

# Attachment A



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**VIA FED-EX OVERNIGHT**

Colleen Rathbone  
Water Permits Unit (8P-W-WW)  
U.S. EPA, Region 8  
1595 Wynkoop Street  
Denver, CO 80202-1129

RE: Comments on Draft Permit and Statement of Basis – Sheldon Dome (Permit #WY-0024953), Wind River Indian Reservation, Wyoming

Dear Ms. Rathbone:

Phoenix Production Company/BreitBurn (Phoenix) appreciates the opportunity to provide comments on the draft NPDES permit and Statement of Basis (SOB) for the above referenced facility, and provides the following comments.

**Page 7 of Statement of Basis – Receiving Waters**

Paragraph 1 of this section states 'The discharge from outfall 001 at this facility is a continuous discharge and will enter an unnamed ephemeral tributary to Dry (Pasup) Creek. Without the continuous significant volume of discharged produced water, the unnamed tributary would be an ephemeral drainage with only precipitation runoff providing water. The total distance from the point of discharge into the unnamed ephemeral drainage is approximately 4.4 stream miles. From this confluence, Dry Creek is an intermittent stream and travels approximately **13.4 miles** to the juncture of the Wind River.

***Comment:*** *As per the attached Rolff Lake and Sheldon Dome Discharge Map, the approximate distance from the confluence of the unnamed ephemeral drainage and Dry Creek is approximately **18.67 stream miles**. Phoenix requests that this paragraph be modified to reflect the actual approximate **stream mile** distance between these two points.*

Paragraph 2 of this page states 'In the Tribes' WQS, designated uses were established in which the Tribes classified this segment of Dry Creek and its tributaries from the confluence with the Wind River, upstream to perennial flow as Class 3B. Class 3B waters are known to support or have the potential to support populations of indigenous aquatic life other than fish that the Tribes have determined deserve special water quality protection measures. This use includes waters that support riparian and/or wetland areas that have plants that are culturally and/or spiritually important. Uses designated on Class 3B waters include aquatic life other than fish, primary contact recreation, wildlife, industrial, agricultural, cultural/traditional and aesthetic uses.'

***Comment:*** *Based on a review of the Tribal Water Quality Standards (WQS) and Waterbody Classification List (WCL) Phoenix cannot determine if the unnamed ephemeral drainage receiving the Sheldon Dome effluent is Class 3B or not, as this specific drainage is not mentioned in the WCL. However, based on the Tribal WQS it*

appears that the classification of this unnamed naturally ephemeral drainage fits the definition of a Class 3E water and should be classified as such (please refer to the definition of Class 3E waters in the WQS – ‘Class 3E waters are perennial, intermittent, or ephemeral streams **whose flows are exclusively the result of permitted effluent discharges** and are known to support or have the potential to support aquatic life other than fish’). Please note that in the Tribal WQS document there are typographical errors in the description of both 3D and 3E definitions.

Under natural conditions (i.e. without the Sheldon Dome effluent) it appears the ephemeral drainage receiving the Sheldon Dome discharge water would be designated as Class 4B and Dry Creek below the effluent confluence would be 3B or 4B. In the WQS Class 4B waters are defined as follows: ‘Class 4B waters are intermittent and ephemeral stream channels that have been determined to lack the hydrologic potential to normally support and sustain aquatic life pursuant to the provisions of Section 33 (b) of these regulations. In general, 4B streams are characterized by only infrequent wetland occurrences or impoundments within or adjacent to the stream channel over its entire length. Such characteristics will be the primary indicator used in identifying class 4B waters.’).

Paragraph 2 of the SOB incorrectly provides a definition of Class 3B waters as those ‘that are known to support or have the potential to support populations of indigenous aquatic life other than fish that the Tribes have determined deserve special water quality protection measures.’ This is actually the definition of a Class 3D water in the Tribal WQS, and not a Class 3B water.

#### **Page 7 of the Statement of Basis – Inspections**

The paragraph contained under this sections states, ‘ An inspection report by U.S. EPA inspectors following a site visit on June 30, 2010 indicated that the facility had submitted a letter dated December 7, 2005 indicating plans were in place to conduct underground injection of produced water from wells with characteristically high TDS and Specific Conductance by October 2006. A summary of monitoring data from December 2005 to June 2010 shows general compliance with the effluent limits established in the previous permit. However, the DMR data indicate that Total Radium 226 was not monitored quarterly as required in the permit. Rather, Total Radium 226 was monitored only once every six months. Additionally, there was one occurrence where effluent limits were exceeded as reported in December 2005 where TDS was measured to be 5,330 mg/l.’

