



## CDP Water Disclosure 2013 Information Request Anadarko Petroleum Corporation

### Module: Introduction

#### Page: Introduction

#### 0.1 Introduction

**Please give a general description and introduction to your organization.**

Anadarko's mission is to deliver a competitive and sustainable rate of return to shareholders by exploring for, acquiring and developing oil and natural gas resources vital to the world's health and welfare. As of year-end 2012, the company had approximately 2.56 billion barrels-equivalent of proved reserves, making it one of the world's largest independent exploration and production companies. For more information about Anadarko, please visit <http://www.anadarko.com>.

#### 0.2 Reporting Year

**Please state the start and end date of the year for which you are reporting data.**

Enter the period that will be disclosed.

Sun 01 Jan 2012 - Mon 31 Dec 2012

#### 0.3 Reporting Boundary

**Please indicate the category that describes the reporting boundary for companies, entities, or groups for which water-related impacts are reported.**

Companies, entities or groups over which operational control is exercised

#### 0.4 Exclusions

**Are there any geographies, facilities or types of water inputs/outputs within this boundary which are not included in your disclosure?**

Yes

#### 0.4a List of Exclusions

**Please describe any exclusion(s) in the following table.**

Exclusion	Please explain why you have made the exclusion
waste water from oil and gas production	This water is a byproduct of oil and gas production and is considered a waste stream. It is typically high in salinity and is not "used" for anything. Most produced water is simply separated from the oil and gas and re-injected into a deep reservoir.

### Module: Water-Governance

#### Page: Water-1-ManagementGovernance

**1.1**  
**Does your company have a water policy, strategy or management plan?**

Yes

**1.1a**  
**Please describe your policy, strategy or plan, including the highest level of responsibility for it within your company and its geographical reach.**

Country or region	Description of policy, strategy or plan	Position of responsible person
Company-wide	Anadarko is committed to safely conducting our business activities in a manner that protects the environment, and minimizes our impact on the land, air and water. Our strategy for managing water-related issues is implemented at multiple levels: Anadarko is undertaking a rigorous macro-level analysis of the company's water management strategies in order to inform decisions about water-related issues and to enhance our water management, conservation and recycling programs. Water management is also sub-divided by region: Southern and Appalachia, Rockies, Gulf of Mexico, and International/Frontier. Current international operations are primarily located in the following regions: Algeria, Brazil, China, New Zealand, East Africa and West Africa. Frontier refers to the company's operations in Alaska. Water-related issues are also assessed and managed at the watershed level. Environmental impact is a particular concern at this level. Potential impacts to watersheds and water sources are also analyzed on a per-project basis. Anadarko's Legal, Regulatory, and EHS (Environment, Health and Safety) departments monitor current and future issues related to water risk and management. Our management strategy includes tracking total water volume used in our operations; sources of water (surface, groundwater, municipal, etc.); volume of water recycled; volume of water discharged; and volume of water injected. Anadarko is undertaking a rigorous analysis of our water management practices, performance and opportunities for improvements in water use efficiency. We were among the first to implement comprehensive water recycling programs in our Rockies, Southern and Appalachia regions, and we constantly evaluate opportunities to apply these programs to other assets around the world. We comply with local, state, regional and federal requirements regarding water quality, wastewater treatment and the protection of watersheds. In addition, as part of our goal to be a leader in environmental stewardship, when operating internationally, we often implement standards that are more stringent than the host nation's requirements, and require that our contractors meet those standards as well. Hydraulic fracturing regulations to protect water sources are closely tracked by the company's Enterprise Risk Management function.	Officer/manager reporting directly to the board
Company-wide	Our EHS policy states that we strive to be a recognized industry leader in environmental stewardship. We have demonstrated that leadership through numerous awards and recognitions as well as being a founding member of both the American Carbon Registry and The Climate Registry. Consistent environmental policies are implemented across the corporation. The Director of Environment, Health and Safety is responsible for environmental policies.	Officer/manager not directly reporting to the board
Company-wide	To protect groundwater, we meet or exceed industry standards by installing layers of concentric, impenetrable steel casing which are sealed with cement and, if appropriate, conduct baseline tests of the water supply.	Officer/manager not directly reporting to the board

