



Kathy Brown, Senior Environmental Analyst, Voluntary Remediation Program  
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RE: “Amended Draft Public Participation Plan and Remedial Investigation Work Plan-  
Amended Draft – Windsor (Wexford Capital, LLC) Crosby 25-3 Natural Gas Well”

July 27, 2007

Dear Ms. Brown,

We appreciate the opportunity to comment on the “Amended Draft Public Participation Plan and Remedial Investigation Work Plan-Amended Draft -- Windsor (Wexford Capital, LLC) Crosby 25-3 Natural Gas Well”. Not only have the groundwater and springs in the Line Creek drainage suffered impacts from contamination, but lives of those residents in close proximity to the Crosby 25-3 well have been substantially affected. Not knowing the fate or future safety of your water supply in an arid environment can be harsh. The blowout and subsequent release of contaminants into the groundwater and soil from Windsor (Wexford Capital, LLC) Crosby 25-3 Well occurred nearly one year ago-- August 11, 2006.

What is particularly disheartening and incomprehensible is that **“Remedial Activities” are not scheduled to begin until November 1, 2008—over two years after the blowout. It is difficult to imagine a viable, scientifically supportable rationale for this extended delay in remediation. The public and the “sensitive” Line Creek environment demand that remediation not be delayed. Hoping that time alone will remedy the situation is imprudent at best and potentially disastrous for the Line Creek drainage.**

Windsor Energy Group, LLC (Wexford Capital, LLC) has applied to drill two additional wells, the Crosby 25-4 and Crosby 25-3, on Section 25. In light of Windsor’s dismal record of spills, groundwater contamination, soil contamination and Notices of Violation and the fact that no evaluation has been undertaken to determine whether contamination is being actively sourced by the gas/condensate reservoirs, **we believe that the State of Wyoming’s only responsible course of action is to enact a drilling moratorium on Windsor, and all other companies, for any future drilling activities in the Line Creek drainage until remediation has been accomplished. Public health and protection of the State’s groundwater and surface water (Line Creek) must be the top priority.**

We ask that the remediation plan incorporate the best scientific methods along with requisite technical expertise for implementing the monitoring program, analyzing data and successfully remediating the contamination. Transparency throughout the entire

process is specifically required, as is **timely determination and implementation** of the appropriate remediation program.

Comments regarding the Terracon Remedial Investigation Work Plan-Amended Draft (“the Work Plan”) and Amended Draft Public Participation Plan are provided below. We request that these comments be made a part of the public record, and that they are forwarded to Terracon for incorporation into the Work Plan and Public Participation Plan.

## COMMENTS

1) Domestic water wells continue to be sampled quarterly as part of this investigation, and data obtained to date appear to show that the domestic wells are not contaminated with hydrocarbons. Although this may be an indication that there are no migration pathways from the site to the domestic wells, the Work Plan does not fully address potential migration pathways and potential future risks to the domestic wells. All monitor wells, Line Creek, the springs flowing into Line Creek, Bennett Creek section 36 potable water well, and all domestic wells must be sampled on a quarterly basis.

The Work Plan should include a survey of each domestic well casing top elevation and measurement of static and pump down water elevations. The potable water well on the Bennett Creek pad (Section 36, T56N R103W) should also be surveyed for the location, well casing top elevation and measurement of static and pump down water elevations. Line Creek elevations should be surveyed along its reach.

A groundwater flow map should be prepared across an area that includes the site, Section 36- Bennett Creek potable well, Line Creek and all domestic wells. The flow maps should be superimposed (layered) over the topographic map. These data should be used to determine if Line Creek is a gaining or losing stream. Permeabilities, transmissivity rates, specific capacity should be determined for each groundwater zone. Magnitude of the hydraulic gradient and variability of flow direction should be compared for different sites.

In addition, all domestic well, screened intervals and drilling logs should be summarized. Geologic cross sections should then be prepared showing the site, Line Creek, the Bennett Creek well and each domestic well.

Since the impacted and potentially impacted areas are situated within a major fault zone--the Line Creek and Beartooth Faults, a geologic map should be prepared to document the locations of faults and the surface geology. Dips on faults and bed dips should be posted. For reference, all monitoring wells, domestic wells, Line Creek, oil/gas wells and springs should be located on this map. The geologic map layer should be superimposed on a topographic map, according to standard mapping procedure.

Faulting in this area is known to involve basement. Surface geology along the Beartooth Front indicates that the major faults and associated minor faults are both blind, exposed and in some locales along the front represented by active Quaternary faults. In light of

these observations, geologic cross sections based on Windsor's 3D and 2D seismic data and well control (oil/gas wells) should be constructed.