**Comment:** *In almost every case, Phoenix did complete quarterly Radium 226 monitoring during the quarterly monitoring periods from 2<sup>nd</sup> half 2005 through June 2010. The DMR data does not reflect this quarterly monitoring frequency for three reasons: 1) The associated EPA printed DMRs incorrectly showed radium 226 monitoring as required only semi-annually, 2) Phoenix is required to only provide the maximum radium 226 value for the reporting period (in this case the DMRs show only semi-annual monitoring required), and 3) Phoenix did not show the ‘Frequency of Analysis’ as requested on the DMRs. Phoenix can provide records of the correct monitoring frequency, if necessary.*

Phoenix would like to point out that the 5,330 mg/l TDS value reported for December 2005 was not in violation of the permit. The previous permit (effective November 1, 2005 and expiring at midnight on September 30, 2010) which is currently under administrative extension contains a footnote at the bottom of page 5 (footnote b/ under Part 1.3.1 – **Effluent Limitations – Outfall 001**) which states ‘This Limit is effective no later than one year after the date of this permit’. Additionally, there is a paragraph at the top of page 3 of the SOB which says, ‘These limits were contained in the previous permit except for Specific Conductance, Total Dissolved Solids, Chlorides, and Sulfates. These new limits will be effective one year after the effective date of the Permit. Permit Condition 1.3.3 contains a compliance schedule for meeting these limitations.’

Therefore, Phoenix was not in violation of the TDS limit for this permit, because the 5,330 mg/l sample was collected and reported prior to the end of the one year compliance period allowed for TDS in the permit and SOB.

#### **Page 8 of the Statement of Basis – Applicable Effluent Guidelines and Standards**

The third paragraph of this section states, 'The permit application contained two letters (dated January 20, 2010 and February 4, 2010) representing two ranchers that documented the beneficial use of the discharged water to their livestock.'

**Comment:** *The letters referenced in this section actually represent five ranchers – Jolene Scheer, Bryan Ty Nicholls, Brodie Nicholls, Darwin Griebel, and Alfred Deshaw, as referenced in the letters. Though Sheldon Dome is in Range Unit #38, there is no boundary between Range Units 38 and 40. Hence the water discharged from the Sheldon Dome facility likely could be providing water to cattle grazing the eastern side of Range Unit #40 as well. Please refer to the attachment showing Permittee and Permitted Cattle Numbers information, as provided by the Bureau of Indian Affairs (BIA) showing the actual number of permittees and cattle that benefit from the Sheldon Dome discharge water.*

#### **Pages 8 and 9 of the Statement of Basis – Additional Technology Based Effluent Limitations**

The first paragraph at the top of page 9 states, 'In the previous permit, emphasis was placed on controlling conductance, chloride, sulfate, and TDS for protection of livestock. **The limits of 7,500 uS/cm for conductance, 2,000 mg/l for chloride, 3,000 mg/l for sulfate, and 5,000 mg/l for TDS have been in effect since the facilities have been covered under an NPDES permit.**'

**Comment:** *Phoenix would like the EPA to correct/remove the second sentence of this paragraph, because it is incorrect. Phoenix would like to point out that prior to issuance of the current permit (effective November 1, 2005 thru September 2010 and currently under administrative extension); this facility did not have a limit for Specific Conductance, Total Dissolved Solids, Chlorides, and Sulfates. Until November 1, 2005 this facility had been grandfathered with no limits on these constituents. The grandfathering of permits with water quality in excess of the current limits was based on the existing quality of water discharged from the facility and the documentation of previous and existing beneficial uses by Tribal grazing permittees. This grandfather status was removed with issuance of the November 1, 2005 permit. However, a compliance schedule was allowed for the facility to come into compliance with the new limits for these constituents. A review of the current permit and the SOB for this permit (Page 3 of the Statement of Basis and page 5 of the permit) discuss the addition of the new effluent limits and provide for a compliance schedule to meet the new limits. Therefore, this facility has not always had limits for these constituents since the facility was covered under an NPDES permit.*

#### **Page 9 of the Statement of Basis – Water Quality for Wyoming Livestock and Wildlife Report**

This section of the SOB provides the basis for establishing the proposed 1,000 mg/l 30 Day Average and 1,800 mg/l Daily Maximum effluent limits for sulfate at this facility. This section also discusses the study recommendations of a 2.0 mg/l level of fluoride and assumes this level is safe for sheep, cervids, and horses.

