DEPARTMENT OF ENVIRONMENTAL QUALITY
Environmental Assessment

Permitting and Compliance Division
Water Protection Bureau

Name of Project: Montana Pollutant Discharge Elimination System (MPDES) Produced Water General Permit (PW-GP), No. MTG310000.

Type of Project: This project is to reissue the PW-GP for the discharge of produced water from oil and gas production. "Produced water" is the separated wastewater resulted from oil or natural gas wells. The raw product pumped from oil or natural gas wells generally contains water and crude oil or entrained natural gas. Various methods can be used to separate the oil from the "produced water" including the use of a heater treater system, gravity separation, emulsion breaking chemicals, and skim ponds. After the petroleum is separated, the "produced water" is ready for disposal. This permit issuance is to allow produced water discharge to ephemeral drainages forming impoundments for a beneficial use-livestock and wildlife watering. Under this PW-GP, produced water is not allowed to discharge into state surface waters other than ephemeral drainages.

Location of Project: This PW-GP applies to all areas of the State of Montana, except for Indian Lands and state waters in watersheds specified in ARM 17.30.670, namely, Rosebud Creek, Tongue River, Powder River, and Little Powder River watersheds.

The National Effluent Limit Guidelines (ELGs) specified in 40 CFR (Code of Federal Regulations) Part 435, Subpart E were promulgated for traditional oil and gas production, not for coal bed natural gas (CBNG) production. Therefore, CBNG produced water discharges do not qualify for coverage and will not be authorized under this PW-GP, details can be referenced from the PW-GP Fact Sheet.

Additionally, this PW-GP only authorizes produced water discharge that can be contained in ephemeral drainages as impoundments. No discharge will be authorized by this permit where the discharge enters state surface waters other than ephemeral drainages.

Description of Project: This PW-GP is applicable to oil and gas production operations with a standard industrial classification (SIC) 1311 that discharge produced water into the ephemeral drainages of state waters in the aforementioned area. Specifically, this PW-GP authorizes the disposal of produced water into ephemeral drainages forming holding ponds or impoundments for beneficial use only. As specified in 40 CFR Part 435, Subpart E, the promulgated ELGs are for agricultural and wildlife water use of produced water. A detailed discussion in the Fact Sheet further determined that only livestock and wildlife watering is practical for the beneficial use the produced water. Therefore, this permit is developed to make the produced water beneficial use-livestock and wildlife watering-possible and protected.

Facilities seeking coverage under this PW-GP will need to apply for an authorization from the Department. The authorization is only valid when accompanied by the permit. Each authorization under this PW-GP will be to a specified owner/operator for a oil or natural gas production facility, to operate only in the area(s) specified in the authorization.

MPDES Permit MTG31000

The Montana Department of Environmental Quality (the Department) Water Protection Bureau is issuing a discharge permit (MTG31000) in 2010 to the State for the discharge of produced water to ephemeral drainages for beneficial uses. The permit is a renewal and does not subject to Montana Nondegradation Policies. The renewal permit was developed with a set of water quality based effluent limits (WQBEL) along with technology based effluent limits (TBEL).

The WQBEL is developed for total dissolved solids (TDS) to protect the designated beneficial use-livestock and wildlife watering, following recommended maximum concentration levels made by National Academy of Sciences (1972), and Council for Agricultural Science and Technology (1974). These recommendations are the most cited guidelines, forming the basis of today's livestock industry practice recommendations.

WQBEL is also developed for Oil and Grease, which is a primary parameter of concern (POC) for oil and gas produced water. Since numeric standards of ARM 17.30.620 through 17.30.629 do not apply to ephemeral streams, the minimum treatment requirements and general prohibitions [ARM 17.30.637(1)(b)] was used to set an oil and grease limit as of the instantaneous maximum concentration shall not exceed 10 mg/L. This limit becomes the final effluent limit because it is more stringent and overrides the TBEL limit of 35 mg/L promulgated in 40 CFR, subchapter N, Part 435 - Oil and Gas Extraction Point Source Category, Subpart E – Agricultural and Wildlife Water Use Subcategory.

Additionally, some special requirements have been developed in this permit renewal to ensure the produced water only being discharged into ephemeral drainages and being contained in impoundments for beneficial use-livestock and wildlife watering.

