

Devon Energy Production Company, L.P. 20 N. Broadway, Suite 1500 Oklahoma City, OK 73102

January 5, 2007

Ms. Becky Peters Wyoming Department of Environmental Quality WYPDES Permit Section 122 W. 25th Street Herschler Building 4W Cheyenne, WY 82002

Subject : Devon Energy Production Company, L.P., Campbell County Belle Fourche River Basin, Hay Creek 2 Permit Renewal WY0048941, Option 2

Dear Ms. Peters:

Devon Energy Production Company L.P. (Devon) is requesting a renewal of the **Hay Creek 2 WYPDES permit WY0048941**. Permit **WY0048941** was originally written in March 2002 for the discharge of twenty-seven (27) wells at seven (7) discharge points into Hay Creek and to its unnamed tributaries (class 3B water) in the Belle Fourche River (Class 2ABWW). All twenty-seven (27) wells were completed in the Wyodak coal seams. Devon proposes the following terms be updated to reflect WDEQ policy:

- 1. Update SAR limit to 14 to be consistent with updated permitting/practices on the Belle Fourche;
- 2. Remove the effluent limit and monitoring requirements for total petroleum hydrocarbons (TPH)
- 3. Update effluent limit for radium to distance-based limits;
- 4. Update the pH range to 6.5-9.0;
- 5. Remove potassium from routine end-of-pipe monitoring requirements; and
- 6. Remove fluoride from routine end-of-pipe monitoring requirements.
- 7. Remove two (2) wells.

Two (2) copies of the renewal application and one electronic copy are enclosed. **Table 1** identifies the outfalls. Locations were identified in consultation with the landowners. For a detailed list of all the wells associated with this permit, please see **Table 2**. The attached **Map 1** identifies the well and outfall locations. Representative water quality samples are found in **Appendix A**. **Tables 3** and **4** of the standard permit are not required as this facility is in the Belle Fourche Watershed. **Table 5** lists the average flow per outfall from the last six months. **Table 6** is a compliance summary for the facility.

The current permitted discharge for all wells is 944.44 gallons per minute (gpm) or 1.36 million gallons per day (MGD). For this renewal, Devon is using an initial production rate of 4.96 gpm/well for the Wyodak coal seam. These rates are based on the Hay Creek 2 area's maximum flow rates per well between 6/1/06 and 11/30/06. The total proposed flow for the Hay Creek 2 facility is 69.65 gpm or 0.1003 MGD (**Table 5**). This translates to an average discharge of 4,012 gallons per day per well (gpd/well).

No mixing analysis, water balances, stream compliance points or water quality monitoring locations have been included in this application as this facility is in the Belle Fourche watershed. There is adequate flow within the existing permit to accommodate all permitted wells. There are no reservoirs required to achieve the water quality management plan objectives and thus no reclamation estimate has been prepared.

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Devon Energy Production Company, L.P. commits to comply with all effluent limits, self-monitoring and reporting requirements and other conditions of the permit.

Sincerely,

E.v.l. Marting

Randall W. Maxey Senior Regulatory Specialist

Attachments

WYPDES Application (1 copy and 1 CD) Map 1: Hay Creek 2 CBM Operations Appendix A: Water Quality Laboratory Data Sheets

	🗌 Yes 🛛 No
4.	General Facility Location: Township(s) <u>43</u> Range(s) <u>72</u>
	Immediate Receiving Stream(s) <u>Hay Creek, unnamed tributaries of Hay Creek (class 3B)</u>
5.	Name of the facility producing the discharge (this is the facility name that will appear on the WYPDES permit) <u>Cosner Hay Creek 2 CBM Facility</u>
6.	Company, Contact Name, mailing address, e-mail address, and telephone number of the individual or company which owns the facility producing the discharge, and the person (consultant) responsible for permit submission.
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De	von/2007/January/5/Renewal/ 10120201/ WY0048941/HC2 CBM application 12-06.doc
(06	-554.DOC)

WY00 WYOMING POLLUTANT DISCHARGE ELIMINATION **SYSTEM APPLICATION FOR PERMIT TO SURFACE DISCHARGE PRODUCED** Date Received: WATER FROM COAL BED METHANE NEW DISCHARGES, RENEWALS, **OR MAJOR MODIFICATIONS** (mo/dav/vr)**Revised: 06-22-06** PLEASE PRINT OR TYPE (Submission of illegible materials will result in return of the application to the applicant) 1. Check the box corresponding to the type of application being applied for: New CBM permit CBM permit renewal Permit number WY0048941 Expiration Date: 7/31/07 CBM permit major modification Permit number Expiration Date: 2. Identify the river basin in which the discharge will occur: Belle Fourche Chevenne Powder Little Powder Tongue Other (identify) 3. Select permit option(s): if more than one option is selected, the applicant must describe which option applies to which outfall. Option 1A – Discharge is contained within a class 4 water body: Containment within an off-channel pit (class 4C) OR containment within a headwater reservoir situated within a class 4 channel and capable of containing all effluent plus up to a 50-year / 24-hour storm event. Option 1B – Discharge is contained within a class 3 water body: Containment within a natural closed basin or playa lake (class 3A) OR containment within a headwater reservoir situated within a class 3 channel and capable of containing all effluent plus up to a 50-year / 24-hour storm event. \bigcirc Option 2 – This option includes any on-channel discharge (including discharge into an on-channel reservoir) that does not meet the impoundment requirements specified in options 1A or 1B above. If applying for outfalls under Option 2, will discharges from the facility proposed in this application require the use of assimilative capacity credits for salt and sodium in the Powder River?