**Comment – sulfate:** *A review of the DMR data (Table 3 of page 12 of the Statement of Basis) shows that in most cases the Sheldon Dome effluent will not meet the proposed 1,800 mg/l Daily Maximum nor the 1,000 mg/l 30-Day Average. A review of possible treatment options to remove sulfate from the effluent indicates that 100% injection of the produced water would be the most cost effective means to keep this facility in compliance; thus resulting in the complete loss of this water for surface discharge and the corresponding loss of beneficial uses to livestock and wildlife. Currently there are no injection capabilities at the Sheldon Dome*

facility. Should the Sheldon Dome facility not be able to obtain a compliance schedule for sulfate and a timely aquifer exemption and UIC permits from the EPA to inject produced water at this facility; or if injection targets cannot be identified, or further investment in infrastructure cannot be justified, then production will have to be shut in so that there is no discharge of produced water from the facility. If Phoenix is forced to shut-in production at Sheldon Dome, it will result in reduced royalties and payments to the Tribes, as well as a resulting loss of beneficial uses of the discharge water.

The basis for the sulfate limits proposed by EPA is a report authored by Dr. Raisbeck (Raisbeck et al. 2007). This report ("UW report") contains a partial review of published toxicity studies on sulfate effects on livestock; the report then provides recommendations for a range of water quality limits that would be protective of livestock. However, proposed recommendations in the UW report are neither consistent with the literature, nor state or federal water quality limits, including those of EPA for other constituents such as fluoride.

Phoenix feels the recommendations in the UW report are not consistent with published reports or standards to date, nor are necessarily applicable to the site. First, the recommendations made in the UW report do not appear to be clearly linked to the literature cited – for example, the report states that sulfate levels between 500 and 1,500 mg/L can result in adverse effects on livestock growth, but the references provided in the report showed that growth remained unaffected at concentrations as high as 2,700 mg/L (see review in PJH Environmental, Inc, Attachment 1). The UW report contends that "concentrations less than 1,800 mg/L should minimize the possibility of acute death in cattle." The number cited seems inappropriately conservative and highly speculative given that the literature cited in the UW report, as well as additional reviews provided in PJH Environmental Inc., showed that acute death in livestock was not recorded in peer-reviewed publications at concentrations less than 4,000 mg/L sulfate, and in these cases, total sulfate ingestion was higher than 9,000 ppm.

Second, many natural water sources in Wyoming utilized for livestock watering purposes (both surface water and groundwater) are naturally high in sulfate, sometimes exceeding 1,800 mg/l sulfate (see Tables 5 and 6 in the report, Attachment 1), and these waters are utilized by livestock (see Appendix A in Attachment 2, Geomega 2007). Further, in a metadata analysis by PJH Environmental Inc. (Attachment 1), the significance of livestock effects as published in the literature were placed in context of empirical Wyoming livestock data. A literature review indicated that current Wyoming standards for sulfate in surface water should be protective of livestock. In the accompanying metadata analysis, using Wyoming-specific data on livestock production rates, natural industry variability in cattle production was shown to be about 8.5% for Wyoming. In comparison, the available literature indicates that variability in production rates can be as much as 5% if cattle are exposed to sulfate levels of between 1,200 mg/l and 3,000 mg/l. Therefore, this potential variability in cattle production is not significantly different than the natural industry variability, suggesting that there is no added degree of injury to livestock from exposure to current sulfate limits (i.e. 3,000 mg/l). In fact, livestock production data from the Flitner Ranch (Table A-1 of Attachment 2), shows that their cattle which drank only discharge water in the 3,000 mg/l range, had an average 7 year weight gain greater than their cattle grazing in pastures where only natural water sources were available.

There are many variables affecting the performance of livestock. Some of these variables include breed, genetics, quality of forage, quantity of forage, living conditions, availability of water, distance from forage to drinking water, availability of shelter, climate, precipitation, predators, etc. These variables are likely to have much more effect on cattle performance than water with elevated levels of sulfate. In fact Wyoming ranchers (including Tribal allotment grazers) utilizing high sulfate produced water have testified and

provided written letters stating that the loss of the water will result in significant detrimental effects on their livestock operations and wildlife.