The first special condition is to require the permittee to conduct a self evaluation to demonstrate that the volume of water need to be impounded is within the impoundment capacity for the proposed area(s). Only those applicants who identify available ephemeral drainage ways and/or holding ponds with enough impoundment capacity qualify for coverage under this PW-GP. If the discharge of produced water up to the amount that can not be held or impounded in ephemeral drainages, it may lead to the runoff of produced water to intermittent or perennial streams. Discharges to intermittent or perennial receiving waters will be handled by individual MPDES permits because such receiving waters are subject to the water quality standards of each specific water body, which could be substantially different due to the classification and water quality status. Facilities discharge produced water up to the amount that can not be held or

impounded in ephemeral drainages do not qualify for coverage under this PW-GP, the owner/operator shall apply for MPDES individual permits.

The second special condition is to require a water quality analysis prior to application for authorization. A list of parameters with maximum recommendation levels is modified from the previous permit to ensure the water quality is good enough for livestock and wildlife watering.

Agency Action and Applicable Regulations: The proposed action is to issue a MPDES permit to the applicant for discharge of produced water. The permit specifies effluent limitations, waste disposal requirements, and monitoring requirements. The Department is issuing this permit under the authority of the Montana Water Quality Act 75-5-101 *et seq.* MCA, and the Montana Pollutant Discharge Elimination System rules, and 40 CFR 435.

For the purpose of this environmental assessment (EA), the Department will only be analyzing impacts from the proposed project. Statewide Oil and Gas Environmental Impact Statement (EIS) has been developed by the Bureau of Land Management (BLM), with the assistance of U. S. EPA, Department of Energy, Bureau of Indian Affairs and Crow Tribe of Indians in January 2003 (MT-FEIS). Impacts to the environment and human population, mitigation measures and general goal of this EA will be drawn from the 2003 FEIS.

Summary of Issues: The Department proposed to issue MPDES permit to regulate the discharge of produced water from oil and natural gas development statewide except areas or industries excluded. Issues of concern include: impacts to air quality, cultural resources, ground and surface water quality and quantity, soil, sensitive wildlife species, and impacts to the human environment.

Affected Environment & Impacts of the Proposed Project:

> Y = Impacts may occur (explain under Potential Impacts). *Include frequency, duration (long or short term), magnitude, and context for any significant impacts identified. Reference other permit analyses when appropriate (ex: statement of basis). Address significant impacts related to substantive issues and concerns. Identify reasonable feasible mitigation measures (before and after) where significant impacts cannot be avoided and note any irreversible or irretrievable impacts. Include background information on affected environment if necessary to discussion.*
>
> N = Not present or No Impact will likely occur. *Use negative declarations where appropriate (wetlands, T&E, Cultural Resources).*

IMPACTS ON THE PHYSICAL ENVIRONMENT	
RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are soils present which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?	[N] Produced water may contain high concentrations of total dissolved solids (TDS) and sodium. The high sodium concentration may feature the produced water with high sodium adsorption ratio (SAR), which is the ratio of the sodium ion concentration to the combined concentration of calcium and magnesium ions in the water. High SAR in combination with elevated specific conductance and TDS in water can cause soils to become dispersed (deflocculation) and develop an undesirable soil structure with less permeability (Ayers and Westcot, 1985; Lenntech, 2009) if used for irrigation, which makes the soil prone to erosion. Therefore, using produced water containing high SAR and elevated TDS for irrigation is not considered practical. For this reason, the PW-GP does not authorize the discharged produced water for irrigation use. Instead, the PW-GP only authorizes the discharge of produced water to ephemeral drainages forming impoundments for livestock and wildlife watering use only. The permit limits developed from technology based effluent limits (TBEL) following 40 CFR (Code of Federal Regulations) Part 435, Subpart E – Agricultural and Wildlife Water Use Subcategory, as well as from water quality based effluent limits (WQBEL) will protect the beneficial use of produced water for livestock and wildlife watering. Because no irrigation use of produced water will be authorized under this PW-GP, no impact to the soil will occur except in the ephemeral drainage area for impoundment. However, such effects will not commence until the authorization for discharge is terminated and the impoundment stops. The impact will only be limited to the impoundment areas. Reclamation measures will be taken by the permittee to close the site upon termination of the authorization for discharge.
2. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?	[N]Groundwater The pumping of raw product from oil and natural gas bearing geological formations are usually deep in the geological strata. These formations are rarely considered or used as water supplies resources. The pumping rates of the oil and gas production wells are usually less than 25 gpm, which may not pose significant impact on the local ground water resources. The discharge of produced water is only authorized to ephemeral drainages. Ephemeral drainages are streams only flows in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and whose channel bottom is always above the local water table (ARM 17.30.602(12). Additionally, most dischargers have a discharge rate of less than 25 gpm, and the evaporation rate is above 45 inches in most of the oil and natural gas production area in Montana. Therefore, the seepage from the impoundment, if occurs, will have very limited chance to reach and impact groundwater. [N]Surface Water

