Report of Investigation Findings in Response to Allegations Raised by Mr. Charles Hamel in June 2006

Introduction

An investigation was initiated as a result of correspondence received from Mr. Charles Hamel alleging (on behalf of anonymous individual(s)) that unsatisfactory conditions existed in British Petroleum (BP) areas of responsibility within North Slope oil fields. The investigation was led and this report was prepared by Edward Morgan of *E. L. Morgan Consulting* at the request of the Alaska Oil and Gas Conservation Commission (AOGCC).

Subsequent sections of this report detail:

- The allegations raised,
- The make up of the investigation team,
- The investigation methodology,
- The investigation findings, and
- Comments and recommendations from the lead investigator.

Appendices are provided that contain:

- Correspondence between Mr. Hamel, the AOGCC, the Alaska Department of Environmental Conservation (ADEC), and the lead investigator,
- Background information on wells, well cellars, well houses, and well pads for readers who might not be familiar with North Slope facilities,
- The results from analyses of collected fluids and hydrocarbon contaminates in well cellars,
- Questionnaire tabulated answers and remarks, and
- Data and photographs collected during the course of the investigation (on CD).

An Executive Summary of the investigation report immediately follows this introduction.

The investigation team received the full cooperation and support of BP managers and employees and from their contractor managers and employees. The team was allowed unobstructed access to all well locations being inspected.

- Investigation Report -

Executive Summary

Mr. Charles Hamel alleged (on behalf of one or more anonymous individuals) that unsatisfactory conditions existed in some areas of the North Slope oil fields operated by British Petroleum (BP). An investigation team was formed to determine the extent to which the alleged conditions existed. The allegations assigned to the investigation team fell into four categories:

1. *Well pads:*
    a. *Oil was accumulating in some well cellars and was contaminating tundra ponds during spring break up,*
    b. *Some well cellar liners were not preventing oil from contaminating well pad gravel, and*
    c. *Fluids and gas are accumulating under some well cellar liners, which is a concern to operators entering the well house.*

2. *The AOGCC and ADEC are complicit in allowing the above conditions to exist because:*
    a. *Their onsite inspectors are not reporting spills that occur, and*
    b. *They are allowing wells to operate that were leaking to the surface.*

3. *The tundra was covered with trash and debris.*

4. *The concerned individual(s) believed it necessary to remain anonymous and report problems outside their normal management chain.*

<u>Investigation Conclusions - Well Pad Allegations:</u>

The investigation team found that hydrocarbons are accumulating in some well cellars and, in several instances, have flowed out of the cellar onto the gravel pad within the well house. There was no evidence to suggest however that the above hydrocarbons then migrated to the tundra or tundra ponds although such a migration is possible according to BP environmental managers and in the opinion of the lead investigator. The source of hydrocarbons that do accumulate in some well cellars are varied and

delineated in greater detail in the body of the report. There was no evidence to suggest that the hydrocarbons found in the well cellars were a result of loss of well control; rather they appeared to be mostly from freeze protection fluids.

One tundra pond was observed that *may* have had a hydrocarbon base sheen however it didn't seem likely that this sheen, *if it were hydrocarbon based*, was the result of hydrocarbons from a well cellar. No additional tundra pond sheens, other than those formed naturally from biological causes, were observed.

Some well cellars are fitted with liners to collect and contain seepage of hydrocarbons into the well cellar. The investigation team noted many instances in which these well cellar liners were not installed adequately and thus were not preventing cellar pad gravel from being contaminated with hydrocarbons.

The investigation team did observe situations in which fluids were accumulating under well cellar liners but did not directly observe any gas accumulation. The fluid accumulation appeared to be the result of liner leakage or inadequate liner installation. The team did note that the way some well liners are installed results in the formation of pockets in which gas accumulation could occur.

Several employees and a BP environmental technician reported observing gas build up under a liner, and in one case the gas was sampled and determined to be methane. The source of this gas was not determined.

During the investigation, the team noted a number of instances in which gas was bubbling to the surface in unlined well cellars that contained fluid. The bubbles were sporadic, very small in size, and unable to be reliably sampled. In some cases the bubbles were located near the well casing and in other cases were distributed throughout the cellar. The bubbles appeared very similar to those observed in tundra ponds as a result of natural causes.

Responses to a questionnaire used as part of the investigation methodology indicated that some employees are concerned about the hazards associated with gas accumulation under well cellar liners.

Investigation Conclusions - ADEC and AOGCC Inspector Allegations

There was no evidence to suggest that AOGCC and ADEC onsite inspectors were failing to report spills of any sort. The basis for this conclusion is contained in the body of the report.

The allegation finding that the AOGCC is allowing wells to continue to operate that are *leaking to the surface* is contingent on what is meant by leaking to the surface. There is no evidence to suggest that formation fluids are leaking to the surface however wells are operating in which freeze protection fluids can and do reach the surface as a result of thermal expansion or other mechanisms. More information about the significance of and difference between formation fluid and freeze protection fluid leakage is contained in the body of the report.