Therefore, Phoenix proposes that the current sulfate limit is appropriate, based on solid agricultural production data and range conditions, and will be consistent with Wyoming's water quality standard for sulfate, which is 3,000 mg/L. This limit is consistent with the body of literature and empirical data for livestock in Wyoming, both of which were comprehensively reviewed by Ms. Hunter. Ms. Hunter has a Master's Degree in Rangeland Ecology and has 15 years experience with risk assessment, particularly for livestock and wildlife. In an accompanying report on this issue (Geomega 2007, Attachment 2), an ecological risk assessment which followed EPA guidelines, was conducted for livestock, which showed that sulfate levels of up to 3,100 mg/L should not adversely affect livestock in Wyoming. In the assessment, consideration of Wyoming-specific sulfate levels in forage and exposure conditions were incorporated into the risk assessment. Therefore, the assessment addressed conditions which would be considered more specific to Phoenix, rather than considerations of a variety of conditions including stressful, feedlot conditions as considered in the UW report.

Phoenix contends that a loss of produced water availability on the Wind River Reservation will result in a dramatic reduction or complete loss of current livestock production in this area and negative economic effects on the Tribal grazers that would lose access to that produced water, should the stricter water quality limits be adopted as proposed in the draft permit and Statement of Basis. Phoenix would like to note that the discharge water from the Sheldon Dome field provides a perennial water source for Tribal range unit #38 and the eastern edge of range unit #40, and is often the only water source available during much of the year. In fact, oilfield discharge waters provide the only reliable perennial water sources in these two allotments which provide grazing for approximately 2,620 head of Tribal cattle and 13 Tribal permittees. These produced water discharges allow better cattle distribution across both range units, thus improving range health. Please see the attached table showing Tribal cattle numbers permitted on these range allotments, as provided by the Bureau of Indian Affairs (BIA). If this produced water becomes unavailable for surface discharge, it is likely to result in lower cattle numbers on the allotments, potentially all cattle removed from these allotments, and/or significant additional operating costs for the Tribal grazers to haul livestock drinking water for these allotments. The produced water is also critical for a myriad of wildlife in the area and creates an aquatic life community which would otherwise be absent from the natural ephemeral drainages.

**Comment – Fluoride:** A review of the February 11, 2010 analytical results, collected for the purpose of permit renewal, shows a level of 3.4 mg/l fluoride. Should the EPA include a future fluoride limit of 4 mg/l or less, it is likely that the facility would be out of compliance for that constituent as well.

While a 4 mg/L standard for fluoride exists for the protection of human health, there is no ecologically-based federal standard for fluoride (F). In published literature, the National Academy of Science (NAS) recommends 2 mg/L criteria for livestock protection. However, this criteria was derived from the 1972 publication from NAS, which reviewed available F toxicity studies to livestock and concluded that tooth mottling in livestock may occur at concentrations as little as 2 mg/L F. Except in extreme cases, this endpoint is neither a toxicologically nor an economically significant adverse effect as it generally describes a discoloration of the teeth. The U.S. Center for Disease Control and Prevention considers this a cosmetic effect harmless to the health of humans and Phillips et al (1960) noted that there was no instance where tooth mottling decreased the economic value of livestock.

Additionally, the NAS recognized that, although 2 mg/L of F may cause, in some cases, tooth mottling, “At least a several-fold increase [from 2 mg/L] seems, however, required to produce other injurious effects.” In all of the studies reviewed by NAS on the effects of fluoride in animals, none showed that tooth mottling causes injury to cattle or other animals that is measurable in terms of milk production, feed consumption, weight gain, growth, reproduction, development, life span, or other effects relevant to livestock producers or toxicologists. In the updated review (NRC 2005), NAS revised its recommendation to a limit of 40 parts per million (ppm) F for livestock (40 ppm is equivalent to 40 mg/kg in feed or 8 mg/L in water, based on average feed and water ingestion rates of adult beef cattle), and higher limits for other types of livestock. A comprehensive review of livestock toxicity studies with fluoride (see Geomega 2007, Attachment 2) showed that a minimum of 49 ppm F was identified to result in decreased milk production in dairy cattle (Stoddard et al. 1963). No effects to livestock on growth or reproduction were found at up to 200 ppm F. Fluoride levels in Wyoming forage are low, about 25 mg/kg (Newman 1984); hence at even 5 mg/L F, there is essentially no risk of additive dosing as the total dose of F is well below the 49 ppm F level even for the most sensitive variety of bovine found in Stoddard et al. (1963).

As discussed above, Phoenix would be forced to potentially rely on injection of the produced water and/or shut in of production (oil and produced water) to eliminate the discharge in order to comply with an overly protective and scientifically unjustified F limit.