**1.1b**  
**Does the water policy, strategy or plan specify water-related targets or goals?**

Yes

**1.1c**  
**Please describe these water-related targets or goals and the progress your company has made against them.**

Country or region	Category of target or	Description of target or	Progress against target or goal
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	goal type	goal	
Company-wide	Direct operations	We have begun the process of assessing our company's water management strategies region-by-region, and have set the goal of reporting and sharing strategies and lessons learned.	Anadarko Petroleum Corporation recognizes that proper water management and water conservation are essential in developing energy resources for our world. The availability of water combined with varying municipal, industrial, agricultural and other demands affect governments, businesses and individuals in many parts of the world. In December 2011, Anadarko employees from every region gathered to discuss and share best management practices for water management, as well as challenges, risks and opportunities. We have built on the lessons learned from that conference to better evaluate and improve performance in water management across the company.
Company-wide	Direct operations	As described above, Anadarko has put in place strategies to increase water-related efficiency and conservation, and we have taken the necessary first steps toward these objectives.	Our actions include tracking water use to establish a robust baseline regarding key water metrics including total water volume used in our operations; sources of water (surface, groundwater, municipal, etc.); volume of water recycled; volume discharged; and volume injected. From this baseline, we will be able to measure the impact of our newly initiated water recycling and conservation programs, helping us accomplish our objectives and expand these programs company-wide. This will also provide a context to inform our current analysis of water-related risk throughout our operations. Additionally, we comply with local, state, regional and federal requirements regarding water quality, wastewater treatment and the protection of watersheds. As part of our commitment to be a leader in environmental stewardship, when operating internationally, we undertake a comprehensive bridging process to assess differences between company, contractor and national standards, including those related to water. To the extent practicable, we implement standards that are more stringent than the host nation's requirements, and require that our contractors meet those standards as well.
United States of America	Direct operations	Protection of water sources in hydraulic fracturing operations	In order to protect local aquifers, we are committed to constructing our wells in a manner that often exceeds regulatory requirements and industry standards. Across our U.S. onshore operating areas, we require that multiple protective layers of steel pipe, also called casing, and cement be set several hundred feet below the deepest known aquifer and sealed with cement all the way to the surface. The cement must meet certain quality requirements and extend the full length of the casing. These redundant protective boundaries are put in place to establish wellbore integrity. Additionally, the casing is pressure tested, the cement's quality, the quality of the bond between cement and casing is checked, and pressure gauges are installed to monitor the well for mechanical integrity once production begins.
		Water management	In the Marcellus Shale and the Rockies, Anadarko's water-management and well-completion strategies strive to reduce truck traffic and associated emissions, while minimizing earth disturbance and conserving available water resources. A creative piping system using two lines, one for natural gas and one for fresh water (located in the same trench) provides water to well sites for the completion process. The closed-loop system moves water from a pre-determined and approved source through pipelines to containment facilities for use in the hydraulic fracturing process. Anadarko has employed the use of temporary earthen impoundments and portable, aboveground holding ponds (PortaDams) to store water required for completion operations. The flowback water from operations is produced into steel tanks and treated on site using