The ADEC has no authority over the design, construction, or operating parameters for production wells and therefore has no accountability for their continued operation. The ADEC does have authority over oil and hazardous substance spills to the environment and is responsible for source control and containment of spilled substances.

The AOGCC does have the authority to issue orders and requirements more stringent than those currently in force. It is within their authority, for example, to require that any wells in which freeze protection fluids reach the surface either be shut in and/or the fluids be contained in an effective manner such as a thermal expansion tank. If they were to exercise this authority it is likely that the amount of hydrocarbon in the well cellars of the effected wells would be decreased. Whether this action, if taken, would be prudent is beyond the scope of this investigation.

Investigation Conclusions - Tundra Trash and Debris Allegations

The investigation team did not directly observe any significant build up of trash or debris on the tundra however nearly everyone questioned stated that there had been significantly more trash and debris on the tundra following breakup this year (and in the last several years) than was present 3 or 4 years ago.

Most said the amount of trash present was extensive and embarrassing.

Investigation Conclusions – Why Allegations Not Raised with Management

It was not possible to determine why the concerned individual(s) chose to raise their concerns anonymously outside the normal management chain because the individual(s) chose not to speak to the investigation team. Questionnaire results and conversations with other BP employees suggest one or more of the following reasons are the likely cause:

1. Fear of adverse consequences such as being labeled a “problem employee” or worse,

2. Frustration that reported problems are ignored, and/or

3. Being assigned the task of fixing the problem themselves without being given adequate resources or authority.

Supporting information for these conclusions, photographs of noted conditions, additional background, and comments and recommendations are contained in the body of the report and in the appendices.

Mr. Hamel's Allegations

On June 28, 2006, the Alaska Oil and Gas Conservation Commission (AOGCC) and the Alaska Department of Environmental Conservation (ADEC) received a faxed copy of a letter from Mr. Charles Hamel dated June 27, 2006. The letter alleged the existence of unsatisfactory conditions in areas of British Petroleum (BP) responsibility within the North Slope oil fields.

A copy of the original letter from Mr. Hamel and subsequent requests for additional information from the AOGCC, ADEC, and the lead investigator (and Mr. Hamel's responses thereto), are attached as Appendix 1.

Of the alleged unsatisfactory conditions in Mr. Hamel's initial letter, the following became the subject of this investigation:

1. *The AOGCC and ADEC have recorded and permitted the operation of 50 BP crude oil production wells as leaking to the surface, for as much as a year.*

2. *Oil accumulates in the well house cellars, to be occasionally sucked out by vacuum trucks.*

3. *Some wells requiring liners have leaked and are leaking into the surrounding gravel pads.*

4. *During this year's early spring melt, high waters flooded the cellars.*

5. *Water carrying the oil which was released from cellars during breakup then flowed over the surface and through the gravel, reaching the interconnected tundra ponds.*

6. *The AOGCC and ADEC onsite inspectors are complicit in permitting and concealing these spills because they must have witnessed the oil and sheen accumulating on tundra pads while making their rounds.*

7. *Some well cellar liners are capturing gas and fluids beneath the liners, causing concern for the operators entering the well houses.*

8. *The tundra is trash laden with discarded plastic sheeting, wood, plastic bottles, Styrofoam, five gallon containers, and other materials disposed of in the snow by BP contractors over the winter months.*

In subsequent correspondence between Mr. Hamel and AOGCC and ADEC officials, additional stated or implied allegations were noted. Of those noted, the following was assigned to this investigation as allegation 9:

9. *Some of the information in Mr. Hamel's initial letter was provided to him by individuals who were concerned that their identity might become public. Determining why they felt it necessary to go outside their management chain became an objective of the investigation.*

The Investigation Team

An investigation team was formed by Commissioner Cathy Foerster of the AOGCC to look into the allegations raised by Mr. Hamel. The team's AOGCC point of contact was Jim Regg. The team lead (and author of this report) was Edward Morgan, an independent consultant on contract to the AOGCC. Team members were:

- Lou Grimaldi - AOGCC, and
- Tom DeRuyter, Toivo Luick, and Walt Sandel – ADEC.

Providing direct assistance and invaluable data gathering support were:

- Joe Anders and Harry Engel – BP,
- Denise Newbould – Environmental Contractor to BP from AWARE Consulting, and
- Brad Authier, Clair Albertson, and Ben Martich – Well sample collectors from Oasis Environmental.

Investigation Methodology, Limitations, and Well Selection Criteria

<u>The investigation gathered data from seven principal sources:</u>

1. Visual inspection of selected wells, well cellars, associated piping, and physical facilities,

2. Visual inspection of nearby well pads, reserve pits, tundra, and tundra ponds,

3. Interviews with working level operators and technicians responsible for wells, well clean up, well spill response, and well maintenance,

4. Interviews with engineering, support, and management staff having responsibility for well and support facility operation and maintenance,

5. Sample collection of fluids noted in well cellars and from a potentially hydrocarbon based sheen noted on a tundra pond,

6. Documentation of pressures associated with the wells visually inspected, and

7. A questionnaire voluntarily completed by 105 respondents of the target population of 203 pad operators. Respondents were not required to identify themselves.