Phoenix would like to point out that **Section 20 – Agriculture Water Supply** of the Tribal WQS states, ‘All reservation surface waters which have the natural water quality potential for use as an agriculture water supply shall be maintained at a quality which allows continued use of such waters for agricultural purposes. Degradation of such waters shall not be of such an extent to cause a measurable decrease in crop or livestock production.’ Phoenix contends that there has not been a documented or anecdotal case of a measurable decrease in livestock production due to elevated levels of sulfate or fluoride in the Sheldon Dome discharge water. Additionally, recent (2010 permit renewal beneficial use letters) and historic beneficial use letters provided by Tribal grazers document that a loss of this water will have negative economic impacts on their livestock operations, as well as wildlife populations in the area. Phoenix contends there will be a net loss (and possibly a total loss) of livestock production if more stringent permit limits force Phoenix to inject the produced water from this facility. Phoenix requests that the EPA and Wind River Environmental Quality Commission (WREQC) consider these beneficial use letters and the degree of injury that will result to Tribal grazers and wildlife from loss of the Sheldon Dome produced water for surface discharge.

#### **Page 14 of the Statement of Basis – Reasonable Potential Evaluation**

**Comment – Fluoride:** Phoenix does not agree with the 2 mg/l acute value used in the Reasonable Potential Evaluation. Per the attached papers from Ms. Penny Hunter and the above discussion on fluoride levels relative to livestock production; Phoenix believes a 2 mg/l value for fluoride is much lower (more restrictive) than the level required to meet the intent of Section 20 – Agricultural Water Supply (i.e. No measurable decrease in crop or livestock production) of the Tribal WQS.

#### **Page 15 of the Statement of Basis – Quantitative RP Analysis – Fluoride, Iron, Zinc**

**Comment:** Phoenix agrees that fluoride, iron, and zinc effluent limits need not be established at this time. More data needs to be collected before a reasonable potential analysis can determine if a permit limit and monitoring requirements are necessary for these constituents. However, Phoenix believes that collection of this data during proposed future Toxic Pollutants Screens is adequate and that quarterly monitoring for these constituents is unnecessary.

#### **Pages 15 and 16 of the Statement of Basis – Quantitative RP Analysis – Organic Compounds,**

In this section EPA states it has evaluated the data on organic compounds benzene, ethyl benzene, toluene, naphthalene, and xylene with respect to EPA/Tribal water quality criteria for human health protection and EPA Maximum Contaminant Levels for drinking water. The EPA further states that the Tribes have not designated the receiving water as a drinking water source.....and that the human health criteria and MCLs are not directly applicable to the water body and effluent limitations will not be established based on this evaluation.

**Comment:** Phoenix agrees that no effluent limitations should be established for these constituents because they are not applicable to the classification nor designated uses for a Class 3B (or 3E) receiving water, to which the Sheldon Dome Facility discharges. Phoenix further asserts that monitoring for these constituents should not be included in the Toxic Pollutants Screen (Permit Part 1.3.4) requirements contained in the SOB and permit. Since there are no aquatic life standards for these constituents and the receiving waters are not classified nor designated as drinking water sources; Phoenix believes it is inappropriate to include monitoring for these constituents in the Toxic Pollutants Screen.

#### **Pages 16 of the Statement of Basis – Other Effluent Limitations**

**Comment:** Phoenix agrees with the new proposed pH limit of 6.5 – 9.0 standard units. An upper pH limit of 9.0 is reflective of natural pH levels in many of Wyoming's surface waters. Phoenix also agrees with other sections of the Statement of Basis and permit which list a pH limit of 6.5 – 9.0 standard units.

#### **Pages 16, 21, and 22 of the Statement of Basis, and Pages 7 and 8 of the Permit – Toxic Pollutants Screen**

**Comment:** Please see comment above concerning benzene, ethyl benzene, toluene, naphthalene, and xylene.

Phoenix believes testing for many of the Acid and Base/Neutral Organic Compounds and Volatile Organic Compounds is unnecessary and will result in unnecessary analytical costs. Many of the constituents listed in the referenced 40 CFR Part 122, Appendix D are chlorinated and fluorinated compounds. Chlorinated and fluorinated compounds are not natural to crude oil. Nor does Phoenix add these compounds during the treatment process. Also, many of the compounds listed in 40 CFR Appendix D likely do not have established aquatic life standards. Phoenix requests that any chlorinated or fluorinated compounds, as well as those compounds that do not have aquatic life standards, not be included in the Toxic Pollutants Screen, as they are not relevant to a facility discharging to a Class 3B (or 3E) water.