Some effort should be made to identify orientations of fracture patterns and the associated faulting in the immediate area since this potential for anisotropy could influence contaminant plume migration and also aid as a predictive tool. Fractures and faults could either inhibit or aid contaminant movement. They may cause non-coincidence for groundwater flow direction and hydraulic gradient direction. Additionally, these data could provide indications as to whether the gas/condensate reservoir at depth is continuing to source the contamination.

The cross sections, both the small scale for the specific groundwater interval(s) and the large scale examining the geologic interval, and the geologic map will aid in placing the domestic wells into geologic and hydrologic context and provide data necessary for a more prudent evaluation of potential migration pathways in the site vicinity and potential impacts to public health.

As a matter of "housekeeping", the legends for all maps and cross sections must include units (i.e., meter, feet, etc.) and scales. The use of the same type of line pattern or stippling for different features on the same map should be avoided. A standard coordinate system (i.e. UTM) should be identified on each map

2) The Work Plan states the wells will be sampled using low flow procedures. It also states three wetted casing volumes will be removed prior to sampling. This appears to be in direct contradiction because typically low flow methods are used to collect a representative groundwater sample from a very discreet depth interval along a well screen. The quantity of water purged prior to sampling is sufficient to verify the sample will be representative of formation water and to minimize vertical mixing along the screened interval.

The Work Plan should include a detailed description of low flow sampling procedures including but not limited to estimated depth interval(s) to be sampled and maximum drawdown criteria necessary to qualify the sample as a low flow sample.

In light of the previous contamination of monitoring wells both by hydrocarbons and chlorine introduced into the wells through the water provided by haul trucks, an enforceable protocol for maintaining drilling water quality must be established.

3) Previously installed monitor wells have screen lengths of up to 50 feet. The Work Plan should provide rationale for these relatively significant lengths. The Work Plan should also indicate if groundwater samples collected from these wells to date are interpreted as an average concentration across an entire screened interval. The source of the release is at a depth below the maximum depth of the existing monitor wells; and therefore, the screened lengths may be appropriate; however, rationale should be provided.

should include rationale to support the proposed well completions, particularly estimated

screened interval lengths. It may be possible that low flow sampling will provide for more discreet groundwater sample intervals at multiple depths in wells with relatively lengthy screened intervals.

4) The Work Plan should provide a statement as to the remediation standards for soil and groundwater and surface water (springs) that are applicable and relevant and appropriate. WDEQ standards are indicated generally, but there is no clear statement indicating remediation goals.

At the July 10, 2007 WyDEQ Public Meeting for the Windsor Crosby 25-3 Well blowout, the WyDEQ representatives stated that remediation standards for impacted groundwater would be Federal Safe Drinking Water Standards. This statement should be included in the Work Plan.

5) The Work Plan should state that the sonic soil core samples will be collected from the center of the cores where significant heat, if any, may not cause significant volatilization during sampling. The Work Plan should also state the frequency of soil sample collection along the core length.

Any indication of fracturing should be noted in the core descriptions along with fracture orientation, if possible. Cores should be photographed and descriptions referenced to specific photographs. A scale for reference should be included in each photo. Cores should be properly containerized and warehoused for future reference. An appropriate sheathing material for the cores should be determined based on the susceptibility for contamination of the core material.

6) We never received a copy of the Sampling and Analysis Plan and request a copy be added to the work plan.

7) Domestic water wells should continue to be sampled for methane because methane is also being sampled as part of the constituents of concern in groundwater monitor wells at the site. WDEQ stated in its comments that 25 percent of the LEL will be the trigger to sample domestic wells for methane. Rationale for this trigger value should be provided.

There are relatively inexpensive techniques available to industry, which can detect microseeps of light hydrocarbon gas molecules (methane, ethane, propane, butane, etc.). These microseeps are buoyancy-driven and reflect dynamic reservoir pressures. The microseeps can produce recognizable and measurable changes in shallow soils and sediments. The technology for identifying microseeps has been around for more than 30 years and was initially developed by Phillips Petroleum. This technique should be considered as a cost-effective aid in determining the source for methane that is occurring in some of the wells.

8) The Work Plan states a forensic evaluation will be completed of potential relic contamination. While forensic evaluation of a site can be very informative, it is largely an

misleading depending on the expertise of the individual conducting the investigation, the

validity of the assumptions underlying the conclusions, and the adequacy of the analytical data used. Capable experts frequently disagree about the meaning of the same data.

No details have been provided in the Work Plan about the experts who will be conducting this proposed evaluation or the basic strategy to be used. If the conclusions reached from the analysis are used in such a way that they impact cleanup or remediation plans for the site, we recommend our own experts review the data and evaluate the validity of the interpretations. In order to do that, we will require at a minimum the following information:

1. Access to the same analytical and site information that was used to reach the conclusions. If electronic instrument data files were used, we will require access to them.
2. Raw data from the laboratory, including chromatograms and mass spectra and instrument library searches for targets identified and for tentatively-identified compounds used in the interpretation.
3. Any standard laboratory reports used in the data evaluation, including quality control information.
4. Literature references used in support of the interpretations.
5. Any historical data used in support of the interpretations.