For Agency Use Only

Application Number

SUBMIT ONE HARD COPY AND ONE ELECTRONIC COPY

Company Contact Name Randall Maxey	Consultant Contact Name Kevin Ritter
Company Name	Company Name
Devon Energy Production Company LP	Norwest Applied Hydrology
Mailing Address	Mailing Address
20 N Broadway, Suite 1500	950 S Cherry Street, Suite 810
City, State, and Zip Code	City, State, and Zip Code
Oklahoma City, OK 73102-8260	Denver, CO 80246
Telephone Number	Telephone Number
(405) 228-8870	(303) 782-0164
E-Mail Address	E-Mail Address
Randy.maxey@dvn.com	kritter@norwestcorp.com

- 7. If submitting a major modification or permit renewal, please describe all requested permit modifications (i.e. add 2 outfalls, add 23 wells, move outfall 001 500 feet...):
 - 1. <u>Update SAR limit to 14 to be consistent with forthcoming WDEQ approval of a Use</u> Attainability Analysis (UAA) on the Belle Fourche;
 - 2. <u>Remove the effluent limit and monitoring requirements for total petroleum hydrocarbons</u> (TPH);
 - 3. Update effluent limit for radium to distance-based limits;
 - 4. <u>Update the pH range to 6.5-9.0;</u>
 - 5. <u>Remove potassium from routine end-of-pipe monitoring requirements; and</u>
 - 6. <u>Remove fluoride from routine end-of-pipe monitoring requirements.</u>
 - 7. <u>Remove two (2) wells.</u> (add additional lines as necessary)

***NOTE:** Major modification applications requesting to increase the permitted flow for a facility will be processed as **RENEWALS**. Major modification applications for permits within six months of their expiration date will also be processed as **RENEWALS**.

8. Name(s) and mailing address(es) of owner(s) of the surface rights on whose land the discharge occurs (in cases where the land is owned by the state or federal government but surface rights are leased to a private individual, provide lessee's name and address)

Landowner #1 Name Dean and Iola Cosner	Landowner #2 Name
Mailing Address P.O. Box 111	Mailing Address
City, State, and Zip Code Wright, WY 82732	City, State, and Zip Code

(additional spaces may be added as necessary)

9. For all facilities relying on reservoirs of any type as part of their water management plan, attach a water balance that demonstrates, considering total maximum projected discharge inflows, natural precipitation, evaporation and infiltration, the amount of the discharge that will be contained within the reservoirs, and the circumstances and volume of effluent that could potentially be discharged. If applying for an Option 1A or 1B permit, the water balance must demonstrate that the containment unit will be adequately sized to contain all projected discharge and storm water runoff from a 50 year, 24 hour storm event. If actual flow rates are

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available, use the maximum flow rate from all active wells within the previous six months of operation in the water balance. **Not applicable, Belle Fourche watershed.**

- 10. For all facilities relying on reservoirs of any type as part of their water management plan, include analyses of expected water quality within the reservoirs. Should the water balance required for Question #6 above indicate that the effluent has the potential to be discharged from the reservoirs under circumstances except a 50 year 24 hour storm or larger, please provide additional analyses describing the expected quality and quantity of the discharge from the reservoirs and expected impacts on water quality in the receiving streams. Not applicable
- **11.** Attach a description and a clear, legible, detailed topographic map of the discharging facility. Include the following:
 - a. A legend
 - **b.** Well locations
 - c. Ponds
 - d. Reservoirs
 - e. Stock tanks
 - **f.** Discharge points (outfalls)
 - g. Immediate receiving streams
 - **h.** Water quality monitoring stations
 - i. Irrigation compliance points
 - j. Location of nearest downstream irrigator.
 - k. Section, Township, and Range information
 - 1. If proposing to use class 4C off-channel pits, include footprint outline of the proposed pits. To denote setback distance, include a distance marker from closest side of pit to the nearest water feature, floodplain, or stream alluvium. Identify latitude and longitude in decimal degrees (using a minimum of 6 decimal places) for each end point of the setback distance marker.

If any of the above are not applicable please indicate in the description and include a brief explanation as to why the item is not applicable) Map 1 identifies items a - g and k. It is our understanding that permits in the Belle Fourche drainage do not include items h - j.