United States of America	Direct operations	in Pennsylvania Marcellus Shale and the Rockies	newly developed water filtration and recycling technologies. The flowback water that is recovered is then recycled and reused in future operations. Additionally, we collect drill cuttings, or pieces of earth that return to the surface in the drilling operations, in steel containers until they can be properly tested and disposed of in accordance with all regulations. In the Marcellus Shale we have pumped approximately 3.5 million barrels (147 million gallons) of fresh water to well locations, eliminating 35,000 truckloads (70,000 trips) since commissioning two water withdrawal pump stations in the 3rd quarter of 2011. We expect to commission three more pump stations by the end of this year. In total, we anticipate eliminating approximately 1,200 truckloads of water per day. This will improve air quality due to reduced emissions, preserve road conditions and enhance safety for the public. We have collaborated with other E&P Operators in mutually sharing pump station and withdrawal sites.
Company-wide	Transparency	Transparent use of hydraulic fracturing materials	Anadarko supports the public sharing of information regarding additives used in hydraulic fracturing. Anadarko was instrumental in initiating and developing a hydraulic fracturing disclosure website to share publicly the ingredients used in its hydraulic fracturing activities with the public on an individual-well basis. The website was a cooperative effort among producers, the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission. Anadarko took a leading role in designing and coordinating this website and is among the most active participants. The website may be viewed at <a href="http://fracfocus.org">http://fracfocus.org</a> .
United States of America	Direct operations	Create programs for water recycling and reuse in the Rockies	Anadarko received an Outstanding Operator award in 2010 for its operations in Colorado by the Colorado Oil and Gas Conservation Commission (COGCC) in recognition for their water-quality protection. In the Greater Natural Buttes area of Utah, Anadarko was recognized by the Utah Division of Oil, Gas and Mining with its 2010 Earth Day Award, and by the Interstate Oil & Gas Compact Commission with its 2010 Chairman's Award for the Anadarko Completions Transportation System (ACTS). This creative water-management program creates temporary staging sites on existing natural gas well locations that treat recycled flowback water that is used for hydraulic fracturing and move the filtered water directly to the next operation via temporary pipelines. These pipelines use existing pad locations and rights of way that minimize additional surface disturbance, truck traffic and associated emissions. In Wyoming, we have a 48-mile water pipeline that transports produced water from our coal bed methane operations in the Powder River Basin south to our Salt Creek field where it is stored in underground aquifers that match the quality of the produced water so it can potentially be used in the future.
Company-wide	Direct operations	Measuring and reporting	We measure the following: - Water consumption in all hydraulic fracturing operations; - Water discharge volumes to surface at select operations; - All water injected; - Quality of water discharge in all operations; - Produced water in all operations; and- Water recycled at select operations.
Mozambique	Community engagement	Increasing access to fresh drinking water	Anadarko has installed twelve drinking wells in the past year in several areas of the Cabo Delgado province of Mozambique. Three of these wells are set aside for immediate community use, while the others will be given to local communities after completion of the construction project.
United States of America	Community engagement	Community engagement around hydraulic fracturing	Anadarko has participated in a committee formed by the American Petroleum Institute to develop good practice guidelines for community engagement around hydraulic fracturing onshore USA. These guidelines will help the industry demonstrate its commitment to being a good neighbor to communities where we operate by promoting transparency and open, timely communication.

## 1.2

**Do you wish to report any actions outside your water policy, strategy or management plan that your company has taken to manage water resources or engage stakeholders in water-related issues?**