Once gathered, the information and data were analyzed and conclusions were drawn about each of the allegations under investigation. The conclusions and their basis are contained in this report. The lead investigator had ultimate accountability, authority, and responsibility to the AOGCC for the investigation conclusions.

<u>The investigation was limited by two factors:</u>

1. The first and principal limitation was that the alleged events occurred during spring break up, early-May to mid-June. The allegations as listed above came in a letter to the AOGCC in late June. The onsite investigation was conducted mid-July to early-August, hence the alleged conditions which occurred during break up could not be directly observed and the investigation team had to rely on the memories of those present during breakup. Memories of events occurring weeks or months earlier sometimes fade and/or become mixed with events that occurred in prior years' break ups. The reliability of information provided from memory is therefore reduced.

2. The second limitation was that the team was not able to obtain any information directly from those raising the allegations to Mr. Hamel,

or from Mr. Hamel himself, less that supplied in his written correspondence and one brief phone call with the lead investigator which provided no additional information. Consequently:

a. The specific wells that were alleged to have overflowed hydrocarbons to the tundra ponds were unknown to the investigation team and thus investigation resources had to be spread widely rather than tightly focused, and

b. The reasons that those who raised the allegations did so anonymously cannot be directly linked to a specific cause.

Wells were selected for inspection using the following criteria:

Mr. Hamel alleged that 50 wells were allowed to operate with oil leaking to the surface but declined to provide any further information about the identity or location of the 50 wells other than the assertion that they were or should be already known to the AOGCC and ADEC staffs. He also did not provide any information about the source of the "oil" leaking to the surface. There are approximately 2100 wells operated by BP on the North Slope and a number of potential sources for "oil" that might accumulate at the surface of a well.

BP managers and the AOGCC staff determined that it was most likely that the wells in question were part of a subset of wells already under review by the BP Well Integrity Group for a variety of reasons. Because of the wording of the allegations, the selection criteria focused on wells with known surface casing issues and known fluid releases into their well cellars. BP identified 57 wells for inspection.

The AOGCC added 19 additional wells to the 57 initially selected for visual inspection bringing the total inspected to 76. The additional wells were selected as a result of information and reports identifying wells that, in the past, exhibited surface casing leaks. The inspection team also conducted visual inspections of other wells in the vicinity of each of the chosen 76 wells to determine if the conditions noted in the chosen wells were representative of other wells on the pad. Pressure readings and fluid samples from the well cellar were obtained only in the 76 wells.

Prior to and during the period visual inspections were conducted, 8 of the selected wells were shut in because of operational reasons not related to integrity issues. Twelve additional wells selected for inspection were shut in prior to the start of visual inspections by BP senior management.

Allegation Findings

Allegation 1: *The AOGCC and ADEC have recorded and permitted the operation of 50 BP crude oil production wells as leaking to the surface, for as much as a year.*

Finding:

No evidence was found that indicated gas and/or crude oil, *located in the formation from which a well is producing,* is or has reached the surface in any way other than through the production tubing as designed, or from minor leakage associated with valves or fittings located on the well tree. However, production wells do operate when hydrocarbons from sources other than the formation are present in well cellars.

Operation under these circumstances may require a waiver of some of the operating company's normal requirements. BP currently imposes stricter operating limits (as a management control) than the operating limits required by the AOGCC.

When a BP well fails to meet BP's stricter operating limits, analyses are performed by BP to determine if the well can safely remain in service. If the well is to remain in service, an internal BP waiver is prepared and the well is restarted with increased operating restrictions. The AOGCC is informed of the decision and provided a copy of the waiver.

The AOGCC has authority over the design, construction, and operation of wells. Specific to producing wells (subject of the allegations), the AOGCC relies on operator policies and procedures for ensuring the well can operate in a manner that prevents the release of reservoir fluids and the contamination of subsurface freshwater zones. One of the company-imposed operating limits for a well to remain in production is that all wells must demonstrate two competent barriers preventing the release of oil and gas from a hydrocarbon bearing formation. AOGCC imposes requirements that supplement a company's operating policies and practices to prevent an

overpressure condition from occurring in a well. The AOGCC has no role in approving a company's relaxation of self-imposed operating limits.

The process of waiver approval is different for injection wells. A more complete understanding of well integrity requirements and differences between injection and production well waiver requirements is contained in Conservation Order 492 which is available on the AOGCC website at www.aogcc.alaska.gov. Further discussion of injection wells is not included in this report because the allegation was that the ADEC and AOGCC were approving the continued operation of waivered production wells which is not the case.

The AOGCC does have the authority to issue orders and requirements more stringent than those currently in force. It is within their authority, for example, to require that any wells in which freeze protection fluids reach the surface either be shut in and/or the fluids be contained in an effective manner such as a thermal expansion tank. If they were to exercise this authority it is likely that the amount of hydrocarbon in the well cellars of the effected wells would be decreased. Whether this action, if taken, would be prudent is beyond the scope of this investigation.