12. Describe the control measures that will be implemented to prevent significant damage to or erosion of the receiving water channel at the point of discharge.

Discharge points are located on gently sloping channels. Waters are discharged onto a concrete or rockarmored splash pad. Erosion and sediment control facilities are implemented pursuant to BLM Best Management Practices

13. **Describe the control measures that will be implemented to achieve water quality standards and effluent limits**. If proposing to utilize a treatment process, provide a detailed description of the treatment process, including, but not limited to: Water quality analyses demonstrating the effluent quality before and after treatment; waste stream volumes and planned method of disposal; aquatic life toxicity data for any chemicals being used in the treatment process; description of how the chemicals will be handled at the facility and the potential for any impacts to waters of the state in the event of a spill; and diagrams of the facility indicating the water treatment path. Additional sheets and diagrams may be attached.

Not applicable to this facility.

14. Outfall locations must be established as part of a preliminary field reconnaissance survey using GPS or conventional survey equipment and documented in Table 1. Please document the type of equipment used, the expected accuracy of your measurements, and a brief rationale for locating the outfalls at the requested sites below.

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<u>Coordinates were obtained by the field samplers using handheld GPS units with accuracies ranging from 15 to 60 feet.</u>

- 15. Complete the attached <u>Table 1</u>. Provide all the information requested in the table for each proposed discharge point or monitoring point. If proposing changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided. Option 2 permits must include water quality monitoring station locations. "Non-Discharging" Option 2 permits (reservoirs capable of 50 year, 24 hour storm water containment) must include flow monitoring station locations. Option 1A and 1B permits must include containment unit monitoring station locations. Information related to reservoirs is only required if the facility's water management plan includes reservoir containment.
- 16. Complete the attached <u>Table 2</u>. Provide all the information requested in the table for each well associated with this proposed discharge authorization. If proposing changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided.
- 17. Complete the attached <u>Table 3.</u> Provide all the information requested in the table for each reservoir proposed for containment of CBM produced water. Specified locations refer to the approximate center of the reservoir. If proposing changes (a major modification) to an existing facility, **clearly** indicate the desired changes on the table. Additional tables may be attached. Use the format provided. Information related to reservoirs is only required if the facility's water management plan includes reservoir containment.
- **18.** Complete the attached <u>Table 4.</u> Provide all information requested in the table related to reservoir bonding requirements for each reservoir proposed for the containment of CBM produced water. If proposing any changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided. Information related to reservoirs is only required if the facility's water management plan includes reservoir containment.
- **19**. **Provide the results of water analyses for a sample collected from a location representative of the quality of the water being proposed for discharge for all of the chemical parameters listed in the table below.** The sample must be collected from well(s) or outfall(s) within a twenty mile radius of the proposed facility's location, and from the same coal formation(s) and the same approximate depth(s) as proposed in this application. If filing an application for a permit renewal or modification, the representative sample must be collected from the facility being proposed for renewal or modification. Explain why this sample is representative of the produced water to be discharged.

<u>A Wyodak water analysis was collected from the nearby outfall 001HC2 located in the NWNW quarter-</u> <u>quarter of Section 3 in T43N and R72W which is 0.25 mile from the center of the facility. The wells are</u> <u>1043 feet below ground surface on average.</u>

Samples from co-mingled coal seams are acceptable as long as the sample(s) meet the following criteria:

- A. all of the coal seams being proposed for development are represented in the co-mingled sample, with no contribution from coal seams not being proposed for development at the new facility.
- B. the ratio of each coal seam's contribution is approximately the same in the sample and the proposed development,
- C. documentation is provided to verify the criteria listed in A and B.

The analyses must be conducted in accordance with approved EPA test procedures (40 CFR Part 136). Include a signed copy of your lab report that includes the following:

- a. detection limits
- **b**. results of each of the 25 chemical parameters at the chemical state given below
- c. quarter/quarter, section, township and range of the sample collection location
- d. Time and date of sample collection

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- e. Time and date of analysis for each parameter
- f. Analyst's initials for each parameter
- g. Detection limit for each parameter as achieved by the laboratory
- h. WYPDES permit number and outfall number, where the sample was collected.
- i. Origin of produced water (coal seam and legal location of sample collection location)

If more than one coal seam is being proposed for development, the permittee must submit a lab analysis and complete information characterizing water quality from each coal seam being proposed for development. If the permittee is proposing to include discharges from a coal seam not previously developed at this facility, the permittee must submit a lab analysis and complete information characterizing water quality from the new coal seam being proposed for development. A mixing analysis may be required if the representative water quality analysis from the new coal seam indicates that the inclusion of the new effluent source may result in degradation of existing effluent quality. Analyses must be provided in the units listed below.

