

Alaska Department of Environmental Conservation Investigation Report & Findings
Nabors Alaska Drilling, Inc. Well L-02 A and Well PBU V-111
March 25, 2005

Allegation Background: The Alaska Department of Environmental Conservation (ADEC) investigated allegations brought forth in correspondence addressed to Senator Ted Stevens dated January 20, 2005 by Mr. Charles Hamel. Of interest to the Department were the allegations of a release of drilling mud caused by a well blowout on the Nabors Alaska Drilling, Inc. (Nabors) Rig 9ES. The conclusions reached by the Department are based on information obtained from interviews with BP Exploration (Alaska) Inc. (BPXA) and Nabors personnel, information contained in the Nabors Rig 9ES International Association of Drilling Contractors (IADC) drilling reports, information contained in BPXA's drilling information management system (DIMS) records, information contained in the Nabors Rig 9ES automatic rig data recording system records (EPOCH reports), Alaska Statutes contained in Title 46, Chapter 3, and regulations contained in Alaska Administrative Code Title 18, Chapter 75.

Allegations and Investigation Findings: The findings of the investigation follow.

Allegation 1: “This past December 6th, Nabors Rig #9ES, drilling on the remote L pad, with BP on-site supervision, suffered a gas kick/blow-out, spewing gas, liquids, and mud 70 feet into the air and over the rig windwalls to the pad.”

Department Finding 1: The Department finds that Nabors Rig 9ES experienced a well control incident while drilling Well L-02 A through the Shublik formation on December 5, 2004. A phenomenon referred to as wellbore breathing was encountered throughout this time frame in which it is not uncommon to receive an influx of natural gas, crude oil, or water into the well when the hydrostatic pressure of the wellbore is less than the formation pressure (i.e., when the mud pumps are shut down).

During this incident, Rig 9ES was attempting to pull the drill string out of the hole to change out the bottom hole assembly (BHA) in order to continue drilling the well. Each attempt to shut down the pumps and pull out of hole was unsuccessful, as the well would begin to flow (give back mud that had been lost to the formation during drilling along with gas from the formation, hence termed breathing). Attempts to increase the density of the drilling mud to kill the well were unsuccessful and attempts to pump lost circulation material (LCM - bulky, lightweight, plugging material designed to block the pores in the formation) downhole to stop the flow of gas into the well were unsuccessful.

At this point, it was decided to allow the gas to flow into the well and circulate the gas out of the wellbore in an attempt to deplete the gas in the formation so the BHA could be changed out. As they began to circulate the gas and mud from down hole, the gas reached the surface before the driller expected it. The driller counts mud pump strokes to determine when to expect a kick to come to surface. In this case the gas reached the surface much earlier than expected. This resulted in water based drilling mud with a small percentage of crude oil and natural gas erupting to the surface and spraying over

the rotary table to the rig floor. The driller then shut down the mud pumps and shut in the well using the pipe rams in the blow out preventer equipment system. It is estimated that the spray from the well occurred for 7 to 10 seconds.

A water based drilling mud was being used during this time period and contained lube, potassium chloride, caustic potash, calcium carbonate, corrosion inhibitor, and crude oil from the formation.

It is difficult to estimate an exact volume of material spilled, however testimony from some present on the rig indicates it could have been as high as 294 gallons (7 barrels). Testimony also indicates the spray of well bore fluids reached anywhere from 20 to 85 feet high as evidenced by the presence of mud on the derrick board. It is the opinion of the Department that the drilling mud did reach above the windwalls of the rig, which extend about 50 feet above the rig floor. It is also the opinion of the Department that it is possible that some drilling mud was blown over the windwalls as evidenced by the presence of drilling mud on the pit complex roof and the dog house roof, and may have reached the gravel pad. Testimony from most of the workers that inspected the pad around the rig indicates that no mud was present. However, some conflicting testimony was received that said a light spray of mud (“speckles on the snow”) was present on the pad.

Cleanup of the mud included spraying the windwalls and rig floor with a high pressure washer and using squeegees to direct the wash water and mud to the drains in the rig floor that lead to the mud pits below. Contaminated snow on the dog house and pit complex roof was shoveled into buckets and absorbent pads were also used. Contaminated snow was disposed of in the mud pits and allowed to melt. Contaminated absorbent pads were disposed of in an oily waste dumpster.

Allegation 2: “This rig suffered a similar blowout the first week of July 2003”

Department Finding 2: After reviewing the IADC reports and the DIMS records no incident matching the allegation was discovered during the first week of July 2003. A loss of well control was discovered on July 31, 2003 that is consistent with the allegation. The circumstances surrounding this event follow.

While drilling well PBU V-111 the Rig experienced mechanical failure with one of the mud pumps that required the pump to be removed and replaced. The well was killed using oil based drilling mud and shut in. The mud pit complex was then disconnected and pulled away to allow adequate space for replacement of the mud pump. During this time the well was shut in for approximately 21 hours over the course of two days, July 30 and July 31, 2003. While the well was shut in, gas hydrates (a frozen mixture of gas and water) migrated into the well bore from the formation.