Phoenix requests that chloride and radium 226 be removed from the list of parameters included in Table 10 of Page 22 of the SOB and Page 8 of the permit. Chloride and radium 226 are already required to be monitored on a quarterly basis, as per the Self Monitoring Requirements of the permit and SOB. There will be substantial chloride and radium 226 data collected during this quarterly monitoring and it should not be necessary to collect additional chloride and radium 226 data during the Toxic Pollutants Screen.

#### **Pages 16 and 17 of the Statement of Basis and Pages 9 thru 11 of the Permit – Acute Whole Effluent Toxicity Monitoring**

**Comment:** Phoenix does not believe that a Whole Effluent Toxicity Monitoring requirement or limit should be included in the SOB or permit for this facility. Phoenix does not believe that this test is appropriate for a Class 3B (or 3E) water, to which this facility discharges. Based on the attached map of the Rolff Lake and Sheldon Dome geographic area, it is approximately 22.62 stream miles from the Sheldon Dome outfall to the confluence of the Wind River. The Sheldon Dome effluent only travels approximately 0.67 miles downstream of the outfall before it dries up. It is unlikely that the effluent ever reaches intermittent Dry Creek or the Wind River, except during a major runoff or precipitation event. During a major runoff or precipitation event



which might cause some Sheldon Dome effluent to reach Dry Creek or the Wind River, it would be so dilute that there would be no impact on intermittent Dry Creek or the Wind River. Also, complete natural attenuation of hydrogen sulfide would occur within a very short reach of the 22.62 stream mile distance.

The aquatic communities present in the Sheldon Dome discharge have adapted and evolved to live in the produced water under ambient discharge conditions. In the case of the natural ephemeral drainage to which the Sheldon Dome discharge enters, there would naturally be zero aquatic life in this drainage if not for the presence of the discharge water. Under natural conditions this drainage would be totally dry almost 100% of the time, with no associated aquatic life. If permit conditions (including WET testing) are so restrictive as to not allow the current effluent water quality to be discharged; it is likely that Phoenix will inject all of the produced water, or shut in production, which will result in the loss of all aquatic life that is dependent upon this water.

Sour oilfield discharges, such as Sheldon Dome, are likely to fail an acute WET test without extensive treatment to remove sulfide. Such treatment is expensive and it is likely that it will be uneconomic for Phoenix to treat the water to remove potential toxicity, and Phoenix would rely on injection of all of the produced water to keep this facility in compliance. As discussed above, Phoenix believes there will be a net loss of aquatic life to the drainage should all the produced water be injected.

Page 17 of the SOB and Page 9 of the permit require the permittee to **'conduct** and additional test within **two (2) weeks** of the date of when the permittee learned of the test failure.....'

**Comment:** Phoenix requests that the language be changed from **'conduct'** (which insinuates completion) of a WET test to **'initiate'**, and that this timeframe be increased to **four (4) weeks**. Phoenix requests this change because it often takes 2 weeks just to set up a WET test with a contracting lab and an additional 4 days (96 hour static-renewal test using *Pimephales promelas*) to complete the test and additional time for QA/QC and reporting. Test species must be cultivated at the lab and must be of the right age to conduct the test.

#### **Page 5 of the Permit, Part 1.3.1.1 General Effluent Limitations**

**Comment:** The second paragraph of this section discusses monitoring and permit limits relative to periods of reinjection and discharge conditions. Since Phoenix has no injection capacity at this facility, we feel this paragraph should not be included in the permit. Should Phoenix be required to reinject the produced water to maintain permit compliance, this statement could be appropriate. However, Phoenix would first need to get an aquifer exemption from the EPA, followed by UIC permits for all injection wells. It can take over 3 years to obtain a UIC permit from the EPA for the Wind River Reservation. Phoenix does not know how long it would take to get the aquifer exemption. But it is likely that these permitting efforts could take longer than the 5 year life of the permit. Since any discharge of produced water would immediately put the facility out of compliance with the proposed new sulfate and chloride (after the end of the 36 month compliance schedule) limits, Phoenix would rely on shut in of productions to maintain facility compliance, until proper injection approvals could be obtained from EPA.

#### **Pages 18 and 19 of the Statement of Basis and Page 5 of the Permit – Interim and Final Effluent Limits**

**Comment - Sulfate:** Phoenix does not agree with the proposed 1,800 mg/l Daily Maximum and 1,000 mg/l 30-Day Average sulfate limits and requests the existing permit sulfate limit of 3,000 mg/l be retained in the new permit and SOB.