Parameter* (See notes following	Required Detection Limits and Required Units
the table on chemical states)	
Alkalinity, Total	1 mg/l as CaCO ₃
Aluminum, Total Recoverable	50 µg/l
Ammonia, Total	0.03 mg/l as total N
Arsenic, Total Recoverable	1 μg/l
Barium, Total Recoverable	100 µg/l
Bicarbonate	10 mg/l
Cadmium, Dissolved	5 μg/l
Calcium, Dissolved	50 μg/l, report as meq/l
Calcium, Dissolved	50 μg/l, report as mg/l
Chlorides	5 mg/l
Copper, Dissolved	10 µg/l
Dissolved Solids, Total	5 mg/l
Fluoride, Dissolved	100 µg/l
Hardness, Total	10 mg/l as CaCO ₃
Iron, Dissolved	50 μg/l
Lead, Dissolved	2 µg/l
Magnesium, Dissolved	100 μg/l, report as meq/l
Magnesium, Dissolved	100 μg/l, report as mg/l
Manganese, Dissolved	50 μg/l
Mercury, Dissolved	1 μg/l
рН	to 0.1 pH unit
Radium 226, Total	0.2 pCi/l
Radium 228, Total**	0.2 pCi/l
Selenium, Total Recoverable	5 μg/l
Sodium Adsorption Ratio	Calculated as unadjusted ratio
Sodium, Dissolved	100 μg/l, report as meq/l
Sodium, Dissolved	100 μg/l, report as mg/l
Specific Conductance	5 micromhos/cm
Sulfates	10 mg/l

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<u>Parameter*</u> (See notes following the table on chemical states)	Required Detection Limits and Required Units
Temperature	0.1 degrees Celsius
Zinc, Dissolved	50 μg/l

*Discharges into drainages other than the Powder River geologic basin may require analysis of additional parameters, please contact the WDEQ for a separate list.

**This parameter is only required for those discharges located within one stream mile of a class 2 water.

20. For new facilities, provide the expected (estimated) flow volume from each well in gallons per day, and provide the rationale behind the flow volume estimate. For existing facilities, provide actual flow data from all wells within the last six months.

See Table 5.

- 21. For applications for new facilities, are any of the required chemical constituents in the laboratory analysis present in concentrations above Wyoming Water Quality Standards?
 - **YES**

NO NA

If the answer to question # 16 is yes, answer 21.a. – 21.b below. If no, proceed to question 23.

- a. Which constituents?
- b. Has this constituent been addressed in the response to question 10?
- 22. For applications for existing facilities, has the facility ever exceeded permit limits or water quality standards?

 \bowtie YES \square NO

If the answer to question 22 is yes, answer 22.a. - 22.b. If no, proceed to question 23.

- a. Which constituents? Iron, Total Recoverable Arsenic, pH, Sodium Adsorption Ratio, and Radium 226
- b. Has the exceedance been addressed? Yes
- c. Describe how the exceedance was addressed. Discharge from outfalls with elevated SAR were treated with gypsum. Upgrades to the oxidation channel are being made to address elevated dissolved iron concentrations. All other constituents were in compliance upon re-sampling.
- 23. Is there active irrigation in the drainage downstream of the discharge? (*Please note that this response includes both artificially and naturally irrigated bottomlands as defined in the* <u>Draft Agricultural Use</u> <u>Protection Policy for the interpretation and implementation of Chapter 1, Section 20</u> of the Wyoming Water Quality Rules and Regulations).

YES YES

If yes, at a minimum, the WYPDES Program requires submission of the following information:

- 1. Location(s) of irrigation diversions and/or sub-irrigated acreage;
- 2. **Type(s)** of Crops grown under irrigation;
- **3. Description** of Irrigation Practices
- 4. A topographic map showing irrigated acreage, any structures, ownership of irrigated acreage.

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In addition to the minimum information described above, the WYPDES Program may require additional information should the permittee request site-specific effluent limits protective of irrigation uses. Contact the WYPDES Program for more information regarding requirements for site-specific SAR, TDS, and EC limits. <u>An email from Becky Peters, WDEQ, to Kevin Ritter, NAH, in July 2006 indicated that this section did not apply in the Belle Fourche drainage if agricultural limits are met in representative sample.</u>

24.	Provide name(s) and address(e) for all downstream	irrigators between t	he outfalls and the mainstem.
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Irrigator #1 Name	Irrigator #3 Name
Dale Lester Wright	
Mailing Address	Mailing Address
P.O. Box 389	
City, State, and Zip Code	City, State, and Zip Code
Wright, WY 82732	
Irrigator #2Name	Irrigator #4Name
Durham Ranches, Inc.	
Mailing Address	Mailing Address
7835 Hwy 59 South	
City, State, and Zip Code	City, State, and Zip Code
Gillette, WY 82718-7038	

(additional spaces may be added as necessary)

25. Provide a listing of all active permits or construction approvals received or applied for by the applicant for the site described in this permit application in accordance with *Chapter 2, Section 5.T. of the Wyoming Water Quality Rules and Regulations.*

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am requesting <u>7</u> (fill in number) outfalls in this application.