The ADEC has no regulatory authority over the design, construction, or operation of wells and thus has no accountability for their continued operation. The ADEC does have authority over oil and hazardous substance spills to the environment and is responsible for source control and containment of spilled substances.

Allegation 2: *Oil accumulates in the well house cellars, to be occasionally sucked out by vacuum trucks.*

Finding:

Under normal circumstances, the greatest volume of fluid which collects in well cellars comes from rain water and snow melt because the well houses are not water tight and are periodically opened or removed for maintenance. Potential sources of crude oil (and other fluids and hydrocarbons) that might accumulate in well cellars include:

1. Formation fluids (crude oil, gas, and water contained in the formation from which the well is pumping) could potentially enter a well cellar

in two ways. The most likely would be through seepage or leakage from valves or seals in the well production tree. Less likely would be seepage or leakage through the multiple barriers of protection both vertically and horizontally that are installed to prevent formation fluids from reaching the surface uncontained.

2. Hydrocarbons that are intentionally placed in the well's outer annulus for freeze protection (See Figure 1 of Appendix 2) can (and do) enter the cellar on occasion because of thermal expansion. A surface casing leak is the probable pathway for fluids to move from the outer annulus to the annulus space between surface casing and conductor casing, which is open to the well cellar in many North Slope wells.

   Examples of freeze protection fluids include: diesel oil, arctic pack (diesel oil mixed with bentonite), "dead" crude (crude oil which has weathered such that all volatile constituents have been removed), and combinations of these substances.

3. Other sources of hydrocarbons in the well cellars include hydraulic oil used to operate some tree valves, grease, and lubricating and cutting oils used during maintenance.

When fluids enter cellars they tend to soak into cellar gravel if present and/or collect in secondary containments if present and properly constructed. For cellars without floors or secondary containments that prevent further fluid flow, introduced fluids (if not removed) will normally flow downward until they reach the permafrost. The flow dynamics are influenced by a variety of factors.

It is commonly accepted that hydrocarbons reaching the permafrost will disburse horizontally on top of the permafrost layer at a rate and in a direction dependent on local factors. However, a recent study conducted near Barrow, AK suggests that under some circumstances hydrocarbons will not disburse laterally but instead penetrate into the permafrost. A copy of this study is available online at www.sciencedirect.com.

Fluids which enter well cellars and remain pooled from any of the sources described in the preceding paragraphs are removed. The means of removal is dependent on the type of fluid present, and the frequency of removal is dependent on the type of fluid(s) present and the rate at which they are

accumulating. Liquid hydrocarbons are generally removed by vacuum trucks within a short time after they are reported. Water without hydrocarbon present is either removed by vacuum truck or is pumped to un-remediated reserve pits.

However, during the investigation there were several instances noted where continuing hydrocarbon releases (releases which can't be isolated), although reported and vacuumed up when they were initially discovered, have continued to release hydrocarbons into cellars. Some of these continuing releases have been allowed to exist for years without addressing the underlying cause. It was also noted during the investigation that an accumulation of hydrocarbons existed in a well cellar at Northstar (well NS-29) that had not been removed for over a week after it was discovered because of the lack of a vacuum truck. The vacuum truck that was previously permanently located at Northstar had been removed because it was taking up too much space according to BP's Northstar personnel.

The following photographs are of a few of the wells which have accumulated hydrocarbon fluids in their cellars.

(Hydrocarbon fluid note in PBU 6-15)

(Diesel like fluid on top of water in the cellar of NS-29)

(Hydrocarbon fluid both within and outside secondary containment on DIU 3-11)

(Hydrocarbon stains on cellar gravel at PBU K-13)

Allegation 3: *Some wells requiring liners have leaked and are leaking into the surrounding gravel pads.*

Finding:

The investigation team noted several instances in which liners, particularly those constructed from herculite, were not secured adequately to the well and/or well cellar to prevent fluid contact with the gravel pad. In addition, some liners were torn and others were not adequately sealed to prevent leakage. It was obvious that hydrocarbons had been and were leaking from the liners into the gravel within the well cellars.

Whether the leakage into the well cellar gravel subsequently migrated into the surrounding well pad gravel can not be determined without obtaining extensive gravel borings. However, it is certainly possible that such a migration could occur given the porosity of a gravel pad and the combined effects of snow melt, rain water runoff, and (under some circumstances) subsurface water flow from reserve pits to tundra and tundra ponds.

The following pictures document some of the conditions found:

(Secondary containment herculite liner detached from the well casing on PBU S-16)

(Secondary containment seam held together by clamps at PBU R-20A)

(Torn herculite secondary containment at PBU R-11A)

Allegation 4: *During this early spring melt, high waters flooded the cellars.*

Finding:

Pad operators and other site personnel consistently reported to the investigation team that during break up, heavy rain will combine with snow melt to form ponds on sections of well pads where run off is blocked by un-melted snow. This water can then cause well cellars to fill up from the bottom as water seeks it own level, or in cases where the well cellar top is below the elevation of the accumulated melt water on the well pad, the water can enter the well house and fill the cellar from the top as well as the bottom. Either way, any free oil in the cellar will float to the surface.