Country or region	Category of action	Description of action and outcome
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United States of America	Direct operations	Local aquifers must be protected, and we are committed to constructing our wells in a manner that often exceeds regulatory requirements and industry standards. In the drilling of wells across our U.S. onshore operating areas, we require that multiple protective layers of steel pipe, also called casing, and cement be set several hundred feet below the deepest known aquifer and cemented all the way to the surface. The cement must meet certain quality requirements and extend the full length of the casing. These redundant protective boundaries are put in place to establish wellbore integrity. Additionally, the casing is pressure tested, the cement's quality and placement is checked, and pressure gauges are installed to monitor the well for mechanical integrity once production begins.
United States of America	Direct operations	In the Marcellus Shale, Anadarko's water-management and well-completion strategies strive to reduce truck traffic and associated emissions, while minimizing earth disturbance and conserving available water resources. A creative piping system using two lines, one for natural gas and one for fresh water (located in the same trench) provides water to well sites for the completion process. The closed-loop system moves water from a pre-determined and approved source through pipelines to containment facilities for use in the fracture-stimulation process. Anadarko has employed the use of temporary earthen impoundments and portable, above-ground holding ponds (PortaDams) to store water required for completion operations. The flowback water from operations is produced into steel tanks and treated on site using newly developed water filtration and recycling technologies. The flowback water that is recovered is then recycled and reused in future operations. Additionally, we collect drill cuttings, or pieces of earth that return to the surface in the drilling operations, in steel containers until they can be properly tested and disposed of in accordance with all regulations.
United States of America	Direct operations	In the Greater Natural Buttes area, Anadarko was recognized by the Utah Division of Oil, Gas and Mining with its 2010 Earth Day Award, and by the Interstate Oil & Gas Compact Commission with its 2010 Chairman's Award for the Anadarko Completions Transportation System (ACTS) This creative water-management program creates temporary staging sites on existing natural gas well locations that treat recycled flowback water that is used for fracture stimulation and move the filtered water directly to the next operation via temporary pipelines. These pipelines use existing pad locations and rights of way that minimize additional surface disturbance, truck traffic and associated emissions.
United States of America	Direct operations	We constructed a 48-mile water pipeline that transports produced water from our coalbed methane operations in the Powder River Basin south to our Salt Creek field where it is stored in underground aquifers that match the quality of the produced water so it can potentially be used in the future.
Rest of world	Direct operations	We measure the following: Water consumption in all hydraulic fracturing operations; Water discharge volumes to surface at select operations; All water injected; Quality of water discharge in all operations; Produced water in all operations; and Water recycled at select operations.
Mozambique	Community engagement	Anadarko has installed drinking water wells to increase access to freshwater in several communities in northern Mozambique. We are also developing projects to increase access to drinking water and sanitation in our project-affected areas in the Palma District. These projects will be launched early 2014.
United States of America	Transparency	Anadarko supports the public disclosure of information regarding additives used in hydraulic fracturing. Anadarko was instrumental in initiating and developing a voluntary hydraulic fracturing disclosure Website to provide ingredients used in hydraulic fracturing to the public on a per-well basis. The Website was a collaboration among producers, the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission. Anadarko took a leading role in designing and coordinating this Website and is among the most active participants. The Website may be viewed at <a href="http://fracfocus.org/">http://fracfocus.org/</a>

## Further Information

Anadarko participated in the drilling of more than 1,300 wells in the U.S. onshore – approximately 80 percent of which required hydraulic fracturing. Hydraulic fracturing is generally applied to formations that are more than a mile below the surface (4,000 to 14,000 feet); whereas, potential sources of ground water typically reside much closer to the surface (between 100 and 500 feet). Hydraulic fracturing involves the injection of fluid (generally consisting of water, sand and a proportionately small amount of additives) under pressure through multiple protective layers of steel pipe, concrete and rock into a pre-determined oil or natural gas-bearing formation. The water and pressure open microscopic pathways, which are propped open by grains of sand. These pathways allow the natural gas or oil to flow to the wellbore and ultimately be produced at the surface. As mentioned above, the process includes multiple steps to protect water supplies. Anadarko requires that multiple protective layers of steel pipe, also

called casing, and cement be set several hundred feet below the deepest known aquifer and cemented all the way to the surface. The cement must meet state quality requirements and extend the full length of the casing. These redundant protective boundaries are put in place to establish wellbore integrity. Additionally, the casing is pressure tested, the cement's quality and placement is checked, and pressure gauges are often installed to monitor the well for mechanical integrity once production begins. With these and other precautions taken, fracturing fluids are pumped deep into the well at pressures sufficient to create or restore the small fractures in the reservoir rock needed to make production possible. The ingredients used in hydraulic fracturing fluids vary according to geology. In general terms, water makes up more than 90 percent of the solution; sand or proppant constitutes approximately 9 percent; and additives make up less than 1 percent of the total volume. The relatively small amounts of additives generally consist of friction reducers, biocides to prevent bacterial development, and scale inhibitors. Anadarko publicly shares the additives used for each well online at [Fracfocus.org](http://Fracfocus.org). Fluid Handling and Disposition: Following hydraulic fracturing, fluids returned to the surface within a specified length of time are referred to as flowback. Besides the original fluid used for fracturing, flowback can also contain fluids and minerals that naturally occur in the fractured formation. The responsibility for regulating wastes such as flowback fluid lies with one or more state regulatory agencies, depending on the state. In at least nine states, the jurisdiction over waste management for oil and natural gas exploration and production activity involves more than one agency. Proper disposal of flowback fluids is critically important to the protection of both surface and ground water. The majority of flowback fluids are disposed of in underground injection wells. Injection of flowback fluids is conducted in a Class II injection well. Underground injection of flowback is regulated either by the U.S. Environmental Protection Agency's (EPA) Underground Injection Control (UIC) program or by a state granted primary UIC enforcement authority by the EPA.