9) A deep zone groundwater flow map should be included in the Work Plan together with the existing shallow zone flow map. Some groundwater elevations in the shallow and deep zone wells are similar; however, some locations show a downward gradient.

10) The Bennett Pad Site well (Section 36, T56N R103W) should be sampled as part of the Work Plan. It provides for another apparent downgradient monitor point for both groundwater quality and groundwater elevation. In addition, **Section 1.6 Terracon Activities – Interim Monitoring Report – May/July Sampling Event**, page 6 of the “Remedial Investigation Work Plan – Amended Draft” states, “The concentrations of constituents in the surface water samples collected from Line Creek continue to remain at non-detectable levels. Additionally, with the exception of a reported concentration of bis(2-ethylhexyl) phthalate in the Hager well, no other samples were reported with any constituents.” In the “**Interim Monitoring Report May/July 2007 Sampling Event, Table II – Analytical Laboratory Results – GROUNDWATER**” the Bennett Pad Well, a potable water well, clearly shows contamination, and should be noted in the work plan.

11) Contaminant plume maps (both concentration and plume thickness represented through time) should be constructed so they can be layered on the groundwater flow maps and topographic base map. The plume maps will aid in visually identifying the

be identified as a predictive tool. The methodology and statistical analysis required for

fitting the plume model to the observed contaminant concentration data and estimating plume dimensions should be described.

12) A list of all potential contaminants should be included in the Work Plan with their respective MSDS and the volumes used on the Crosby 25-3 Well and the Crosby 25-2 Well. Both wells should be included since they are located on the same drilling pad, drilled within a short time period of each other and located within the same geologic setting. Of particular concern are data dealing with toxicity, environmental and health issues, suggested remediation, chemical tests for identification and quantification, decay products and length of time for chemical decay.

The mud engineer on a well maintains specific records of all chemicals, volumes of such and muds and their weights utilized in drilling a well. However, this record has not been provided. Since some chemical additives used in the drilling of the Crosby 25-3 Well can apparently only be determined from invoices supplied to Windsor, a list of various trade names under which suspect chemicals are marketed should be developed to provide whoever is reviewing the invoices a means for their identification. For instance, a chemical of concern, Gluteraldehyde, is marketed as X-Cide, Diald 25, and Aldacide. Seemingly benign components, such as walnut shells and cellulosic fibers, are generally mixed by the manufacturer with chrome acetate. Thus, the actual MSDS sheet for each product should be included. Chemical composition of proprietary compounds should also be identified.

The list of chemical compounds supplied by Windsor's representative that were used for drilling the Crosby 25-1 Well detailed over forty-eight (48) chemical products that are classified as hazardous or toxic. The July 2, 2007 Remedial Work Plan lists only twenty-three (23) chemical compounds used in the Crosby 25-3 well. Many of the chemical families represented in the Crosby 25-1 Well are not found in 25-3. This discrepancy raises the issue of whether all chemicals utilized in drilling Crosby 25-3 have been identified.

13) Problems with loss of circulation in the Crosby 25-3 Well should also be addressed. The interval(s) affected should be identified and evaluated as possible contributors to the groundwater contamination. Barofibre is identified as having been used during drilling of the well, and its use is noted for loss circulation control.

14) Tests for radioactivity should be conducted on all groundwater samples. Radioactivity is "picked up" by the drilling muds in the circulation process.

14) A more detailed description of the drilling history along Line Creek was prepared by the Wyoming Oil and Gas Conservation Commission, immediately following the Crosby 25-3 blowout. That description should be substituted for the limited paragraph-- 1.2 Site History.

surficial soils should be included. All soil test results for the Crosby 25-3 site should be available.

16) As a matter of good science, quantified data should not be devalued in a “subjective” qualitative table (i.e., Section 5.0 Conclusions, p.16). If a summary is presented, the data should retain their quantitative status and presentation should be statistical (i.e. as percentiles). All statements must be supported by data or referenced to data-supported scientific research.

17) Full macroinvertebrate testing of Line Creek and correlation to the baseline macroinvertebrate testing done in 2000 should be performed along with macroinvertebrate testing of the springs feeding into Line Creek. This testing could help to identify the effects of contamination by chemical compounds-- for substances that can be identified by chemical tests and those that can not (see #18 below).