The exact way a well cellar can fill with water during break up is a function of many variables including: cellar construction, cellar top height relative to the well house gravel floor, the depth of the cellar, whether the cellar has a floor other than gravel, whether the cellar has a liner (or other secondary containment) and its effectiveness in retaining fluid, the elevation of the well house gravel floor relative to the well pad elevation, the height of the well pad above adjacent tundra ponds and reserve pits, the graded slope of the well pad, and the degree to which run off is blocked by un-melted snow.

Regardless of how water enters cellars during break up there is overwhelming evidence that it does based on personal observation of the investigative team, reports from Pad Operators, and survey responses.

The investigation team noted where cellar flooding had caused hydrocarbons in the cellar to overflow the cellar and contaminate some surrounding gravel within the well house. Site management was notified of the condition by the Pad Operator accompanying the investigation team when the condition was pointed out and the contaminated gravel was removed the next day.

The below photograph is of well PBU R-28 cellar and is an example of a well cellar that has accumulated hydrocarbons, filled with water, and overflowed to contaminated the well house gravel pad.

(Photograph of PBU R-28 showing that hydrocarbons have contaminated well house gravel due to cellar flooding.)

Allegation 5: *Water carrying the oil which was released from cellars during breakup then flowed over the surface and through the gravel, reaching the interconnected tundra ponds.*

Finding:

It is possible that hydrocarbons from well cellars could reach tundra ponds in the manner alleged, however the investigation team could find no evidence that it had in fact occurred, and it seems unlikely that it did. The basis for this conclusion is as follows:

1. Pad Operators and pad maintenance personnel consistently reported that the depth and extent of surface water accumulation on well pads during this year's spring melt never reached that needed to allow hydrocarbons to be transported on top of the water sufficiently above the elevation of well pad to avoid contact with the gravel. Without an unimpeded flow, hydrocarbons from overflowing well cellars would have to migrate through the well pad rather than over it and thus the time for migration to occur would be significantly longer.

2. It is possible that hydrocarbons which might have been released to the well pad during previous years' breakups could have migrated close enough to the edge of the well pad to be washed into tundra ponds during this year's breakup. However this seems unlikely since data is available which demonstrates that there is a near continuous flow of water from the reserve pit side of a well pad to the tundra side when the reserve pit water level is higher than the tundra as is the case during breakup.

   Measurements and analyses of this flow does show migration of contaminants located in the reserve pits to the tundra; however no hydrocarbons have ever been detected in the out-flowing water according to BP environmental personnel. The hydrocarbon content of out-flowing water was not independently verified by this investigation. The lack of out flow hydrocarbons suggests that hydrocarbons (if any) present in the well pad gravel below well cellars is either not descending to the depth of the outflow water, is not being picked up by the flowing water, and/or is of insufficient concentration to form a sheen if/when they reach a tundra pond.

3. Tundra pond sheens can and do form from the decay of biological materials within the ponds and also can easily be generated by pressing down on shoreline mud adjacent to a tundra pond.

   According to ADEC personnel on the team, sheens from biological decay can be differentiated from those that are caused by hydrocarbon contamination because of the way they disperse when disturbed. Hydrocarbon based sheen, if broken apart, will reform whereas a biologically based sheen will remain disbursed.

   Based on the above criteria all the sheens on tundra ponds noted by inspection team members were biologically based with one possible exception as described below.

While conducting visual inspections of tundra ponds near well pads, one instance was noted in which a sheen appeared to be of non-biological origin based on how it disbursed. The sheen was located near well house 6 on Prudhoe Bay N Pad. A sample was collected and analyzed. The analysis results indicated that the sheen contained Diesel Range Organics (DRO) at a concentration of 1.68 milliliters per liter. DRO are compounds that contain C10 through C24 carbon chains which are common to diesel fuels. However their presence doesn't completely rule out the possibility that the sheen was of biological origin according to OASIS environmental personnel.

A follow on analysis of the original sample using a different process was conducted to try and determine if the sheen was in fact hydrocarbon based. The second analysis did not indicate the presence of DRO however the age of the sample at the time of this analysis invalidated the sample results.

The tundra pond on which the sheen was noted was about 4 inches deep and had a surface area of approximately 50 square feet. The sheen extended inward at most about 2 feet from the tundra pond edge along about one fourth of the pond's circumference. Its geometric configuration appeared to be the result of a slight breeze blowing the sheen toward the pond edge. The amount of hydrocarbon fluid volume making up the sheen at the time of the observation was estimated to be much less than a teaspoon.

It isn't possible to know for certain how long the sheen had been present, its original volume, or its source. It seems unlikely that the sheen was caused

by hydrocarbons originating from a well cellar because of the reasons presented earlier. In addition, the water level in the reserve pit was lower than the tundra pond due to a recent pit pump down so there was no hydraulic pressure to carry any cellar hydrocarbons to the tundra pond. If cellar hydrocarbons were the source of the sheen it seems much more likely the sheen would have shown up in the reserve pit which is much closer to the well cellars. No sheens were noted in the reserve pit.

