

**THE DRILLING OF UMIAT #1**

**Kansas Oil Man Leads Opening of Arctic Petroleum Resources**

**Lee C. Gerhard**

**Kansas Geological Survey  
Lawrence, KS**

**Open-file Report 94-17**

## The Drilling of Umiat #1

### Kansas Oil Man Leads Opening of Arctic Petroleum Resources

Fifty years ago Kansas oil driller LtCmdr William (Bill) Rex, CEC, USNR, was appointed the commanding officer of an expedition to explore United States Naval Petroleum Reserve No. 4, on the Arctic north slope. Worried about the depletion of domestic oil reserves and the specter of increasing reliance upon foreign imports, the nation turned to examine its own resources so as to prepare itself for self-sufficiency in time of war.

In 1944, World War II was closing, but fierce engagements were still to come. The atomic bomb had not yet fallen on Japan. But concern about future fuel needs was high, and little was known about operating under Arctic conditions.

In 1944, orders were cut to select personnel and materials for the exploration of "Pet. 4." The Seabees were selected for the task, and a new Naval Construction Battalion Detachment was organized, the NCBD 1058.

Bill Rex, born in Missouri and a graduate of the University of Missouri, had built a drilling company out of the ashes of the depression with partner Ed Morris, and was doing "okay" in El Dorado, Kansas, when the war broke out. Under the prevailing rules, only one of the two could remain with the business, the other had to go to war. Since he had no children, unlike his partner, Bill volunteered, and eventually was assigned to Aleutian Islands Seabee duty with the 66th Battalion.

Rear Admiral Ben Moreell proposed the expedition to drill core holes and explore "Pet 4" on May 8, 1944. The President approved the expedition on June 2, 1944. The 1058 was at sea by the 20th of July, having had authority to cut through red tape and directly purchase all necessary supplies. Screening of personnel for the expedition led to the appointment of Bill Rex as commander because he was an experienced oil well driller and highly regarded officer. His detachment consisted of 196 Seabees and 235 stevedores, supplied to operate independently for a full year in the field.

Orders for the 1058 were simple and to the point: "The purpose of this expedition is to carry out exploratory work in NPR 4 (Naval Petroleum Reserve No. 4) with a view toward determining the presence of oil in commercial quantities and if so to establish methods by which it may best be produced and transported to a point of greatest usefulness. This mission, therefore, includes detailed geologic study, core hole drilling, deep well drilling, and overland and aerial pipeline survey. This region being virgin exploratory territory, you will be required to do your utmost to complete your task with the greatest possible amount of information of every type. Everything down to the most insignificant item should be recorded for future use. It is of the utmost importance that one of the products of this task be a complete record of not only the success but the failures of this first Seabee petroleum venture." Quite a mandate for so little time, and so much significance!

Not everything goes well in classical military ventures. Those who provisioned the expedition did so having had only tropical experience. The Quonset huts provided had plenty of mosquito netting, but no insulation. There were no maps. Bill stated "We had no maps, so I went down to the local high school and got some geography books. Those were our only maps. That's what we knew about our destination."

"We got under way and found we had a lot of oil field experience and a chaplain, but no cook. I guessed the chaplain could cook," he reminisced shortly before his death, "We did a lot of things we weren't supposed to. But we drilled that damn well!"

"They gave us this beautiful soft black wool underwear, it was wonderful warm stuff. Only thing is, the first time it went through the laundry, it wouldn't fit a Barbie doll any more."

Landing at Point Barrow, skipping the planned Simpson landing area because of shallow water and swamps, Bill and his crew built a camp, first tents, then Quonsets. The natives made fun of the tents, but later were amazed at the Quonset city that grew. The first permanent building was the "Top of the World Officers Club" according to AAPG member George Gryc, now Western Region Director's Representative of the USGS at Menlo Park, a participant in a

companion USGS expedition. The permanent camp was ready for move-in on September 14, only three weeks after landing.

Point Barrow was only a staging and testing area. The real work lay 307 miles to the south. 1000 tons of supplies and drilling equipment had to be moved overland. The inventiveness of the oil men-Seabees made short work of the transportation problem. Heavy equipment couldn't be moved over the tundra in summer, so they invented sled trains and moved in winter, constructing wannigans on conduit runners, pulled by caterpillars. By late winter of 1945, the sled-trains had been designed, built, tested, and delivered the freight. The 307 miles of sledging was along 58 miles of sea ice, 176 miles along freshwater ice, and 73 miles over tundra. An airstrip was constructed later at Umiat.

Meanwhile the rigs were tested. Drilling in permafrost is a little different than the limestones of Kansas. Frozen drilling mud, plugged bits and ice cores were a problem, partly solved by using large oil-fueled immersion heaters in the mud tanks. Unfortunately this caused the loss of the first rig, which burned down on its second test hole. A National 50 rig proved more serviceable, and drilled a 685 foot hole on its first try, using a flame-thrower to de-ice the lines, standpipe, and hoses when coming out or going in the hole. Eventually the testing discovered a small gas field at Barrow that was used to heat the camp.