## Module: Water-RisksOpps

### Page: Water-2-indicators-op

#### 2.1

**Are any of your operations located in water-stressed regions?**

Yes

#### 2.1a

**Please specify the method(s) you use to characterize water-stressed regions (you may choose more than one method).**

Method used to define water stress	Please add any comments here:
Environmental assessment	
Internal company knowledge	
WWF-DEG Water Risk Filter	

#### 2.1b

**Please list the water-stressed regions where you have operations and the proportion of your total operations in that area.**

Country or region	River basin	Proportion of operations located in this region (%)	Further comments
United States of America	Colorado(Pacific Ocean)	31 – 40	Potential water stress due to drought conditions
United States of America	Other: Permian Basin	1 – 10	Water stress due to drought conditions
Morocco	Sous	1 – 10	Water stressed region
United States of America	Other: Maverick Basin	1 – 10	Water stress due to drought conditions

#### 2.2

**Are there other indicators (besides water stress) which you wish to report that help you to identify which of your operations are located in regions subject to water-related risk?**

Yes

#### 2.2a

**Please list the regions at risk where you have operations, the relevant risk indicator and proportion of your total operations in that area.**

Country or region	River basin	Risk Indicator	Proportion of operations located in this region (%)	Further comments
Rest of world	Other: Developing countries	Inadequate water infrastructure	21-30	
Company-wide		Tightening of regulations	91-100	
Company-wide		Other: Litigation	91-100	

**2.3**

Please specify the total proportion of your operations that are located in the regions at risk which you identified in questions 2.1 and/or 2.2.

100%

**2.4**

Please specify the basis you use to calculate the proportions used for questions 2.1 and/or 2.2.

Basis used to determine proportions	Please add any comments here
Production volumes	

**Further Information**

We recognize that water is a precious resource, thus we consider water-related risk to be a factor in all of our operations. For this reason, we analyze risks related to the availability of water, potential impact on watersheds and water sources, legal and regulatory issues, and stakeholder concerns for all plays. The level and type of risk varies by region and activity. For example: Drought conditions in Texas, Wyoming, and Utah have the potential to reduce the availability of water. Hydraulic fracturing operations are currently the subject of public controversy and regulatory scrutiny. Access to water in developing countries may be limited by a lack of physical infrastructure. Potential impacts to water sources and watersheds must be assessed and managed.

**Page: water-indicators-sc**

**2.5**

Do any of your key inputs or raw materials (excluding water) come from regions subject to water-related risk?

Don't know

**2.5b**

You may explain here why you are not able to identify if any of your key inputs or raw materials come from regions subject to water-related risk and whether you have plans to explore this issue in the future.

Although we currently do not have information regarding water-intensive inputs throughout the supply chain, we are reviewing these concerns. We assume that our suppliers are subject to many of the same water-related risks and challenges that we face, and we are working on strategies to assess and manage supply chain issues as a part of our overall strategy.

**Page: water-3-riskassess-op**

**3.1**

Is your company exposed to water-related risks (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?

Yes

**3.1a**

Please describe (i) the current and/or future risks to your operations, (ii) the ways in which these risks affect or could affect your operations before taking action, (iii) the estimated timescale of these risks, and (iv) your current or proposed strategies for managing

them.