The DMR data shows that in almost all cases the facility will not meet the proposed 1,800 mg/l Daily Maximum or the 1,000 mg/l 30-Day Average limits for sulfate. First, Phoenix does not believe the proposed 1,800 mg/l Daily Maximum and 1,000 mg/l 30-Day Average sulfate limits should be applicable to this permit

and that the existing 3,000 mg/l sulfate limit is adequately protective of livestock and wildlife drinking water, as per the above discussion on sulfate relative to the UW Report and the Penny Hunter documents. Second, Phoenix does not understand why a compliance schedule cannot be allowed for a technology based limit (i.e. sulfate). The current permit, which is administratively extended, contained a compliance schedule for Specific Conductance, Total Dissolved Solids, Chloride, and Sulfate, as those limits were new to this permit when it was issued effective November 1, 2005. Phoenix requests that if the more restrictive limits for sulfate are included in the new permit that a compliance schedule of 36 months also is allowed for sulfate. Phoenix does not have any injection capacity at this facility and would be forced to immediately shut in all production to maintain permit compliance. It can take over three years to get a UIC permit from the EPA for the Wind River Reservation. Also, there is no aquifer exemption for any formations at the Sheldon Dome field. Obtaining an aquifer exemption could also take years and this must be done before any UIC applications can be processed. Under this scenario, the Sheldon Dome field could remain shut in for several years.

**Comment – Total Sulfide:** Phoenix does not agree with the proposed Final Effluent Limit of 2 ug/l Total Sulfide and requests it be removed from the permit. Phoenix does not believe this limit is appropriate for this type of receiving water (currently classified as 3B but fits definition of Class 3E and would be Class 4B under natural conditions). Although Phoenix does appreciate the proposed compliance schedule for implementing the proposed Total Sulfide limit, it is evident that the facility cannot meet this proposed Final Effluent Limit without extensive treatment. To maintain permit compliance, Phoenix would rely on injection of 100% of the produced water.

Sulfide toxicity is dependent on the species of sulfide present. The aquatic life standard of 2 ug/l is based on hydrogen sulfide toxicity, not Total Sulfides. The species of sulfide present in a liquid is dependent upon the pH of the liquid, and determining the level of hydrogen sulfide present in the effluent would require a calculation based on the Total Sulfide value and the pH of the effluent. For instance, the hydrogen sulfide fraction is approximately 10% of the total sulfide value at a pH of 8.0 standard units. Please refer to the attached **Ionization Fractions and Distribution Diagrams for polyprotic acid - H<sub>2</sub>S**. Phoenix asserts that any sulfide limit should be based on hydrogen sulfide and not Total Sulfide.

The aquatic community that has evolved in the Sheldon Dome effluent is tolerant to and in some instances dependent on the ambient levels of hydrogen sulfide in the effluent. Under natural conditions there would be no aquatic life present in the natural ephemeral drainage to which the Sheldon Dome effluent discharges. Phoenix believes there is a net gain of aquatic life in the receiving water at ambient effluent water quality, and that removal of the effluent will result in a net loss of aquatic life in the receiving water. Produced water discharges on the Wind River Reservation have created ecosystems of macro-invertebrates, amphibians, and other aquatic life that support shorebirds, waterfowl and other terrestrial wildlife. The discharge waters also create riparian zones and wetlands, as well as enhancing forage for both livestock and wildlife.

**Comment – Chloride:** Phoenix does not agree with the proposed Final Effluent Limits of 230 mg/l 30-Day Average (chronic) and 860 mg/l Daily Maximum (acute) chloride limits included in the SOB and permit, and requests that the existing 2,000 mg/l chloride limit be retained in the new permit as a Final Effluent Limit. Phoenix does not believe the proposed more restrictive chloride limits should be applied to a Class 3B (or 3E) receiving water. Although Phoenix respects the Tribes' rights to develop and implement their own water quality standards; Phoenix is not aware of any other states or Tribes within EPA Region 8 that apply this strict chloride aquatic life standard to Class 3 waters or equivalent. As previously stated, Phoenix believes there will be a net loss of aquatic life in the receiving waters, if the discharge is eliminated.

**Comment – pH:** Phoenix agrees with the proposed new pH limit of 6.5 – 9.0 standard units, as previously discussed.

**Page 20, 21, 23, and 24 of the Statement of Basis and Pages 6 and 12 of the Permit – Self Monitoring Requirements and Mercury Minimization Plan**

**Comment – Oil and Grease:** Phoenix requests that the existing permit monthly Oil and Grease monitoring frequency be retained in the new permit, rather than the proposed weekly monitoring requirement in the draft documents. Phoenix believes the existing monthly oil and grease monitoring frequency has been adequate to detect any oil and grease pass through at this facility.