On the sled train to Umiat the first land casualty occurred, when one of two Alaskan Scouts was lost, missing from his remote camp and never found. Another casualty was a Seabee who dropped into the Bering Sea during unloading operations and could not be revived.

During 1945 the detachment was strengthened for its exploration duties. The main project, drilling of exploratory wells, was to commence.

Umiat is located along the Colville River, in an area of surface anticlines. Lt. William Foran, formerly a USGS explorer of the mid-1920's and later an Imperial Oil Company geologist, was chief geologist. Foran picked the location for Umiat #1 on the Umiat anticline. AAPG member Earle Taylor of Houston was a member of the geological mapping crew for the Navy. Rigging up of the National 50 commenced in late May, 1945, and Umiat #1 was spudded on June

22. The well was continuously cored to 685 feet and cored as possible below, eventually 1257 feet of the hole was cored. Drilling was terminated at 1816 feet because of lack of water for drilling, the only source being a small creek nearby the location that could not supply the needed 200 barrels a day when freezeup started. Cement used for setting casing had to be warmed by standpipe in order to set. The crew did not have the same problems drilling through permafrost as they had had during rig testing on the coastal tundra, but there were other problems. George Gryc remembers "the permafrost was 356 meters deep on the Umiat anticline" (Umiat no. 6) and "that the camp nearly sank out of sight and a very substantial gravel pad had to be built..." The last entry in the drilling log is: "Shut down for winter, P.T.D. 1816' 16 Sept." The Navy had run out of water.

Five oil shows were logged, at 535'-555', 919'-934', 1305'-1308', 1335'-1386', and 1736'-1782'. No production test was run, and as the season ended, the atomic age started. After V-J Day, LtCmdr William H. Rex went home to Kansas, on September 26, 1945, where his successful drilling business made him a leading member of the community in El Dorado, Kansas until his death on September 5, 1991.

What did these intrepid oil men-Seabees accomplish? Bill Rex gave some insight not found in the official records. "We invented a lot of stuff, including the sledge trains and how to drill in the Arctic cold and ice. We located a pipeline route to the south to get oil out if necessary. But most of all, I think, we had to learn how to survive and work under Arctic conditions. Later on they sent all kinds of people up there, and there was another reason. You see, the Russians had just kicked the hell out of the Germans under winter conditions, and we could see we would probably have to fight in Siberia some day. I think the second purpose of this expedition was to learn how to operate in the Arctic, so we could fight when we had to. "

Look at the orders. "Record all details. ..." The records are heavy on survival gear and clothing, and how to make machinery work. Bill was probably right.

Bill Rex helped make oil field history - he was a "Can Do!" Kansas oil man. The Arctic was open. This was only the first chapter in Arctic oil exploration.

**Acknowledgments:** I appreciate the help of AAPG members and explorers George Gryc and Earle Taylor who filled in gaps in Bill Rex's notes and memories and who contributed freely of their own memories and materials. Dr. Vincent A. Transano, Command Historian, Naval Facilities Engineering Command kindly supplied several summary reports that materially assisted my writing of the story.

Lee Gerhard  
Kansas Geological Survey  
March 18, 1994

Figures and photographs to be inserted as appropriate:

Figure 1. Location of the Umiat #1, with reference to other landmarks of the time. From the official records of the 1058 NCB. Sled train route to Umiat from Point Barrow is marked, length 307 miles.

Figure 2. LtCmdr William H. Rex, right foreground, inspects the National 50 rig drilling Umiat #1.

Figure 3. Bill Rex, right, during interview for this article in 1990. Lee Gerhard, Kansas State Geologist (Left), and Dick Pearce, current operator of REXOCO, Eldorado, Kansas (Center).

Figure 4. LtCmdr William H. Rex, from portrait by Rusty Huerlein, ca. 1945.

Figure 5. Drilling log of Umiat #1, from U.S. Navy records.

DRILLING DATA

Umiat Test #1

Loc.: approx 69°23' N. Lat., 152°18' W. Long.  
(approx 1500 yds. N. and 10,000 yds. W. of 1945  
Umiat camp-site)

Elev.: 818' D.F. (based on approx. elev. of 350' at Umiat  
Lake; may be too high)

Started digging cellar (used jack-hammer): 13 May 1945  
 Derrick up:..... 27 May  
 Started drilling (24" 3-way drag bit)..... 15 June  
 (Rock too hard for drag bit, had to  
 finish spudding with jack-hammer)  
 24" conductor set at 19' and cemented .... 16 "  
 Resumed drilling, below conductor ..... 23 "  
 (6 1/8" hard formation core-head, and  
 reaming with 15 1/2" rock bit; subse-  
 quently reamed with 22" rock bit)  
 10" surface casing set at 97' & cemented . 30 June  
 (Set higher than originally planned be-  
 cause lost circulation into fissures  
 in strata from 25' to 75')  
 Resumed drilling (first coring, then  
 reaming with 15 1/2" rock bit)..... 15 July  
 11 3/4" surface casing set at 685'  
 & cemented ..... 4 Aug.  
 Resumed drilling (spot coring, then  
 reaming & drilling with 10 5/8" bit)... 9 "  
 Shut down for winter, P.T.D. 1810' 16 Sept.