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Randall W. Maxey	Senior Regulatory Specialist
Printed Name of Person Signing*	Title
E.v.l. Marton	1/5/07
Signature*	Date

*All permit applications must be signed in accordance with *Section 14, Chapter 2 of the Wyoming Water Quality Rules and Regulations*, "for" or "by" signatures are not acceptable.

Section 35-11-901 of Wyoming Statutes provides that:

Any person who knowingly makes any false statement, representation, or certification in any application ... shall upon conviction be fined not more than \$10,000 or imprisoned for not more than one year, or both. Permittees are required to retain records of all data used to complete permit applications in accordance with *Chapter 2, Section 5, Part 5.V.vii of the Wyoming Water Quality Rules and Regulations*.

Mail this application to:

WYPDES Permits Section Department of Environmental Quality/WQD 122 West 25th Street, Herschler Building, 4W Cheyenne, WY 82002

Permits issued under the WYDPES Program are subject to an annual \$100 permit fee for as long as permit is active. The annual billing cycle is based on the state's fiscal year from July 1 to June 30. There is no need to pay the fee with the application. All permit fees are invoiced after June 30th of each year.

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	TABLE 1: Outfall, Water Quality Monitoring Station, Containment Unit, and Flow Monitoring Station Location Information											
Distance												
Desired Changes	Discharge			from								
(modifications and	Point		Mainstem (closest	outfalls to	Quarter/							
renewals only)	(Outfail) #	Immediate Receiving Stream	perennial water)	mainstem	Quarter	Section	Township	Range	Latitude (NAD 27)	Longitude (NAD 27)	County	Reservoir Name and type
No Change	001HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	32.6	NWNW	3	43	72	43,7369444	-105.5008333	Campbell	
No Change	002HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	33.7	SWSE	4	43	72	43.7266667	-105.5100000	Campbell	
No Change	003HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	34.4	SWNE	9	43	72	43.7182135	-105,5089753	Campbell	T43NR72W9NWNE
No Change	004HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	34.8	NWSE	9	43	72	43.7129639	-105.5091673	Campbell	T43NR72W9NWSE, Res 4
No Change	005HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	36.3	SWNE	8	43	72	43.7180556	-105.5302778	Campbell	T43NR72W8NWNE
No Change	006HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	36.9	NESE	8	43	72	43.7126256	-105.5233049	Campbell	
No Change	007HC2	Unnamed Tributary of Hay Creek	Belle Fourche River	37.6	SESW	8	43	72	43.7093184	-105,5337272	Campbell	T43NR72W8SWSE
Desired Changes												

Desired Changes									
(modifications and	Station		Quarter/				Latitude (decimal	Longitude (decimal	Notes regarding water quality
renewals only)	Name	Station Description	Quarter	Section	Township	Range	degrees)	degrees)	monitoring station types
NA	UWQMS	Upstream mainstem water quality monitoring station							
NΛ	DWQMS	Downstream mainstem water quality monitoring station							
NA	CU001	Containment unit water quality monitoring station							
NA	CU002	Containment unit water quality monitoring station							
NA	FM001	Flow monitoring station							
NA	FM002	Flow monitoring station							

Please note that not all station types may be applicable for a particular facility. Additional spaces/pages may be added if necessary. Use the format provided. Please denote reservoir type(s) - on channel, off-channel, playa - in the appropriate column