18) A significant volume of contaminants was released to the air during the well blowout. Additionally, as the Energy Labs representative revealed at the WyDEQ Public Meeting on July 10, 2007, certain chemical compounds, such as Gluteraldehyde, can not be detected in the groundwater but are highly water soluble and very mobile. It would be prudent to include in the groundwater monitoring and remediation program a public health monitoring program, perhaps under the auspices of the Wy Department of Health, to identify potential health concerns and detect and document any health problems for Line Creek residents, Windsor employees and sub-contractors employed during the blowout and first responders to the blowout. A system for notification of the impacted public should be in place if specific health problems or concerns are identified. Attached is the **Wyoming: Crosby 25-3 Well – Windsor Energy Analysis of Products Used for Drilling Before August 11, 2006** by The Endocrine Disruption Exchange, Inc., P.O. BOX 1407 ,Paonia, CO 81428.

19) Costs for monitoring and remediation of the Crosby site, groundwater, springs, domestic wells (if affected) and Line Creek (if affected) should be revealed throughout the process and made a part of the public record. These should be the costs incurred by Windsor (Wexford Capital, LLC), the state, the county and the public.

20) **3.3 Public Property Permission, Amended Draft Public Participation Plan**, page 8, references how the WDEQ understands information will be provided to Line Creek Wilderness Subdivision Residents, “Additionally, the letter stated that it was WDEQ’s assumption that the letter was to be provided to all Line Creek Wilderness Subdivision residents via Deb Thomas and the Clark Resource Council. To date no response has been received by WDEQ, Windsor, or Terracon by any interested parties.” Neither Deb Thomas nor Clark Resource Council has authority to speak on behalf of Line Creek Wilderness Subdivision residents and neither has agreed to provide information to the Line Creek Wilderness Subdivision residents. Clark Resource Council will make all information they have available to any Line Creek Wilderness Subdivision residents or

information to the public, and notification of the public for all Public Meetings must be the responsibility of the Wyoming DEQ. We suggest the following ways to better notify

the public and keep them aware of information surrounding the Public Participation Plan, Remedial Investigation Work Plans, and all future information surrounding the on-going monitoring and remediation plans for the Crosby 25-3 Blowout.

1. Send all draft plans and public notifications to all Line Creek Wilderness Subdivision landowners.
2. Using the address of Clark Mailing Route (Clark HCR) for all alerts for public meetings and comment periods ensures that all Clark boxholders will be notified .
3. Advertise public meetings and comment schedules in the Cody Enterprise and Powell Tribune twice per week for 2 consecutive weeks prior to meetings and twice per week for 4 consecutive weeks prior to comment period deadlines.
4. Update Windsor Information Website daily.

**21)** We believe the proposed monitor well program and the remediation program should be “fast-tracked” because monitor well results, to date, show contamination moving off the pad. A delay on the part of WDEQ to determine legal issues associated with drilling of monitor wells on the subdivision’s common ground and the tardiness of Windsor/Wexford sampling and development of a remediation program has put the residents and environment at further risk. The following issues must be addressed by the Wyoming Attorney General, so that the monitor wells can be drilled **as soon as possible**.

1. Since the common ground is owned by all land owners in the Line Creek Wilderness Subdivision, do all land owners need to unanimously give approval, or can a majority of land owners grant permission for the drilling of monitor wells on the common ground?
2. If a majority of owners can give permission, what constitutes a majority of the landowners?
3. Line Creek Wilderness Subdivision Owners use the common ground for fishing, hiking, swimming, camping and recreation. Line Creek Wilderness Subdivision property owners can also give permission to any guests for recreational use of the common ground. The Environmental Quality Act 35-11-1802. Immunity for innocent owners (b) To be eligible for immunity under this act, a person shall:  
(iii) Not use the real property in a manner that causes exposure of the public to harmful environmental conditions. Does the above statute mean that the residents and any guests must be kept from the areas being monitored and/or from areas of



ground that is potentially contaminated?'

4. If so, how should the Line Creek Wilderness Subdivision landowners, as innocent landowners, stop the public from using the common ground?
  
5. Are there any liabilities or loss of current or future private property rights for landowners if they grant permission for the monitor wells?
  
6. Are there any liabilities or loss of current or future private property rights for landowners if they do not grant permission for the monitor wells?
  
7. By granting permission will private landowners relinquish any rights to pursue actions against Windsor, or other responsible parties, for impacts to human health from exposure to contamination?
  
8. The WDEQ has stated that relict contamination separate from the Crosby well blowout cannot be addressed in the Voluntary Remedial Investigation Work Plan Windsor is proposing. If testing results from the monitor wells on the private common ground show relict contamination, are the landowners now or at any time in the future liable for monitoring and/or remediation of relict contamination?

Please let us know if there are any questions or if clarification is required concerning any of these comments.

Sincerely,

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