GAS odor, shale, 250'-252'  
 OIL show, sandstone, 535'-555'  
 OIL odor, " 555'-584'  
 OIL odor, " 749'-766'  
 OIL show, " 919'-934'  
 OIL show, " 1305'-1308'  
 OIL show, " 1335'-1386'  
 OIL show, " 1730'-1782'

Footage cored:

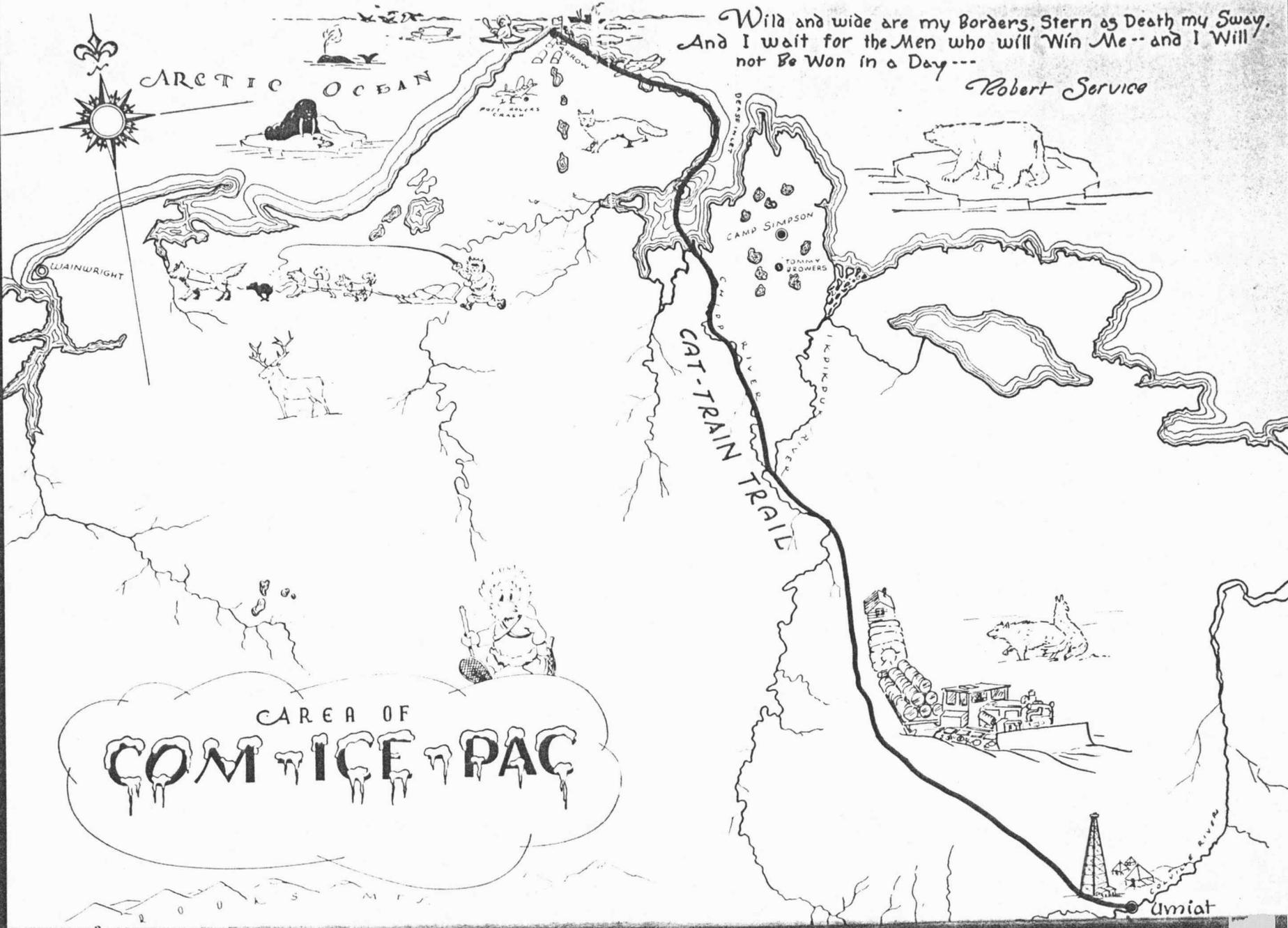
Conventional barrel: 246'  
 Wire-line barrel: 881'  
 Total: 1127'