Country or region	River basin	Risk type	Potential business impact	Estimated timescale (years)	Risk management strategies
United States of America		10. Regulatory: Regulatory uncertainty	Increased cost to operations	Current	Effective policy analysis and involvement in legislation/regulatory rule/law-making Dedicated pre-compliance preparation for requirements as well as robust compliance assurance
United States of America		15. Other: Reputational damage	Reputation risk could lead to increased regulatory oversight, fewer exploration opportunities and/or project delays	Current	Efficient and focused external stakeholder engagement with local communities, state and federal agencies, NGOs, and resident groups that begins with project conception continues through the life and decommissioning of the producing well
United States of America		03. Physical: Increased water stress or scarcity	Possible restrictions on groundwater withdrawal could lead to project delays	1 – 5	Anadarko is assessing ways to improve water efficiency
Company-wide		15. Other: Reputational damage	Reputational damage could impact our ability to do business in certain areas	Current	Stakeholder engagement and continuous focus and improvement in the areas of safety and environmental impact minimizes this risk
Company-wide		10. Regulatory: Regulatory uncertainty	More stringent regulatory standards could cause project delays and increase costs. Additionally, we were forced to stop all operations in the Gulf of Mexico during a lengthy moratorium while regulations were under review	Current	Effective policy analysis and involvement in legislation/regulatory rule/law-making. Dedicated pre-compliance preparation for requirements as well as robust compliance assurance
Company-wide		13. Other: Litigation	Litigation and associated legal fees or fines related to water contamination is potentially costly to company	Current	Continuous focus on safety and environmental impact minimizes this risk
Other: Developing countries		16. Other: Inadequate infrastructure	Anadarko's operations in developing countries are increasing. Future international production could be affected by limited infrastructure	1 – 5	Continual assessment of existing water supplies and infrastructures in areas of exploration
United States of America		11. Regulatory: Statutory water withdrawal limits/changes to water allocation	Regulatory risk could lead to project delays due to limited water sources and permitting requirements	Current	Effective policy analysis and involvement in legislation/regulatory rule/law-making. Dedicated pre-compliance preparation for requirements as well as robust compliance assurance

### 3.2

**What methodology and what geographical scale (e.g. country, region, watershed, business unit, facility) do you use to analyze water-related risk across your operations?**

Risk methodology	Country or geographical
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<p>Analysis of water-related risk is undertaken at multiple levels. A macro-level analysis of water-related risk informs decisions about water-related activities. The methodology used for this analysis begins with an information-gathering process to establish baseline activities company-wide. This information is then used to consider water-related risk as part of our enterprise risk management function. Hydraulic fracturing is already analyzed in our enterprise risk management. Risk analysis and management is also sub-divided by region. Regional analysis includes taking into account such issues as water stress, water availability, regional and local regulations, and stakeholder concerns. Water-related risk is also analyzed at the watershed level. Environmental impact is a particular concern at this level. Site surveys and sampling are used to collect baseline data in order to analyze potential impacts. Water-related risk is analyzed on a per-project basis. One methodology used for this level of analysis is the EIA and EIS. Anadarko's Legal, Regulatory, and EHS departments monitor current and future issues related to water risk and management.</p>	<p><b>scale</b></p>
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**3.3 Do you require your key suppliers to report on their water use, risks and management?**

No

**3.4 Is your supply chain exposed to water-related risks (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?**

Don't know

**3.4c Please explain why you do not know if your supply chain is exposed to any water-related risks that have the potential to generate a substantive change in your business operation, revenue or expenditure, and if you have plans to assess this risk in the future.**

Though we have not undertaken a thorough analysis of water-related risks throughout the supply chain, our supply chain is likely subject to similar risks as our company and throughout the oil and gas industry.

**4.1 Has your business experienced any detrimental impacts related to water in the past five years?**

Yes

**4.1a Please describe these detrimental impacts including (i) their financial impacts and (ii) whether they have resulted in any changes to company practices.**

Country	Impact indicator	Description of impact	Response strategy
Company-wide	Tightening of regulations	With regard to hydraulic fracturing, the uncertain regulatory environment and changes in regulatory requirements increases costs and causes delays in our operations. The BP oil spill in the Gulf of Mexico in 2010 increased the perceived risk associated with deep-water drilling and the ability to respond to and contain a similar event in the future. A government-imposed moratorium on drilling in the Gulf, a more stringent regulatory environment, and reputational damage to the broader oil and natural gas industry also affected the company's ability to operate in this core area for a period.	Anadarko has committed to improving transparency around hydraulic fracturing in an effort to address concerns and gain public trust.