Oil based drilling mud was being used while the well was shut in to avoid freezing. The mud contained mineral oil, gelling agents, wetting agents, and salts.

After the mud pump was replaced, drilling operations resumed. While circulating the oil based mud out of the well, the gas hydrates were unknowingly brought to the surface. As the gas encountered higher temperatures and lower pressures it expanded and quickly rose to the surface, forcefully pushing the drilling mud above it out of the wellbore. At this time the driller on duty was in the dog house filling out the daily reports as the tour was coming to an end. The motorman was filling in at the driller's console. When the motorman realized they were taking a kick he shut down the mud pumps. By this time, the driller had made it to the console and shut in the well using the pipe rams. However, due to concern about the location of the tool joint, before the pipe rams could fully close, the driller countermanded the order to close the rams and closed the rams again, stopping the flow of mud into the rig.

According to testimony from those present on the rig, the top drive was positioned approximately 20 feet above the well. This caused the mud that was spraying from the well to shoot up, hit the top drive, then "mushroom" or spray horizontally out toward the exterior walls of the rig. Testimony indicates some mud may have been forced through the cracks of the corrugated metal sheets that comprise the windwalls, some mud may have collected in the rungs of the derrick above the top drive that fell out to gravel pad when the derrick was lowered several days later, and some mud may have flowed out the cellar doors and permeated the herculite liner and under the rig mats. Most testimony indicates no drilling mud escaped the rig during this event.

Cleanup consisted of using squeegees to direct the mud on the rig floor to the drains that lead to the mud pits. Absorbent pads were also used to spot clean affected areas.

Statutory and Regulatory Background: Alaska Statute 46.09.900 (4) defines a hazardous substance as (A) an element or compound that, when it enters into or on the surface or subsurface land or waters of the state, presents an imminent and substantial danger to the public health or welfare, or to the fish, animals, vegetation, or any part of the natural habitat in which fish, animals, or wildlife may be found; or (B) a substance defined as a hazardous substance under 42 U.S. C. 9601 – 9657 (Comprehensive Environmental Response, Compensation, and Liability Act of 1980); "hazardous substance" may include drilling fluids/mud's complete in formulation.

For hazardous substance spills to the environment, the Department's policy is to require notification as soon as the person has knowledge of a discharge or release [18 AAC 75.300 (a)(1)(A)].

On March 20, 2003 the ADEC and BPXA entered into a Compliance Reporting Agreement. The intent of this Agreement is to establish applicable alternative reporting requirements for spills of low risk substances to low sensitivity receiving environments. This Agreement was entered into pursuant to AS 46.03.755(b), AS 46.09.010(b), and 18 AAC 75.300(c). The purpose of the reporting requirement is to alert both BPXA and the state so that steps can be taken to prevent future occurrences. As with all spill reports, all materials released must be included in the report whether or not they would, on an

individual basis trigger a reporting requirement to the state. Drilling fluids that are complete in formulation are included in the compliance reporting agreement, specifically:

- Discharge to Impermeable Secondary Containment Areas
 - In excess of 55 gallons
As soon as a person has knowledge of the discharge.
 - 55 gallons or less
No discharge reporting required.

Investigation Conclusion: Throughout the course of this investigation, Nabors and BP employees were interviewed either as a team with Nabors, BP, ADEC, and AOGCC personnel or independently with State of Alaska personnel only. All records and logs were provided by Nabors and BP to the State of Alaska by request. The material released was drilling fluids complete in formulation, which is considered a low risk substance. The release did not present an imminent and substantial danger to public health or the environment. The release was confined within the drill rig, which constitutes secondary containment.

Under present reporting guidelines agreed to by the Department and BPXA for low risk substances to low sensitivity receiving environments per 18 AAC 75.300(c), these releases should have been reported to the ADEC. The agreement includes a reporting threshold for drilling fluids in formulation in excess of 55 gallons to secondary containment areas. Both releases involved the discharge of drilling fluids in formulation in excess of 55 gallons to secondary containment areas (i.e., the rig floor) and are, therefore, required to be reported as soon as the person has knowledge under the terms of the agreement.

It is understood by the Department, in both of these incidents, that the driller, toolpusher, and BPXA Well/Drilling group representative were aware that the event had taken place. No one from Nabors or BPXA Well/Drilling group reported the spill in accordance with the agreement to the state or to the proper company officials. Furthermore, it is BPXA company policy that all spills, regardless of size, be reported to BPXA Health, Safety, and Environment (HSE) staff. This internal notification was not made. BPXA HSE personnel are responsible for assessing the information and ensuring compliance with reporting requirements. This is a vital link between BPXA and regulatory agencies.

Recommendation: Based on the investigation findings, ADEC will pursue appropriate corrective actions to ensure BPXA timely reports any future releases to the environment of low risk substances.