IMPACTS ON THE PHYSICAL ENVIRONMENT	
	The PW-GP only authorizes the discharge of produced water to ephemeral drainages to form impoundments for livestock and wildlife watering use only. If the amount of produced water to be discharged is up to the amount that can not be held or impounded in an ephemeral drainage, it may lead to the runoff of produced water to intermittent or perennial streams. Such discharge will not be qualified for coverage under PW-GP and will not be authorized. The permittee will be directed to apply an individual MPDES permit as stated in the PW-GP. This special requirement will ensure the intermittent and perennial state waters be protected from the discharge of produced water. Therefore, no impact to surface water is anticipated.
3. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)?	[N] Montana statewide oil and gas environmental impact statement was amended in 1994, then amended again in 2003 and 2008 with consideration of coal bed natural gas (CBNG) development and cumulative environmental impacts considered and more development alternatives provided. Even though the CBNG development adds cumulative impact to the environment, the FS-EIS (2008) concluded that under the preferred Alternative H (scenario 1), there are no exceedances of air quality standards predicted for the Montana near-field receptor grid. The conclusion was drawn from an intensive air quality modeling technical support document prepared by Argonne National Laboratory in 2002 (BLM, FS-EIS, 2008) and revised in 2007. A supplemental Air Quality Analysis (SAQA) report was also prepared for the modeling effort conducted on the FS–EIS (BLM, FS-EIS, 2008). Three group of emission sources contributed to the modeled emission results. They are existing emissions, CBNG project-related emissions, and reasonably foreseeable future actions (RFFAs). Two additional air quality models, Wyoming Powder River Basin Coal Review modeling conducted by Wyoming BLM and Cumulative Impact Model conducted by Montana DEQ, were also conducted for reviewing the regional air quality. Results indicate potential of all criteria pollutants would be below National Ambient Air Quality Standards (NAAQS) and Montana and Wyoming AAQS in 2010, 2015, and 2020 except PM_{10} might impact class I and Class II area visibilities. Montana Department of Environmental Quality cumulative impact model was conducted using EPA approved Industrial Complex Short Term Version (ISCST3) model. This refined dispersion model uses detailed information regarding the region's meteorology, terrain and local emissions sources to estimate ambient air pollutant concentrations. Each emission source identified at all of the CBNG compressor stations was included in the air dispersion model as a point source. The permitted allowable emissions were used for all Montana and Wyoming sources, rather than actual emissions, which is a more conservative approach because not all emissions would be expected to operate at maximum permitted level. Even though, the model results demonstrated that the CBNG development currently complies with the MAAQS/NAAQS and PSD Class I/Class II increments. Since the permitted activity under PW-GP is primarily produced water discharge from traditional oil and gas production, the air pollution from the

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	statewide oil and gas is therefore does not have the potential to exceed applicable air quality standards. Some key mitigation measures have been considered in the FS-EIS(BLM, 2008) for CBNG development in addition to traditional oil and gas development. These mitigation measures include: • To reduce dust, operators of federal leases would have to post and enforce speed limits for their employees and contractors, operators would work with local government to use dust suppression techniques on roads. • Access roads, well pads and production facility sites constructed on soils susceptible to wind erosion will be appropriately surfaced to reduce fugitive dust emissions. • Dust inhibitors will be used as necessary on unpaved collector, local and resource roads to reduce fugitive dust emissions to the air and resources adjacent to the road. Therefore, with the modeling results and the mitigation measures, as well as permitting requirement under applicable MAAQS/NAAQS, the impact on air quality shall be considered non-significant.
4. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be significantly impacted? Are any rare plants or cover types present?	[N] Impact to vegetation would be short term and minor. Disturbances from drilling, pipeline corridors, and compaction from equipment would reduce the amount of vegetation available for livestock or wildlife. Disturbances due to road construction would eliminate small areas of vegetation but for a longer time. Vegetative productivity would be restored through reclamation and elimination of vehicle traffic. All reclamation activities are to be conducted as soon as practical. Seeding of reclaimed areas shall use a prescribed seed mix. The operator shall follow the noxious weed control plan to control invasive species. The operator is required to reclaim and implement a storm water pollution prevention plan to control erosion and sediment migration from disturbed areas. Since the drilling and produced water discharge to ephemeral drainages are generally in small scale, and the discharge is primarily occupy ephemeral drainage ways, it will not have substantial impact on the habitat of sensitive plant species.
5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?	[N] It is anticipated that the direct impacts to macroinvertebrates, fish, amphibians and reptiles are minimal. Indirect impacts to avian species, which subsequently forage on some of these species, are also anticipated to be minimal. The either seasonal or year-round impoundmentS from produced water discharge will provide alternative water sources for watering naturally IS not available otherwise, therefore, some positive effects are anticipated to the wildlife though the effects are insignificant.
6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified	[N] Although the authorized activity can occur statewide, the impact is anticipated to be minimal because each discharge activity is small in scale and will not bring substantial impact to the environment.