## 5.1

Do water-related issues present opportunities (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?

Yes

## 5.1a

Please describe (i) the current and/or future opportunities, (ii) the ways in which these opportunities affect or could affect your operations (iii) the estimated timescale and (iv) your current or proposed strategies for exploiting them.

Country or region	Opportunity type	Potential business impact	Estimated timescale	Strategy to exploit opportunity
Other: Worldwide	Cost savings	Innovative recycling and treatment could reduce costs of disposal	6 – 10	We are currently assessing technologies and opportunities for water recycling and treatment
United States of America	Cost savings	Innovative recycling and treatment could reduce the amount of water purchased for operations	6 – 10	We are currently assessing technologies and opportunities for water recycling and treatment

Page: Water-6-tradeoffs

## 6.1

Has your company identified any linkages or trade-offs between water and carbon emissions in its operations or supply chain?

Yes

## 6.1a

Please describe the linkages or trade-offs and the related management policy or action.

Linkage or trade-off	Policy or action
Linkage	<p>Hydraulic Fracturing for Deep Shale Natural Gas -- The company is increasing its exploration and production of deep shale natural gas resources. The proven and advancing technology of hydraulic fracturing combined with horizontal drilling techniques make it possible to access oil and natural gas in shale formations that were previously thought to be uneconomic. Natural gas is a cleaner-burning alternative for many of America's energy needs, including cooking, heating, cooling, electricity generation, and increasingly in the area of fleet transportation. Because of the advent of shale plays, natural gas is now considered domestically abundant, with most independent studies estimating more than a 100-year supply that continues to grow with technology. Although the development of natural gas from shale requires large amounts of water, studies have shown the amounts are smaller on a relative basis when compared to the water-requirements of other industrial and agricultural uses, and the benefits of natural gas are far reaching. These include reducing the carbon footprint of energy use and reducing the America's dependence on foreign oil. In order to balance water use and access to energy, we are investing in water recycling and treatment programs. We have implemented water-recycling programs in our Rockies, Southern and Appalachia regions, and we are investigating expanding these programs in other areas of operation. Fluid Recycling Advances in flowback fluid recycling and treatment technology offer the promise of using flowback fluid for other purposes. The use of filtration, reverse osmosis, decomposition in constructed wetlands, ion exchange and other technologies may eventually result in the widespread practice of using flowback fluids for such things as managed irrigation and land application. One practice in use today is the recycling of flowback fluids for their reuse in other hydraulic fracturing applications, which saves water. Anadarko recycles flowback fluids in its hydraulic fracturing operations where feasible in Colorado, Pennsylvania, Utah and Wyoming. We are investigating similar programs in our other areas of operation. We do not currently have hydraulic fracturing operations internationally.</p>
Linkage	<p>Water Used for Oil and Gas Production Compared to Other Energy Sources -- As demonstrated by a report titled "The Environmental Cost of Energy" by the American Energy and Environmental Research Foundation, the amount of water required to access deep shale gas by the hydraulic fracturing process (water intensity) is actually less than other energy sources,. It is much less than the production of alternative energy sources, such as fuel ethanol (irrigated corn), biodiesel (irrigated soy), and hydropower.</p>

**Module: Water-Accounting****Page: Water-7-Withdrawals****7.1**

Are you able to provide data, whether measured or estimated, on water withdrawals within your operations?

Yes

**7.1a**

Please report the water withdrawals within your operations for the reporting year.