Core Recovery

71.8%  
 84.4%  
 81.5%

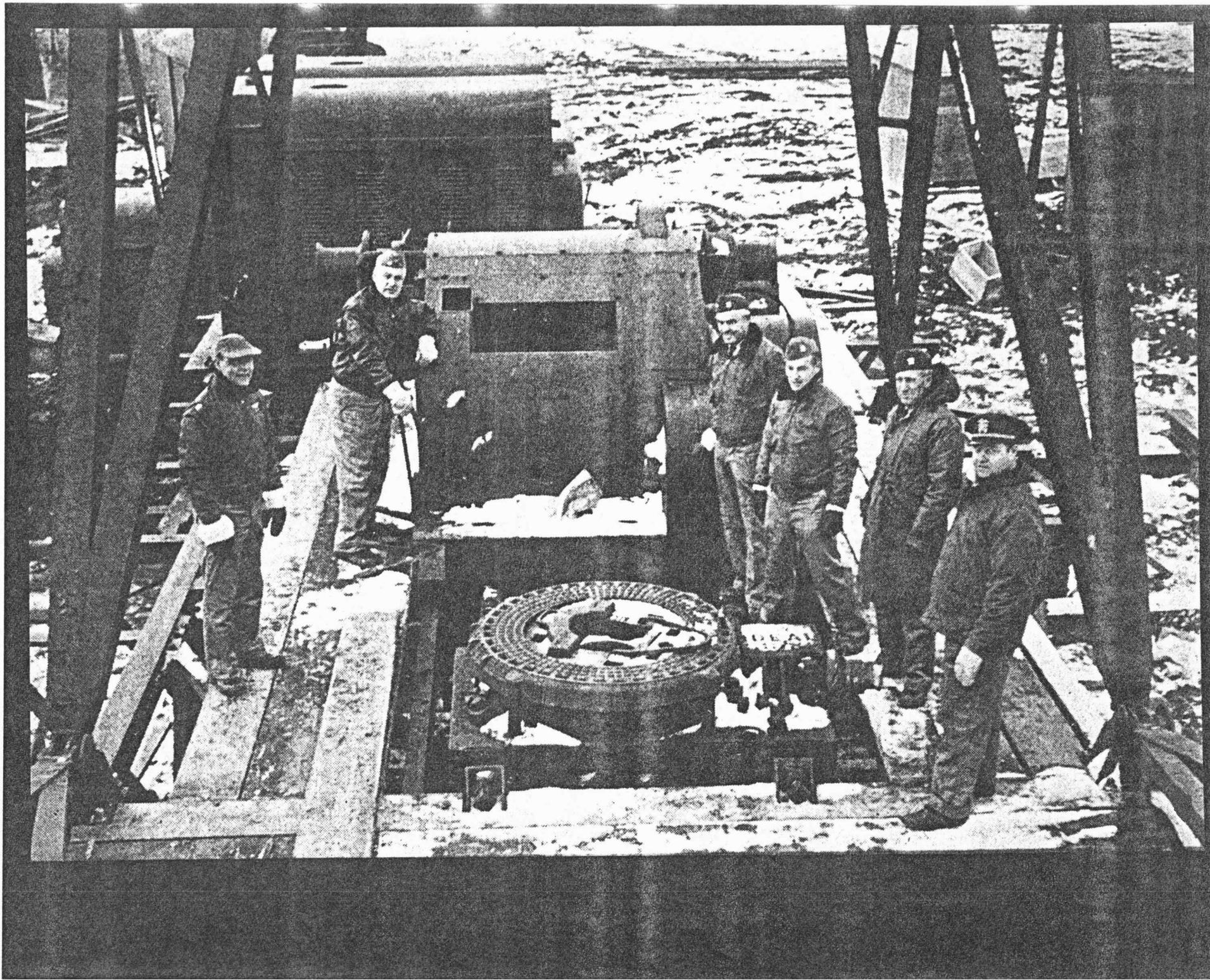
Wild and wide are my Borders, Stern as Death my Sway,  
And I wait for the Men who will Win Me--and I Will  
not Be Won in a Day---