**Comment – Fluoride, Iron, and Zinc:** Phoenix requests that these three constituents and their respective quarterly monitoring requirements be removed from the Self Monitoring Requirements of the SOB and permit. These three constituents are already required to be monitored in the Toxic Pollutants Screen. Phoenix feels that the monitoring requirements contained in the Toxic Pollutants Screen are adequate for EPA to gather additional information to complete a Reasonable Potential Analysis for these constituents, and that quarterly monitoring is not warranted.

**Comment – Total Mercury/Mercury Minimization Plan:** Phoenix requests that implementation of the Mercury Minimization Plan be based on **two** mercury samples over the trigger level of 0.77 mg/l during the life of the permit, rather than **one** sample. Mercury is typically not at detectable levels in crude oil or produced water. If mercury is detected in a produced water sample it is likely due to laboratory analytical error or cross contamination of the laboratory analytical equipment, which was likely the case of the October 25, 2005 sample reported on the February 13, 2006 Hazard Screening Sample Report. When measuring constituents in the parts per billion and parts per trillion ranges, it is not unusual to see a hit on any particular constituent. Often times re-analysis of the same sample, or analysis of a follow-up sample will show non-detectable levels of that same constituent. Therefore, Phoenix would like the opportunity to validate (i.e. duplicate) any mercury sample results over the 0.77 ug/l trigger level, prior to implementing a Mercury Minimization Plan.

Phoenix also requests that any mercury monitoring requirements and permit limits be based on dissolved mercury instead of total mercury, as dissolved mercury would be the bio-available form. A dissolved mercury standard, for purposes of aquatic life protection, would be consistent with the Tribal WQS.

**Page 21 of the Statement of Basis and Page 7 of the Permit – Compliance Schedules**

**Comment:** Defensible justification has been provided herein which provides EPA with an environmentally protective technical basis to incorporate alternative effluent limits or omit certain constituents/requirements from the draft permit. Such measures will serve to preserve the oil production, royalties, revenue, and jobs related to the operation of this field. The proposed alternatives will also ensure that the ecology that has evolved around the Sheldon Dome discharge is sustained, the beneficial use of this water continues, and the enhanced forage for livestock and wildlife remains viable. Agreeing to the suggested alternatives will also benefit Tribal ranching operations which are dependent on the availability of produced water in this area and the increased productivity of this arid landscape to support their operations.

The compliance schedule detailed in Section 1.3.3 of the draft permit is an important tool to ensure the necessary effluent quality is achieved, but should be expanded to include all new or more restrictive effluent limits that may be incorporated into the final permit, or subsequent modifications. Phoenix proposes the following language be included in the SOB and permit. “The permittee shall monitor for all new or more restrictive constituent listed in Part 1.3.1 in accordance with the required frequency for a period of 36

*months. Unless amended or otherwise authorized, compliance with all appropriate effluent limits shall be required after 36 months using the staged implementation and milestones outlined."*

In conclusion, Phoenix requests an opportunity to meet with the EPA and WREQC to discuss these comments and work collectively on a resolution to the proposed sulfide, WET testing, sulfate, chloride, and fluoride issues. The economics of the Sheldon Dome Field will not withstand any costly water treatment options. Passive treatment to reduce hydrogen sulfide levels and eliminate the potential effluent toxicity may be economical at this field. However, sulfate, chloride, and potential fluoride treatment costs would likely make this field uneconomic.

Phoenix believes the produced water discharge from Sheldon Dome and other NPDES facilities on the Wind River Reservation create a myriad of beneficial uses for wildlife, livestock, grazing permittees and wildlife observers. A loss of these perennial water sources, due to excessive and unnecessarily restrictive effluent limits, would be a lose/lose situation for all parties involved.

If you have any questions, please do not hesitate to contact me at 989-731-9324 or our consultant Marvin Blakesley at 307-587-5912.

Sincerely,



Steve Niehaus, P.E.  
Regional EH&S Manger  
BreitBurn Management Company and Phoenix Production Company

Encl: Risk Management Considerations for Wyoming Livestock Water Quality Criteria, PJH Environmental Water Quality Effects and Beneficial Uses of Wyoming Produced Water Surface Discharges, Geomega Sheldon Dome NPDES Waters (BIA Cattle and Permittee Statistics for Range Units #38 and #40)  
Rolf Lake and Sheldon Dome Discharge Map  
Ionization Fractions & Distribution Diagram – polyprotic acid H<sub>2</sub>S

Cc: Clarence Wong – BreitBurn Cody  
Joshua Black – BreitBurn Cody  
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