Country or region	River basin	Withdrawal type	Quantity (megaliters/year)	Proportion of data that has been verified (%)	Comments
Other: South Texas	Nueces	Other: Surface and groundwater	5141	0	
Other: West Texas	Rio Grande (US)	Other: Surface and groundwater	647	0	
Other: Northeast Texas	Other: Cypress	Other: Surface and groundwater	1840	0	
Other: Other Texas	Other: Brazos, Trinity, San Jacinto	Other: Surface and groundwater	424	0	
Other: New Mexico	Rio Grande (US)	Municipal water	41	0	
Other: Kansas	Other: Cimarron	Municipal water	2	0	
Other: Pennsylvania	Susquehanna	Other: Surface and municipal water	835	0	
Other: Ohio	Other: Ohio	Other: Groundwater, surface and municipal water	235	0	
Other: Colorado	Other: South Platte	Other: Surface and groundwater	1882	0	
Other: Utah	Other: Green	Other: Surface and groundwater	224	0	
Other: Southwest Wyoming	Other: Green	Other: Surface and groundwater	118	0	
Other: Northeast Wyoming	Other: Powder	Other: Surface, groundwater and wastewater	235	0	
Other: Gulf of Mexico	Not known	Municipal water	2	0	
Mozambique	Not known	Other: Municipal and groundwater	125	0	
Sierra Leone	Not known	Other: Municipal and groundwater	0.3	0	
Cote d'Ivoire	Not known	Other: Municipal and groundwater	0.6	0	
Tunisia	Not known	Other: Municipal and groundwater	0.2	0	
Brazil	Not known	Other: Municipal and groundwater	0.3	0	

**7.2**

Are you able to provide data, whether measured or estimated, on water recycling/reuse within your operations?

Yes

**7.2a**

Please report the water recycling/reuse within your operations for the reporting year.

Country or region	River basin	Quantity (megaliters/year)	Proportion of data that has been verified (%)	Comments
Other: Pennsylvania	Susquehanna	307	0	
Other: Utah	Other: Green	493	0	
Other: Northeast Wyoming	Other: Powder	22	0	

**7.3**

Please use this space to describe the methodologies used for questions 7.1 and 7.2 or to report withdrawals or recycling/reuse in a different format to that set out above.

**7.4**

Are any water sources significantly affected by your company's withdrawal of water?

No

**7.4b**

You may explain here why your company's withdrawal of water does not significantly affect any water sources.

**Page: Water-8-Discharges**

**8.1**

Are you able to identify discharges of water from your operations by destination, by treatment method and by quantity and quality using standard effluent parameters?

Yes

**8.2**

Did your company pay any penalties or fines for significant breaches of discharge agreements or regulations in the reporting period?

No

**8.3**

Are any water bodies and related habitats significantly affected by discharges of water or runoff from your operations?

No

**8.3b**

You may explain here why your company's discharge of water does not significantly affect any water bodies or associated habitats.

All discharges are conducted under regulatory and/or permit requirements which include strict discharge parameters. Visual observations and period laboratory analysis are used to ensure compliance.

**Page: Water-9-Intensity**

**9.1**

Please provide any available financial intensity values for your company's water use across its operations.

Country or	River	Financial	Water use type	Currency	Financial intensity	Please provide any contextual details that you consider relevant to
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region	basin	metric	(megaliters)	(Currency/mega-liter)	understand the units or figures you have provided.
United States of America	Other: Various	Revenue	Water use in operations	USD(\$)	857267
Rest of world	Not known	Revenue	Water use in operations	USD(\$)	27121339

**9.2**

Please provide any available water intensity values for your company's products or services across its operations.

Country or region	River basin	Product	Product unit	Water unit	Water intensity (Water unit/product unit)	Water use type	Please provide any contextual details that you consider relevant to understand the units or figures you have provided.
United States of America	Other: Various	Oil & Natural Gas - Barrels of Oil Equivalent (BOE)*	Other: Barrels	Other: Barrels	0.31	Water use in operations	* BOE is the sum of natural gas produced converted to a barrel equivalent (6 MCF per barrel)
Rest of world	Not known	Oil & Natural Gas - Barrels of Oil Equivalent (BOE)*	Other: Barrels	Other: Barrels	0.026	Water use in operations	* BOE is the sum of natural gas produced converted to a barrel equivalent (6 MCF per barrel)

**Module: Sign Off**

**Page: Sign Off**

Please enter the name of the individual that has signed off (approved) the response and their job title

David McBride, VP Environment Health and Safety

CDP