Allegation 6: *The AOGCC and ADEC onsite inspectors are complicit in permitting and concealing these spills because they must have witnessed the oil and sheen accumulating on tundra pads while making their rounds.*

Finding:

For AOGCC and/or ADEC onsite inspectors to conceal tundra or tundra pond spills three things are necessary:

1. A spill or sheen had to occur,
2. The inspector had to see the spill or sheen or have it reported to him, and then
3. The inspector had to intentionally cover up the spill's existence or negligently fail to make a report.

It is not possible to conclude that something which might have happened actually did or did not occur. Further, it is not possible to determine (assuming something happened) that a potential witness to the occurrence actually saw the occurrence and if having seen the occurrence failed to take appropriate action, absent a self-admission.

However it is possible to infer the likelihood of such an event based on indirect evidence such as the professionalism of those whose actions are the subject of allegations, and the culture of the organizations having a stake in the process which was alleged to have been violated.

It is the lead investigator's opinion that the probability of an ADEC and/or AOGCC investigator covering up a spill or tundra pond sheen is so small that it hasn't occurred. The basis for this conclusion is that there was simply no evidence to suggest that AOGCC and/or ADEC onsite inspectors are complicit in allowing or concealing spills of hydrocarbons to the tundra or tundra ponds (or anywhere else) or are negligent in looking for spills.

Furthermore:

1. ADEC inspectors routinely inspect for spills and sheens based on information provided by Pad Operators;

2. ADEC inspectors are not present on site continuously. In most cases they are only on site for less than two weeks a month thus if a hydrocarbon based tundra pond sheen occurred during periods of absence, they couldn't see it. When onsite, they can only observe a small fraction of the visible tundra ponds at any given time;

3. AOGCC inspectors are on site nearly continuously but they are tasked in areas other than oil spill detection and reporting thus their attention is appropriately focused elsewhere;

4. There is no apparent motive for an ADEC or AOGCC inspector to cover up a spill and a lot of obvious negative consequences for doing so;

5. Before ADEC or AOGCC inspectors enter a well house they notify the Pad Operator of their presence and the Pad Operator accompanies them. If a reportable condition is noted, it is the Pad Operator's responsibility to report it and there is overwhelming evidence that they do based on personal observation of the investigation team members and questionnaire results;

6. Because each well is inspected each day by an operator (weather permitting) and because the operators assigned to specific wells vary periodically, it is unlikely that a reportable condition would go intentionally unreported for an extended period. There are approximately 200 Pad Operators who monitor the 2100+ wells operated by BP on the slope. At any given time there are about 95 operators on site. Questionnaire results and team member discussions with individual operators provide overwhelming evidence that virtually all operators are willing and do report spills routinely; and

7. Questionnaire responses and discussions with Pad Operators indicate the only fear associated with a spill or sheen is <u>not</u> reporting it.

Based on the above it is impossible to postulate a set of credible circumstances in which an ADEC or AOGCC inspector would have the slightest motivation to conceal a spill.

Allegation 7: *Some well cellar liners are capturing gas and fluids beneath the liners, causing concern for the operators entering the well houses.*

Finding:

Some well cellars are fitted with liners to collect and contain seepage of hydrocarbons into the well cellar. The investigation team noted many instances in which well cellar liners were not installed in a manner that prevents cellar and potentially pad gravel from being contaminated with hydrocarbons.

The investigation team did observe situations in which fluids were accumulating under well cellar liners but did not directly observe any gas accumulation. The fluid accumulation appeared to be the result of liner leakage or inadequate liner installation. The team did note that the way some well liners are installed results in the formation of pockets in which gas accumulation could occur.

Several employees and a BP environmental technician reported observing gas build up under a liner, and in one past case, the gas was sampled and determined to be methane. The source of the gas was not determined when found but it was most likely the result of natural decomposition processes according to BP environmental personnel.

During the investigation the team noted a number of instances in which gas was bubbling to the surface in unlined well cellars that contained fluid. The bubbles were sporadic, very small in size, and unable to be reliably sampled. In some cases the bubbles were located near the well casing and in other cases were distributed throughout the cellar. The bubbles appeared very similar to those observed occurring naturally in tundra ponds.

Although several attempts to collect samples of the gas bubbles were made, only one sample was collected that registered on an explosive meter. The amount registered (3%) was only a small fraction of the amount necessary to create an explosive atmosphere.

It is the opinion of the lead investigator that the accuracy of any quantitative analysis on the samples collect is questionable based on the small volume of the gas sample and the potential for its dilution with air during collection. Additionally, the concentration of the gas in the sample bottle (even if it is an accurate reflection of the bubble concentration) is likely not representative of the concentration that could or would exist in a liner pocket.

Responses to a questionnaire used as part of the investigation methodology indicated that some employees are concerned about the hazards associated with gas accumulation under well cellar liners. Determining whether gas accumulation in well cellars actually is or has the potential to be hazardous to employees entering well houses was beyond the scope of the investigation.