TABLE 2: WELL INFORMATION										
Desired about 755					Legal Location					
(modifications and renewals only)	Well Name	API Number	Coal Seam(s)	Well Depth	Section	Township	Range	Quarter/ Quarter	Discharges to Outfall #	
No Change	D Cosner Federal 3W-4	49-005-47452	Wyodak	958	3	43	72	NWNW	001HC2	
No Change	D Cosner Federal 3W-6	49-005-47449	Wyodak	986	3	43	72	SENW	001HC2	
No Change	Meister Federal 3W-11	49-005-54959	Wyodak	929	3	43	72	NESW	001HC2	
No Change	D Cosner Federal 3W-12	49-005-47453	Wyodak	986	3	43	72	NWSW	00111C2	
Remove	T Cosner Federal 34W-13	49-005-55449	Wyodak	1082	34	44	72	swsw	001HC2	
No Change	D Cosner Federal 4W-10	49-005-47450	Wyodak	886	4	43	72	NWSE	002HC2	
No Change	D Cosner Federal 4W-12	49-005-47451	Wyodak	1085	4	43	72	NWSW	002HC2	
No Change	D Cosner Federal 4W-14	49-005-47445	Wyodak	1070	4	43	72	SESW	002HC2	
Remove	D Cosner Federal 4W-16	49-005-47444	Wyodak	1055	4	43	72	SESE	003HC2	
No Change	D Cosner Federal 9W-2	49-005-47446	Wyodak	912	9	43	72	NWNE	003HC2	
No Change	T Cosner Federal 10W-3	49-005-54962	Wyodak	915	10	43	72	NENW	003HC2	
No Change	D Cosner Federal 10W-4	49-005-47464	Wyodak	950	10	43	72	NWNW	003HC2	
No Change	D Cosner Federal 9W-8	49-005-47447	Wyodak	1145	9	43	72	SENE	004HC2	
No Change	D Cosner Federal 9W-10	49-005-47448	Wyodak	945	9	43	72	NWSE	004HC2	
No Change	D Cosner Federal 9W-16	49-005-47455	Wyodak	1000	9	43	72	SESE	004HC2	
No Change	Hladky Federal 10W-1	49-005-54958	Wyodak	860	10	43	72	NENE	004HC2	
No Change	Mackey Federal 10W-7	49-005-54961	Wyodak	893	10	43	72	SWNE	004HC2	
No Change	Mullins Federal 10W-9	49-005-54963	Wyodak	832	10	43	72	NESE	00411C2	
No Change	T Cosner Federal 10W-11	49-005-54964	Wyodak	927	10	43	72	NESW	004HC2	
No Change	D Cosner Federal 10W-12	49-005-47454	Wyodak	1033	10	43	72	NWSW	004HC2	
No Change	T Cosner Federal 10W-15	49-005-54965	Wyodak	906	10	43	72	SWSE	004HC2	
No Change	D Cosner Federal 8W-2	49-005-48882	Wyodak	1155	8	43	72	NWNE	005HC2	
No Change	D Cosner Federal 8W-8	49-005-48881	Wyodak	989	8	43	72	SENE	00511C2	
No Change	D Cosner Federal 8W-10	49-005-48880	Wyodak	1072	8	43	72	NWSE	006HC2	
No Change	D Cosner Federal 8W-16	49-005-48879	Wyodak	1068	8	43	72	SESE	006HC2	
No Change	D Cosner Federal 8W-12	49-005-49755	Wyodak	1110	8	43	72	NWSW	007HC2	
No Change	D Cosner Federal 8W-14	49-005-48883	Wyodak	1129	8	43	72	SESW	007HC2	
Use format provided.	Additional sheets may be included if ne	cessarv, AWAO –	"all wells to all e	outalls"						

Total Number of Wells

25

TABLE 3: RE	TABLE 3: RESERVOIR INFORMATION											
Desired									[
Changes		Reservoir							Geograph	ic Location		
(modifications		Storage			Legal Location				(Decimal Degrees)			
and renewals		Volume	SEO	SEO Reservoir						<u>_</u>		
only)	Reservoir Name	(acre/feet)	Permit #	Requirements	Date	Section	Township	Range	Latitude	Longitude		
	Not Applicable: Belle Fourche Watershed.											

Additional spaces/tables may be included as necessary. Use the format provided. *Please note that reservoir information is not required if reservoir containment is not part of the facility's water management plan – for instance, information about existing "incidental" downstream reservoirs is not required.*

Table 4: Bonding Information Table										
		Please check or volume"	nly one "reserv ' box for each r							
		Reservoir								
		Bonding	Reservoir				Bond			
Desired		Authority	Reclamation			Reservoir	currently			
Changes		(BLM,	Volume*			constructed	posted			
(modifications		WDEQ,	less than			prior to	with			
and renewals		WOGCC, or	5000 cubic			September	bonding			
only)	Reservoir Name	OSLI)	yards?	Value	Date	1, 2005?	authority?			

Not Applicable: Belle Fourche Watershed.

*"Reservoir reclamation volume" is the volume of backfill and/or topsoil needed to fill reservoir upon reclamation, in cubic

Table 5: Well Flow Summary
Devon Energy Production Company, L.P.
Hay Creek 2 WYPDES Permit Renewal WY0048941
Campbell County T43N R72WReceiving Streams: Unnamed Tributaries to Hay Creek 2 (Unclassified 3B)
Receiving Drainage: Belle Fourche River (Class 2ABWW)

	Average flow	per well		
Outfall	between 6/1/06 a	nd 11/30/06		
001HC2	0.00215	MGD/well	1.50	gpm/well
002HC2	0.00189	MGD/well	1.31	gpm/well
003HC2	0.00234	MGD/well	1.62	gpm/well
004HC2	0.00232	MGD/well	1.61	gpm/well
005HC2	0.00238	MGD/well	1.65	gpm/well
006HC2	0.00242	MGD/well	1.68	gpm/well
007HC2	0.00265	MGD/well	1.84	gpm/well
Average Flow per Well (16 flowing				
wells)	0.00225	MGD/well	1.56	gpm/well
	53.6	bbls/d/well	2,252	gpd/well
Average Flow for Facility	0.03603	MGD	25.02	gpm
	857.9	bbls/d	36,032	gpd
Highest Flow Per Well (Wyodak) ¹	0.00714	MGD/well	4.96	gpm/well
	170.0	bbls/d	7,140	gpd/well
9 Wyodak wells not flowing	0.06426	MGD	44.63	gpm
	1,530.0	bbls/d	64,260	gpd
Total Anticipated Flow	0.1003	MGD	69.65	gpm
	2,387.9	bbls/d	100,292	gpd
				<u>Si</u>
Approved Volume	1.36	MGD	944.44	gpm
	32,381.0	bbls/d	1,360,000	gpd

¹ Based on the maximum daily flow per Wyodak well between 6/1/2006 and 11/30/2006 of Devon's Cosner Hay Creek 2 Facility.