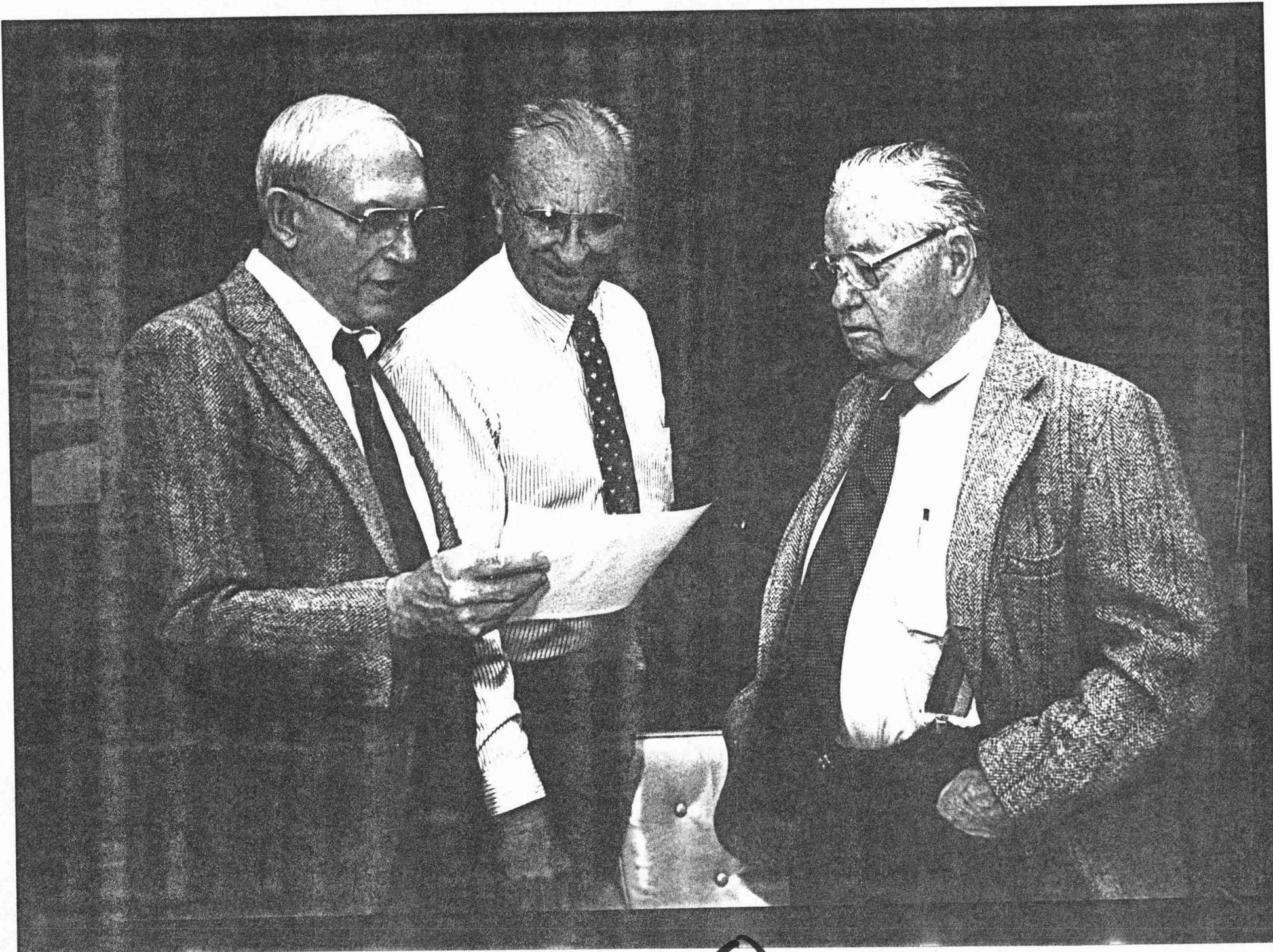
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## OPENING THE ARCTIC: THE DRILLING OF UMIAT #1

Lee C. Gerhard

*Director and State Geologist, Kansas Geological Survey, Lawrence, KS 66047*

**ABSTRACT:** One of the greatest excitements for a petroleum geologist is to venture into the frontier, to explore and drill "where no man has gone before." Over 50 years ago Bill Rex, a Kansas oilman, was tapped to lead the first oil drilling expedition into the Alaskan Arctic. He successfully assembled and outfitted a Naval Seabee expedition whose mission was to drill the first well north of the Arctic Circle, Umiat #1. The story of Umiat #1 is one of anecdotes and personal accounts. This paper relates the successes and tribulations of that Seabee exploration venture, as told to the writer by some of the participants.

### THE STORY

Over fifty-three years ago, Kansas oil driller LtCmdr William (Bill) Rex, CEC, USNR, was appointed the commanding officer of an expedition to explore United States Naval Petroleum Reserve No. 4, on the Arctic north slope. Worried about the depletion of domestic oil reserves and the specter of increasing reliance upon foreign imports, the nation turned to examine its own resources so as to prepare itself for self-sufficiency in time of war.

In 1944, World War II was closing, but fierce engagements were still to come. The atomic bomb had not yet fallen on Japan. Concern about future fuel needs was high, and little was known about operating under Arctic conditions. The Russians had soundly defeated the Germans under near-Arctic conditions, and it was thought that the Russians might be our next foe.

In 1944, orders were cut to select personnel and materials for the exploration of "Pet. 4." The Seabees were selected for the task, and a new Naval Construction Battalion Detachment was organized, the NCB 1058. They were to search for new petroleum reserves and to test operating procedures for the Arctic climate.