Allegation 8: *The tundra is trash laden with discarded plastic sheeting, wood, plastic bottles, Styrofoam, five gallon containers, and other materials disposed of in the snow by BP contractors over the winter months.*

Finding:

Trash as described in the allegation does collect on the snow during the winter months. The amount of trash noted during the past several years is greater than that observed three or four years ago according the recollections of nearly everyone asked who was present on site during this and prior years' breakups. Most said that they were personally embarrassed by the trash because it reflected very poorly on BP and BP employees.

All opined that the source of the trash was not limited just to BP contractors but originates from a variety of causes during the winter months. Winter darkness and severe weather make trash collection difficult and even dangerous depending on trash location, which is often far from the point of its origination due to high winds. Consequently the trash accumulates and spreads. There was no evidence to suggest that the trash was intentionally disposed of although it would be unreasonable to rule out that someone somewhere didn't dispose of something in a negligent manner. That said, personal observation by the inspection team indicated that North Slope workers take extraordinary care to prevent anything from defacing the tundra.

Each year BP hires about 80 college students to work on the North Slope during summer break. The program is called "stick pickers" because these students are assigned (among other things) the task of cleaning up the trash that accumulated during the winter months. Based on personal observation from July 22 to August 1, the "stick pickers" have done an excellent job in removing trash. Very little is present in areas they have worked and the tundra overall is nearly trash free.

The reasons for more trash in the last several years than previously is likely because of increased winter work and thus more trash generation, an earlier snow melt, and a later Memorial Day this year, which oftentimes determines when classes end and thus the arrival date of the student "stick pickers." Although the last two factors have little bearing on the rate of trash generated, it does affect the length of time the trash accumulates and is visible before removal begins.

Allegation 9: *At least some of the information in Mr. Hamel's initial letter was provided to him by individuals who were concerned that their identity might become public.*

Finding:

There are three principal reasons why employees are sometimes unwilling to raise concerns to their management. One is fear of adverse consequences; the second is repeated failure of management to address reported concerns; and the third is the employee's belief that he/she will be tasked with the responsibility for fixing the concern without being given the necessary authority and resources. In any of these cases, the consequences are often that concerns go unreported or are reported outside the normal management structure.

The reason why the concerns that are the subject of this investigation were reported anonymously is not able to be determined since the concernee(s) were not available for interview. However responses to the questionnaire and discussions with individual employees indicate that a least a few employees are hesitant to report concerns to their management for one or more of the above reasons. All employees spoken to or responding to the questionnaire indicated however that they are willing to and would report a serious concern, either directly to their management or by one of the other available avenues.

Comments and Recommendations

The cooperation the investigation team received from BP and their contractor managers, supervisors, and individual contributors was outstanding. Without exception everyone with whom we interacted was professional, knowledgeable, helpful, and candid in expressing their views.

During the course of the investigation it became apparent that there were some areas of oil field operations and regulatory practices that might benefit from the investigation team's knowledge of best practices in other industries. At the request of the AOGCC the following comments and recommendations are included in the report. It should be noted however that these comments and recommendations are based on limited observation over a short period of time in a small sector of the oil field.

Comment 1:

Some AOGCC and ADEC inspectors feel constrained in their ability to report noted HSE deficiencies which fall outside their perceived area of regulatory responsibility. While they are undoubtedly technically correct, the consequence is increased risk of injury or harm to personnel particularly because of limited onsite OSHA presence.

An example is the continued existence of a temporary fix to a personnel safety hazard. Specifically, some brackets which attach a walking grating (over 6 feet above the cellar floor to allow access to valves near the top of the production tree) have failed. As a temporary fix, a brace made by nailing two, 2X4's together was attached to the walking platform and cellar covering to reduce the stress on the bracket subject to failure. The attachment was made with baling wire. Permanent repairs have not yet been completed in many of these instances even though several years have passed since the problem was first identified.

Recommendation:

Form a working group composed of ADEC, AOGCC, State OSHA, and other interested parties with the aim of insuring that all regulatory requirements applicable to oil field operations are identified, clearly understood, and periodically monitored. Additionally a mechanism should

be established so that all regulators have more than just basic familiarity with each others requirements, and a process created to hand off observations from those seeing potential problems to those responsible for regulating and/or correcting them.

Comment 2:

Confusion exists between and within both BP and ADEC about reporting requirements for releases which are periodically vacuumed up from secondary containments. The existence of this confusion was readily apparent and freely admitted by both ADEC and BP environmental personnel during conversations with the lead investigator.

Recommendation:

Convene a working group of ADEC, Alaska Clean Seas (ACS) and BP environmental employees to establish a common understanding of the requirements. (Note: This action was proposed and favorably received by ADEC representatives on the investigative team and BP representatives supporting the team during the course of the investigation.)

Comment 3:

There is a difference in expectations between BP field personnel and office technical personnel on what does or ought to occur when fluids are discovered in a well cellar.

Field personnel believe their job is to report the situation and call for a vacuum truck or pump truck depending on the well location and fluid constituents. Once these actions are taken field personnel believe they have done what is expected and only report the problem again if the conditions originally noted become worse.