Table 6: Compliance Summary

	2		D			Dl.	Dl.		
Outfall	>2 mile from class 2 stream	Constituent	Limit	Value	Date	Ke-sample Value	Re-sample Date	Units	Comments
001HC2	ves	Iron. Dissolved	1000	1600	4/16/2005	2870	5/5/2005	ug/L	Re-sampled on 5/5/2005
001HC2	ves	Iron, Dissolved	1000	2870	5/5/2005	61	6/15/2005	ug/L	Re-sampled on 6/15/2005, in compliance.
002HC2	yes	Arsenic, total recoverable	3.1	4	4/16/2005	4	5/5/2005	ug/L	Re-sampled on 5/5/2005
002HC2	yes	Arsenic, total recoverable	3.1	4	5/5/2005	2.7	6/15/2005	ug/L	Re-sampled on 6/15/2005, in compliance.
002HC2	yes	Iron, Dissolved	1000	1240	4/26/2004	934	4/16/2005	ug/L	Re-sampled on 4/16/2006, in compliance.
002HC2	yes	pH	6.5-8.5	8.75	4/15/2006	8.26	5/5/2006	s.u.	Re-sampled on 5/5/2006, in compliance.
002HC2	yes	Sodium Adsorption Ratio (SAR)	10	10.9	6/16/2006	13.2	7/11/2006	unitless	Re-sampled on 7/11/06
002HC2	yes	Sodium Adsorption Ratio (SAR)	10	13.2	7/11/2006	12	8/20/2006	unitless	Re-sampled on 8/20/06.
									Re-visited on 9/14/06, 10/4/06, 11/3/2006, and 12/4/2006, outfall was dry when visited.
002HC2	yes	Sodium Adsorption Ratio (SAR)	10	12	8/20/2006	see co	mments	unitless	Another site visit is scheduled for January 2007.
003HC2	yes	Arsenic, total recoverable	3.1	4.9	4/26/2004	1.5	4/16/2005	ug/L	Re-sampled on 4/16/2005, in compliance
003HC2	yes	Arsenic, total recoverable	3.1	1.5	4/16/2005	2.1	4/15/2006	ug/L	Re-sampled on 4/15/2006, in compliance.
003HC2	yes	Iron, Dissolved	1000	2020	4/26/2004	850	12/2/2004	ug/L	Re-sampled on 12/2/2004, in compliance.
003HC2	yes	Iron, Dissolved	1000	1160	4/16/2005	38	9/7/2005	ug/L	Re-sampled on 9/7/2005, in compliance.
006HC2	yes	Arsenic, total recoverable	3.1	3.6	4/26/2004	5.1	5/23/2004	ug/L	Re-sampled on 5/23/2004
006HC2	yes	Arsenic, total recoverable	3.1	5.1	5/23/2004	3.8	6/23/2004	ug/L	Re-sampled on 6/23/2004
006HC2	yes	Arsenic, total recoverable	3.1	3.8	6/23/2004	3.7	7/30/2004	ug/L	Re-sampled on 7/30/2004
006HC2	yes	Arsenic, total recoverable	3.1	3.7	7/30/2004	3	7/10/2005	ug/L	Re-sampled on 7/10/2005, in compliance.
006HC2	yes	Iron, Dissolved	1000	1550	4/26/2004	2420	5/23/2004	ug/L	Re-sampled on 5/23/2004
006HC2	yes	Iron, Dissolved	1000	2420	5/23/2004	2770	6/23/2004	ug/L	Re-sampled on 6/23/2004
006HC2	yes	Iron, Dissolved	1000	2770	6/23/2004	1290	7/30/2004	ug/L	Re-sampled on 7/30/2004
006HC2	yes	Iron, Dissolved	1000	1290	7/30/2004	427	7/10/2005	ug/L	Re-sampled on 7/10/2005, in compliance.
006HC2 007HC2	yes ves	Iron, Dissolved Radium 226	1000	1480	7/11/2006	see co	mments	ug/L pCi/L	Another site visit is scheduled for January 2007. Re-sampled on 11/3/2006. in compliance.