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habitat present? Any wetlands? Species of special concern?	
7. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	[N] As a condition for BLM approval, the operator must conduct a cultural survey of the areas influenced by development. The operator/owner will have to acquire drilling permit from Montana Board of Oil and Gas Council (BOGC) prior to any exploring activity. The Indian lands have been excluded from this authorized discharge activity, therefore, no native American cultural resources will be impacted. For existing authorization, all the cultural survey requirements have been fulfilled. For new authorizations, upon application of the drilling permit, cultural survey of the area will be required by BLM. Any other cultural or paleontological resources discovered during construction must be reported immediately to the BLM. Construction may not resume until such time that the BLM has inspected and approved disturbances of the site. Given the BLM requirements there will be minimal impacts to cultural resources.
8. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?	[N] Development of oil and natural gas occupy relatively small physical areas. The BOGC sets spacing for oil and gas development to maximize recovery while minimizing surface impact. The operator is to use environmentally compatible colors to blend well houses into the landscape. With the use of concurrent reclamation and seeding with native species, visual impacts will be short term. Long term visual impacts will be realized by road and facility placement.
9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project? Will new or upgraded powerline or other energy source be needed)	[N] During the development phase no increases in environment resources will be needed. All activities will be temporary (drill and construction). In the production phase limited electrical demand will be realized. The discharge of produced water is proposed to ephemeral drainages as impoundment, which shall not be in a planned land use category. No adverse affects will be realized.
10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other activities nearby that will affect the project?	[N] The pumping of raw produced water is generally from deep geological formations, which are usually not water supply sources. No water resources will be impacted, and no water right issues will be raised.

IMPACTS ON THE HUMAN ENVIRONMENT	
11. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N] No impact is expected. With development additional transportation facilities will be required; limited risk will be associated with the additional facilities, traffic, and impoundments. Each facility is small and is constructed quickly with stringent engineering controls required to meet code.
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[Y] Continued development will maintain industrial sectors of the local area. With increased development, additional resources will become available within the marketplace. With increased development agricultural production may be potentially impacted (decreased carrying capacity). Since the produced water discharge is for livestock and wildlife watering, it brings resources to the project areas for agricultural (livestock) production. Whereas, no irrigated agriculture will be impacted since no irrigation use of produced water discharge is authorized under this permit.
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.	[Y] Impact will be minor. Additional employment opportunities will be realized during the construction and development phase only. Total manpower requirements in the long term remain constant. Additional workforce in and around the area will not be required.
14. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?	[Y] Development of oil and gas resources will increase the revenue to federal, state, and local entities. Leasing of mineral rights will realize initial increases. Production of resources will add additional royalty and production taxes. Additional local activities will increase taxes and consumption in the local areas. By obtaining permits to allow discharges of produced water the operator will continue development, resulting in increased revenue at the federal, state, and local level.
15. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?	[N] No impacts are anticipated. Any increases in traffic will be short term and minor during the construction phase. Since the production facilities are scattering in nature due to the well spacing requirement from the BOGC, it is not realistic and necessary to establish new schools or other governmental services. Most of the workforce will stay in temporary houses while the major public services for the families of the workforce will remain in nearby towns.
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[N] Issuance of this permit will not conflict with local ordinances or plans. Stipulations contained in the permit require the operator to acquire all the necessary approvals or permits prior to commencing any activities.
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?	[N] The major project area will be near or at ephemeral drainage areas, the oil and natural gas production or produced water discharge activity will not be conflict with the recreational or wilderness activities.

