, would be extremely difficult. Further, well treatment often uses significant volumes of water and the utility of any indicator substance would depend on the characteristics of the water used.

EPA does not have or has not seen sufficient compelling information from the NPDES permit application data and other information sources (i.e. Phoenix Production, FracFocus) on the chemical composition of the well treatment fluids to justify such highly complex and expensive testing requirements. However, EPA has added a requirement for a chemical inventory to the permits which will supply more data to inform future permitting.

More broadly, EPA is improving our scientific understanding of hydraulic fracturing and providing regulatory clarity and protections against known risks. Information on these activities is available here:

<http://www2.epa.gov/hydraulicfracturing>

Environmental Justice:

Comments stated that these permits as currently drafted don't serve their intended purpose of protecting water quality, public, wildlife, and livestock health and would not provide equal protection to all the citizens of Wyoming. Commenters assert that under current state regulations these discharges would not be permissible elsewhere in Wyoming, mainly based on the lack of disclosure of fracking chemicals. Permitting these discharges therefore is counter to the standards the state of Wyoming has established in the rest of the state and would unfairly burden the residents of the Wind River Indian Reservation with potential exposure to hazardous constituents in these waste streams.

Response: *Because these permits are for discharges on the Wind River Indian Reservation, EPA has written them to meet the water quality requirements adopted into Tribal law by the Tribes. Nonetheless, the permits drafted by EPA are as, or more, stringent in controlling specific pollutants as similar permits issued by the Wyoming Department of Environmental Quality (WDEQ). Regarding the lack of a reporting requirements for well treatment and maintenance chemicals, in response to this and other comments, EPA has added a requirement that the facilities disclose any such chemicals that are discharged.*

Groundwater:

Comments stated there is no discussion about the contamination of groundwater.

Response: *These permits are for discharges to surface water. Under the CWA, EPA has only the authority to issue NPDES permits for discharges of pollutants to surface waters. EPA cannot issue NPDES permits that directly regulate discharges to groundwater.*

Public Health/ Effect on People/ Side Effects/Benzene:

Commenters stated that the permits do not protect human health in their current state. Commenters stated that the permits should consider the effects of the permitted discharges on the food chain, either through the consumption of cattle that ingested the produced water or the consumption of plants irrigated by the produced water.

***Response:** As described above, EPA developed both TBELs and WQBELs for these permits. The TBELs for sulfate, specific conductance, chloride and TDS were developed to ensure that the discharges are of good enough quality for wildlife and livestock watering and other agricultural uses. EPA has historically interpreted this to mean that the water may be consumed by wildlife or livestock without causing chronic or acute health effects. Thus, the TBELs are written to protect use of the water by wildlife and livestock based on the latest research, which is contained in the administrative record for the permit.*

The WQBELs in the permit are written to protect the aquatic life uses designated for Class 3B waters by the Tribes in their water quality laws. There are no human consumption or recreation uses designated for these waters.

Commenters questioned the lack of limitations to protect public health for various chemicals, including glycol, ethylene glycol, benzyl chloride, isopropanol, naphthalene, and xylene. Commenters stated that the health effects for many of these chemicals are unknown and therefore the permit limits are lacking in protection of public health.

***Response:** As described above, EPA developed TBELs and WQBELs for these permits to ensure the discharges are of good enough quality for livestock and wildlife water and other agricultural uses, and to protect the aquatic life uses of the receiving waters. EPA considered tribal water quality requirements, recommended CWA 304(a) criteria, and available literature in determining whether the uses were protected and if limitations for glycol, xylene, and ethylene glycol, benzyl chloride, isopropanol, naphthalene, and xylene in the discharge would be required. The EPA determined that it is unlikely there is RP for these pollutants in the discharge to cause or contribute to an excursion of the Tribal aquatic life water quality criteria or EPA criteria. However, the EPA does not believe it has sufficient information on the concentrations of these constituents in the discharge to evaluate all applicable CWA requirements for establishing potential effluent limitations and is requiring monitoring of the effluent to gather that data. Using the information gathered during the monitoring, EPA will reevaluate the data against regulatory requirements under 40 CFR Part 122 to determine if limits are needed for future permit renewals.*

One commenter stated that because benzene levels in the discharge may be higher than a drinking water standard, there should be an effluent limit for benzene. Other commenters stated that benzene is a known carcinogen and although the stream has not been determined to be a tribal drinking water source, no level should be permitted.

Response: As described above, EPA can only write NPDES permit limits - including no discharge limits – using the authorities provided by CWA Sections 301 and 402. Thus, the permit writer must determine whether a pollutant may be limited by a TBEL or a WQBEL. As described in the Statements of Basis for each permit, the permit writers had limited data regarding the concentrations of benzene in the effluent from these facilities. The permit writers reviewed the available literature on benzene to determine what concentration of benzene in the discharges would ensure that they are of good enough quality for livestock and wildlife watering, as required by 40 CFR Part 435, Subpart E. Neither EPA nor the Tribes have water quality criteria for benzene for livestock watering. Likewise, there is very little research into the effects of benzene in drinking water on cattle. The permit writers identified a single published report by the American Petroleum Institute and based on Canadian research suggesting that benzene concentrations of 31,400 µg/L in drinking water would be protective of beef cattle. This is roughly three orders of magnitude higher than the limited concentration data available to EPA for the discharges. Without a firm scientific basis to establish a TBEL based on livestock watering, permit writers could not establish a TBEL for benzene.

The permit writers also considered whether a WQBEL for benzene would be necessary. There are no uses of the receiving waters that implicate human health, including drinking water use or recreational uses. Thus, the only designated use for the receiving waters other than livestock watering is aquatic life. While there are recommended human health criteria and a Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) for benzene, there are no aquatic life criteria for benzene. Without a designated use or criterion against which to develop a discharge limit, permit writers could not establish WQBELs for benzene.

While EPA could not establish a TBEL or WQBEL for benzene in these permits, it recognizes that the limited dataset suggests that benzene concentrations in the effluent exceed both EPA's human health criterion and the SDWA MCL for benzene. To allow permit writers to better characterize benzene concentrations in the effluent, and thus aid in permit development in future cycles, EPA has included additional benzene monitoring of the effluent.