Bill Rex, born in Missouri and a graduate of the University of Missouri, had built a drilling company out of the ashes of the depression with partner Ed Morris, and was doing "okay" in El Dorado, Kansas, when the war broke out. Under the prevailing rules, only one of the two could remain with the business, the other had to go to war. Since he had no children, unlike his partner, Bill volunteered, and eventually was assigned to Aleutian Islands Seabee duty with the 66th Construction Battalion (Fig. 1).

Rear Admiral Ben Moreell proposed an expedition to drill core holes and explore "Pet 4" on May 8, 1944. The President approved the expedition on June 2, 1944. The 1058 was at sea by the 20th of July, having had authority to cut through red tape and directly purchase all necessary supplies. Screening of personnel for the expedition led to the appointment of Bill Rex as commander because he was an experienced oil well driller and highly regarded officer. His detachment consisted of 196 Seabees and 235 stevedores, supplied to operate in the field without further support for a full year.

Orders for the 1058 were simple and to the point: "The purpose of this expedition is to carry out exploratory work in NPR 4

(Naval Petroleum Reserve No. 4) with a view toward determining the presence of oil in commercial quantities and if so to establish methods by which it may best be produced and transported to a point of greatest usefulness. This mission, therefore, includes detailed geologic study, core hole drilling, deep well drilling, and overland and aerial pipeline survey. This region being virgin exploratory territory, you will be required to do your utmost to complete your task with the greatest possible amount of information of every type. Everything down to the most insignificant item should be recorded for future use. It is of the utmost importance that one of the products of this task be a complete record of not only the success but the failures of this first Seabee petroleum venture." Quite a mandate for so little time, and so much significance!

Not everything goes well in classical military ventures. Those who provisioned the expedition did so having had only tropical experience. They provided Quonset huts with plenty of mosquito netting, but no insulation. There were no maps. Bill stated "We had no maps, so I went down to the local high school and borrowed some geography books. Those were our only maps. That's what we knew about our destination" (Fig. 2).

"We got under way and found we had a lot of oil field experience and a chaplain, but no cook. I guessed the chaplain could cook," he reminisced shortly before his death, "We did a lot of things we weren't supposed to. But we drilled that damn well!"

"They gave us this beautiful soft black wool underwear, it was wonderful warm stuff. Only thing is, the first time it went through the laundry, it wouldn't fit a Barbie doll any more. So we all wore our summer underwear all year round."

Landing at Point Barrow, skipping the planned Simpson landing area because of shallow water and swamps, Bill and his crew built a camp, first tents, then Quonsets. The natives made fun of the tents, but later were amazed at the Quonset city that grew. The first permanent building was the "Top of the World Officers Club" according to AAPG member George Gryc, now Western Region Director's Representative of the USGS at Menlo Park, a participant in a companion USGS expedition (Fig. 3). The permanent camp was ready for move-in on September 14, only three weeks after landing.

Paul Germann was the navigator aboard the S.S. Spica for both the 1944 and 1945 cruises to Barrow. In 1945 he argued his



Figure 1. Bill Rex, center, during interview for this article in 1990. Lee Gerhard, Kansas State Geologist (right), and Rex Buchanan, Associate Director of Public Outreach, Kansas Geological Survey (left). Kansas Geological Survey photo.

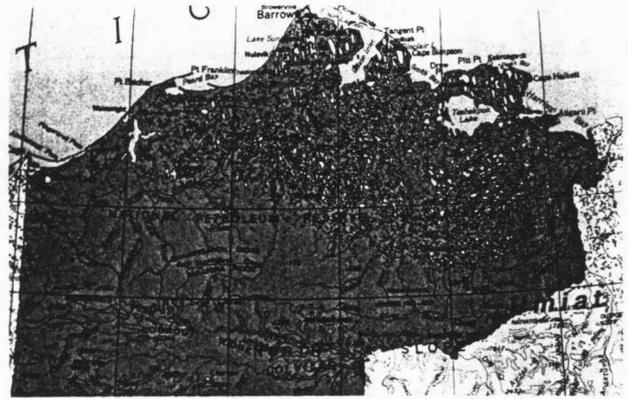


Figure 2. Map showing the location of landmarks cited in the story. From State of Alaska, Map E, U.S.G.S., 1973, rev. 1987.



Figure 3. Top of the World Officers Club, ca. 1944. Note wartime signage. Bill Rex is identified as being the second from the right. U. S. Navy photo.

skipper into hiding behind Point Barrow the night the other supply ship, the S.S. Harrington, was caught in the offshore ice pack (Fig. 4). Paul says he analyzed the weather and winds and concluded that the ice pack would drift in, and it did. "We waved at the Harrington as we steamed by," Paul told me, "and my skipper told me that's why he canceled my earlier orders to transfer from the Spica." This must have been the August 28, 1945 final breakthrough from Barrow to Seattle. Paul said that the other two ships, both Liberty ships, never sailed again from the Seattle/Tacoma moorage, they were too badly beat up from the Arctic ice. Bill Rex recalled that the Harrington was split by the time it arrived back in Seattle.