Office technical personnel generally believe that once fluids are discovered in a well cellar they are removed. If the fluids are hydrocarbons, the source is located and repairs are made to stop further introduction, an adequate secondary containment is fabricated if the source of the hydrocarbon fluids is expected to be recurring, or the well is taken out of service.

BP managers accompanying the investigation team or seeing the photographs of some of the conditions noted were generally surprised and embarrassed by the conditions noted.

Recommendation:

Clarify expectations for initial and continuing actions taken in response to fluids in the well cellar.

Encourage operational and support managers to spend more time in the field.

Comment 4:

There is confusion about what constitutes an adequate well cellar liner for secondary containment. Conversations between the lead investigator, BP Environmental staff assisting with the investigation, and the ADEC representatives on the investigation team freely admitted the confusion regarding when a liner is required, who initiates the required installation of a liner, and the requirements for liner performance.

Herculite liners used as secondary containments in well cellars are for the most part ineffective. In addition, if there should be a slow build up of hydrocarbon fluids in well cellars from beneath the liners, the existing secondary containment liners might delay its discovery.

Herculite liners as currently installed create pockets which could accumulate gas.

Recommendation:

The ADEC should consider developing a design standard or set of minimum expectations for well cellar secondary containments.

BP should consider installation of replacements for the existing herculite liners. There are Alaska based manufacturers of products that can be installed in a way that allows for leak free containment, gas venting, and easy access to inspect for fluid accumulation.

Comment 5:

In the well cellars in which the investigation team noted hydrocarbon accumulation, the source appeared to be from freeze protection fluids from the outer annulus of the well. In some wells the conductor casing is below the level of the gravel in the well cellar and therefore it is possible that any seepage could go unnoticed.

Recommendation:

Consider removing well cellar gravel to a depth that would allow visual inspection of potential leakage locations.

Comment 6:

Conditions noted within and adjacent to some well houses did not reflect well on those responsible for their upkeep. Examples include: graffiti on walls; caution tags adrift on the floor; tools and debris in well cellars; missing placards; caution tags used under conditions requiring a danger tag; missing swing doors on elevated platforms; gauges over due for calibration; improper thread engagement on fasteners, displaced and therefore ineffective pipeline supports, electrical cable insulation damaged by metal strapping; drip collectors damaged to the point of uselessness; ineffective secondary containments, and so on. Examples of the conditions noted are depicted in some of the photos in the body of this report and in the photos of Appendix 5.

Often the above conditions exist uncorrected because they are literally not seen by those who daily inspect the well houses or because those who inspect believe that the conditions are acceptable to their management. It appears that either operating company management expectations are too low or else management does not adequately communicate their housekeeping expectations to field personnel.

Recommendation:

Conduct training on how to recognize deficiencies during inspections of equipment and facilities. It is commonly believed that inspecting for abnormalities is intuitive, i.e. just look around and see what’s not right. The

reality is it takes training, practice, and often the use of checklists to do a competent material inspection.

Increase the amount of time spent by BP operational and support managers in the field evaluating the material condition of facilities for which they are responsible and communicating their expectations.

Comment 7:

Compiled questionnaire responses are provided in Appendix 4. The questionnaire answers and associated remarks provided valuable information that formed the basis for some of the investigation findings.

Recommendation:

Read the survey results and, in particular, the informative comments provided by the responders. Consider appropriate actions to address identified concerns.

Comment 8:

Questionnaire answers indicate that the majority of employees are willing to report HSE concerns to their supervisor and they have no fear of retaliation for doing so. A few employees are afraid that reporting HSE concerns will result in adverse consequences however they are still willing to report concerns using alternative paths. Some employees are not aware of some of the alternate paths available for reporting HSE concerns.

Investigation team members noted posters explaining the various reporting processes are out of date in some facilities and in others they are non-existent.

Recommendation:

Continue the current training and awareness efforts that are effective in encouraging employees to report HSE concerns and eliminating retaliation for doing so.

It is possible that the employees who reported having been retaliated against for raising concerns (or fear that they might be) work for a small number of

supervisors who are (or have in the past) discouraged reporting. There are several ways to determine which work groups might have a supervisor who discourages reporting concerns. An effort to find out who they are is needed.

Display up to date posters of alternate methods to report concerns in visible locations in all facilities.

Comment 9:

Questionnaire responses indicate that the highest level of employee dissatisfaction was with the length of time required to resolve identified HSE concerns.

Recommendation:

Establish target resolution dates for each identified HSE concern, assign responsibility for correction to a specific individual, and develop a tracking system so that any employee can see what HSE concerns have been raised and the resolution actions underway or completed.

Comment 10:

Although a vacuum truck used to be resident on Northstar, it has been removed to save space according to some BP Northstar workers.

Recommendation:

Return the vacuum truck to Northstar or provide an alternate way of promptly removing fluids which accumulate in well cellars.

Comment 11:

The BP Well Integrity Group confirmed that there are numerous wells operated by BP on the North Slope with casing communication during the period of the investigation.

Recommendation: Reconsider the practice of allowing wells to operate with casing communication, either as an adopted BP best practice or as a result of stricter AOGCC requirements.