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18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	[N] Overall development will not increase the population substantially since the distributed nature of the oil and gas production activity, the impact remains minor.
19. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities' possible?	[N] No impacts are expected. No significant increase in population is expected for any specific area due to the distributed nature of the oil and gas production activity. No transient workforce will integrate into the resident population. No additional social services will be necessary.
20. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N] No impacts are anticipated. The workforces employed during construction and development phases are native to the area. Uniqueness of the culture for all the areas involved will be retained.
21. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	[N] No impacts are anticipated in this area.
22(a). PRIVATE PROPERTY IMPACTS: Are we regulating the use of private property under a regulatory statute adopted pursuant to the police power of the state? (Property management, grants of financial assistance, and the exercise of the power of eminent domain are not within this category.) If not, no further analysis is required.	[N] Issuing the MPDES permits do not regulate the use of private property within the project area.
22(b). PRIVATE PROPERTY IMPACTS: Is the agency proposing to deny the application or condition the approval in a way that restricts the use of the regulated person's private property? If not, no further analysis is required.	[N]
22(c). PRIVATE PROPERTY IMPACTS: If the answer to 22(b) is affirmative, does the agency have legal discretion to impose or not impose the proposed restriction or discretion as to how the restriction will be imposed? If not, no further analysis is required. If so, the agency must determine if there are alternatives that would reduce, minimize or eliminate the	[N]

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restriction on the use of private property, and analyze such alternatives. The agency must disclose the potential costs of identified restrictions.	

23. Description of and Impacts of other Alternatives Considered:

A. No Action: Under the "No Action" alternative, the Department would not reissue MPDES permit MTG310000. The permit will continue to be effective with administrative extension provision (ARM 17.30.1313). No further water balance and impoundment capacity evaluation requirement will be realized. The potential risk of produced water runoff to state waters will continue.

B. Approval with modification: The Department has tentatively decided to renew the MPDES permits MTG310000. Under this alternative the permittee will be required to be compliant with all the terms and conditions identified in the PW-GP. The permittee are required to discharge produced water into ephemeral drainages with limitations, to conduct impoundment capacity self evaluation, and to satisfy prerequisite of water quality analysis. These requirements will ensure the discharge meet the beneficial use standards and protect state waters. Should the operators fail to meet permit limits or don't qualify the coverage under the PW-GP, MPDES individual permit will be required if the applicant wish to discharge produced water into state waters. The permit may be reopened and modified to provide additional protection to the receiving water. Enforcement actions may impose corrective measures.

24. Summary of Magnitude and Significance of Potential Impacts: Issuance of the permit ensures that water quality standards will be met. WQBEL developed based on applicable water quality standards and recommended guidelines for livestock and wildlife is protective of produced water beneficial use. Special requirement ensures state waters other than ephemeral drainages will not be impacted by the discharges. Only those facilities qualify for coverage under this permit will be authorized. Therefore, impacts are minor, non-significant, and positive in some aspects.

25. Cumulative Effects: Each produced water discharge impoundment and related oil and gas production activity is isolated and small in scale, so, it will not cause cumulative effects to each other and to other water bodies. No further cumulative impacts analysis is needed and no impact should exist since all the potentially impacted waters have been considered in the permit limits development.

26. Preferred Action Alternative and Rationale: The Department recommends approving the permit renewal with the proposed effluent limitations and special requirements. This action is

preferred because the permit program provides a regulatory mechanism for protecting beneficial uses of produced water by applying permit limitations, and protecting state waters through special requirement to only authorize those facilities who qualify for coverage.

Recommendation for Further Environmental Analysis:

[ ] EIS [ ] More Detailed EA [X] No Further Analysis

27. Public Involvement: This draft EA will be open for public comment during a 30-day public comment period. It will be posted on the Department's web page at http://www.deq.state.mt.ea.asp or commenters may contact Barb Sharpe or Bree Duffy at the Water Protection Bureau at (406) 444-3080. For copies of the Draft EA or to submit comments, write or call the Montana Department of Environmental Quality, Water Protection Bureau, PO Box 200901, Helena MT 59620-0901, (406) 444-3080. Comments must be received for 30-day after the date of the signature below.

The Department maintains a list of persons who have expressed an interest in all environmental water quality related issues. The Department will send a copy of this document to all persons who have submitted their name, address, and telephone number to the Department for the purpose of being included on the water quality interested parties mailing list.

28. Persons and agencies consulted in the preparation of this analysis:
Tom Reid, DEQ WPB, Senior Environmental Specialist
Rod McNeil, DEQ Water Planning and Prevention Bureau

EA Checklist Prepared By:

_Hanxue Qiu_____ _Nov 30, 2009_____
(Name) Date

Approved By:

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(Print: name & title)

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Signature Date

References:

ARM Title 17, Chapter 30, Sub-chapter 6 - Surface Water Quality Standards

ARM Title 17, Chapter 30, Sub-chapter 13 - Montana Pollutant Discharge Elimination System (MPDES) Permits

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