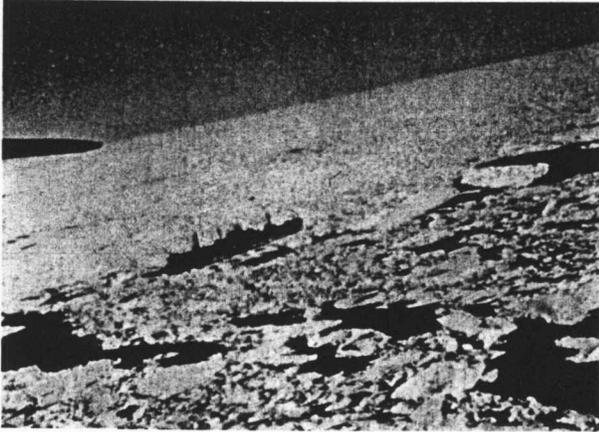
During the lulls in moving supplies, military food paled. Paul Germann and a few others used to take shotguns from the ship's armory to supplement Navy rations with ducks from the potholes on the tundra. Two of them could feed the entire ship,

either because they were really good shots, or there were so many birds. Photos show that at least one polar bear wandered into camp. Bill remembered the bear as not tasting too bad, but that they shot only one. There is no record of how many caribou supplied fresh meat not otherwise available to the men (Figs. 5, 6).

Point Barrow was only a staging and testing area. The real work lay 307 miles to the south. 1,000 tons of supplies and drilling equipment had to be moved overland. The inventiveness of the oil men-Seabees made short work of the transportation problem. Heavy equipment couldn't be moved over the tundra in summer, so they invented sledge trains and moved in winter, constructing wannigans on conduit runners, pulled by caterpillars. By late winter of 1945, the sledge-trains had been designed, built, tested, and delivered the freight. The 307 miles of sledging was along 58 miles of sea ice, 176 miles along

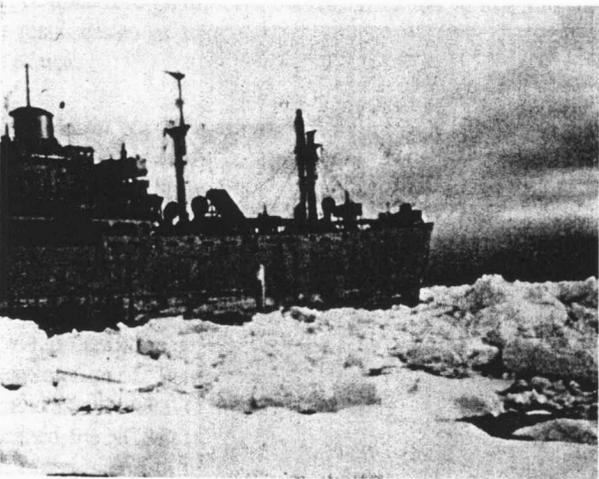
## OPENING THE ARCTIC: THE DRILLING OF UMIAT #1

freshwater ice, and 73 miles over tundra (Figs. 7, 8). An airstrip was constructed later at Umiat.



Visitors from Washington often cadged rubber shoepacs from the military as a treasured memento of their trips to the field. When such visitors landed at Umiat in the winter, the rubber shoepacs frequently shattered on contact with the sub-zero permafrost (Fig. 9).

Meanwhile the crew tested their drill rigs. Drilling in permafrost is a little different than the limestones in Kansas. Frozen drilling mud, plugged bits and ice cores were a problem, partly solved by using large oil-fueled immersion heaters in the mud tanks. Unfortunately this caused the loss of the first rig, which burned down on its second test hole. A National 50 rig proved more serviceable, and drilled a 685 foot hole on its first try, using a flame-thrower to de-ice the lines, standpipe, and hoses when coming out or going in the hole. Eventually the testing discovered a small gas field at Barrow that was used to heat the camp.



On the sled train to Umiat the first land casualty occurred, when one of two Alaskan Scouts was lost, missing from his remote camp, and was never found. The second casualty was a Seabee who dropped into the Bering Sea during unloading operations and could not be revived.

During 1945 the detachment was strengthened for its exploration duties. The main project, drilling of exploratory wells, was to commence (Fig. 10).

*Figure 4. S.S. Harrington caught in the ice. From Reed, J.C., 1958, Exploration of Naval Petroleum Reserve No. 4 and adjacent areas, northern Alaska, 1944-53, Part 1, History of the exploration, USGS Professional Paper 301, 192 p.*



*Figure 5. Caribou grazing near Barrow camp. U.S. Navy photo.*



Figure 6. Caribou grazing at Prudhoe Bay (Deadhorse City). Photo by author.



Figure 8. Tundra near the Arctic ocean, summer. Photo by author.