Map 1

Hay Creek 2 CBM Operations Project Area

WYPDES Application for Permit to Discharge Produced Water: Application for Coal Bed Methane New Discharges, Renewals, or Major Modifications, revised 06-22-06 Devon/2007/January/5/Renewal/ 10120201/ WY0048941/HC2 CBM application 12-06.doc



Devon/2007/January/5/Permit Renewal/ 10120201/WY0048941

Appendix A Water Quality Laboratory Data Sheets

WYPDES Application for Permit to Discharge Produced Water: Application for Coal Bed Methane New Discharges, Renewals, or Major Modifications, revised 06-22-06



LABORATORY ANALYTICAL REPORT

Client:Devon Energy CorporationProject:House Creek 11304-1Client Sample ID:001HC2 WY0048941Location:Samp FRQ/Type:Lab ID:G06120075-001

Report Date:12/20/06Collection Date:12/05/06 07:30DateReceived:12/05/06Matrix:AqueousSampled By:Mike Naus

Analyses	Result	Units	Result	Units	Qualifier Method	Analysis Date / By
FIELD PARAMETERS						
Conductivity, field	816	umhos/cm			FIELD	12/05/06 07:30 / ***
pH, field	7.48	s.u.			FIELD	12/05/06 07:30 / ***
Temperature °C, field *** Performed by Sampler	14.9	°C			FIELD	12/05/06 07:30 / ***
MAJOR IONS, DISSOLVED						
Bicarbonate as HCO3	568	mg/L	9.32	meq/L	A2320 B	12/06/06 14:55 / mli
Chloride	6	mg/L	0.16	meq/L	E300.0	12/06/06 16:11 / mli
Fluoride	1.2	mg/L	0.06	meq/L	E300.0	12/06/06 16:11 / mli
Sulfate	<1	mg/L	<0.02	meq/L	E300.0	12/06/06 16:11 / mli
Calcium	25	mg/L	1.25	meq/L	E200.7	12/08/06 17:45 / eli-b
Magnesium	9	mg/L	0.77	meq/L	E200.7	12/08/06 17:45 / eli-b
Sodium	170	mg/L	7.39	meq/L	E200.7	12/08/06 17:45 / eli-b
METALS, DISSOLVED						
Cadmium	<0.1	ug/L			E200.8	12/07/06 02:54 / eli-b
Copper	<1	ug/L			E200.8	12/07/06 02:54 / eli-b
Iron	37	ug/L			E200.7	12/08/06 17:45 / eli-b
Lead	<2	ug/L			E200.8	12/07/06 02:54 / eli-b
Manganese	16	ug/L			E200.8	12/07/06 02:54 / eli-b
Mercury	<0.06	ug/L			E200.8	12/07/06 02:54 / eli-b
Zinc	<10	ug/L			E200.8	12/07/06 02:54 / eli-b
METALS, TOTAL RECOVERABLE						
Aluminum	<50	ug/L			E200.8	12/07/06 05:53 / eli-b
Arsenic	1.7	ug/L			E200.8	12/07/06 05:53 / eli-b
Barium	636	ug/L			E200.8	12/07/06 05:53 / eli-b
Selenium	<5	ug/L			E200.8	12/07/06 05:53 / eli-b
NON-METALS						
Alkalinity, Total as CaCO3	466	mg/L			A2320 B	12/06/06 14:55 / mli
Hardness as CaCO3	100	mg/L			A2340 B	12/12/06 09:23 / tlc
Nitrogen, Ammonia as N	1.0	mg/L			E350.1	12/07/06 12:09 / eli-b
Sodium Adsorption Ratio (SAR)	7.3	unitless			Calculatio	on 12/12/06 09:23 / tlc
Solids, Total Dissolved TDS @ 180 C	506	mg/L			A2540 C	12/06/06 10:41 / mli
DATA QUALITY						
A/C Balance	1.08	%			A1030 E	12/12/06 09:20 / tlc
Anions	9.53	meq/L			A1030 E	12/12/06 09:20 / tlc
Cations	9.74	meq/L			A1030 E	12/12/06 09:20 / tlc

ReportRL - Analyte reporting limit.Definitions:QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client:Devon Energy CorporationProject:House Creek 11304-1Client Sample ID:001HC2 WY0048941Location:Samp FRQ/Type:Lab ID:G06120075-001

Report Date:12/20/06Collection Date:12/05/06 07:30DateReceived:12/05/06Matrix:AqueousSampled By:Mike Naus

Analyses	Result	Units	Result	Units	Qualifier	Method	Analysis Date / By
RADIOCHEMICAL							
Radium 226	<0.2	pCi/L				E903.0M	12/18/06 18:09 / eli-c
Radium 228	8.2	pCi/L				RA-05	12/18/06 15:19 / eli-c
Radium 228 precision (±)	1.2	pCi/L				RA-05	12/18/06 15:19 / eli-c
Radium 226 + Radium 228	8.2	pCi/L				Calculation	12/20/06 11:59 / eli-c
Radium 226 + Radium 228 precision (±)	1.2	pCi/L				Calculation	12/20/06 11:59 / eli-c