Umiat is located along the Colville River, in an area of surface anticlines. Lt. William Foran, formerly a USGS explorer of the mid-1920's and later an Imperial Oil Company geologist, was chief geologist. Foran picked the structure for Umiat #1 on the Umiat anticline, Bill picked the actual location. AAPG member Earle Taylor of Houston (recently deceased) was a member of the geological mapping crew for the Navy. Rigging up of the National 50 commenced in late May, 1945, and Umiat #1 was spudded on June 22 (Fig. 11). The well was continuously cored to 685 feet and cored as possible below; eventually 1,257 feet of the hole was cored. Drilling was terminated at 1,816 feet because of lack of water for drilling, the only source being a



Figure 7. Location of the Umiat #1, with reference to other landmarks of the time. From the official records of the 1058 NCBD. Sled train route to Umiat from Point Barrow is marked, length 307 miles.

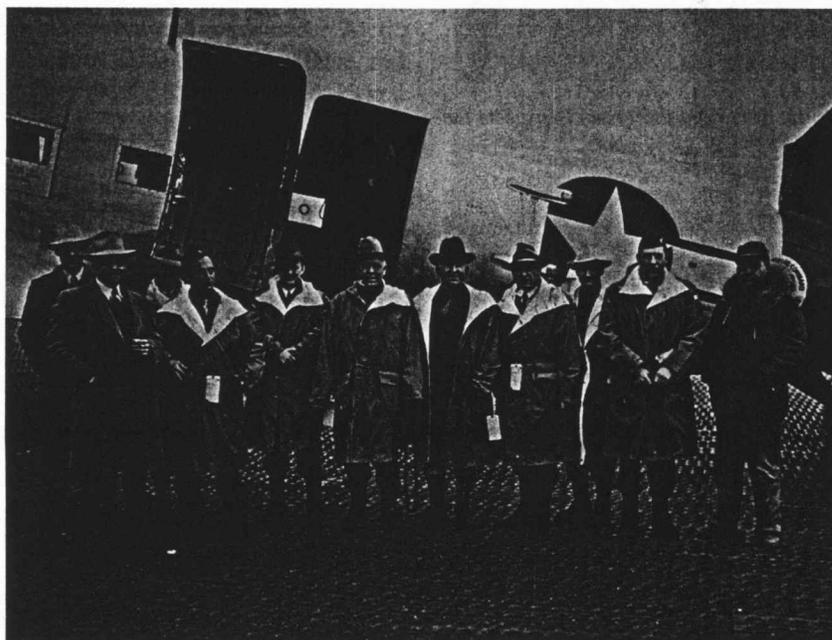


Figure 9. Visitors to Umiat. Many wartime dignitaries visited the operations at Umiat, all wanted rubber "shoepacs" as a treasured memento. Shoepacs shattered at first contact with the extreme cold at Umiat, much to the chagrin of the wearers. This photo was taken on a balmy day. Note that Bill Rex is wearing leather boots (right). U. S. Navy photo.

OPENING THE ARCTIC: THE DRILLING OF UMIAT #1

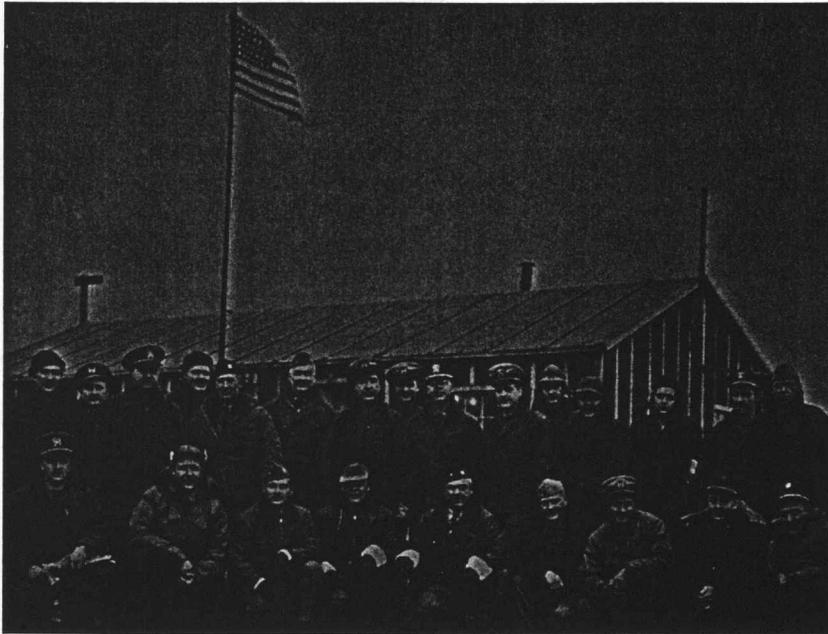


Figure 10. Some members of the 1,058th, location either Umiat (as Bill Rex recalled) or Barrow. Bill Rex is identified as being rear row, third from the left. U.S. Navy photo.

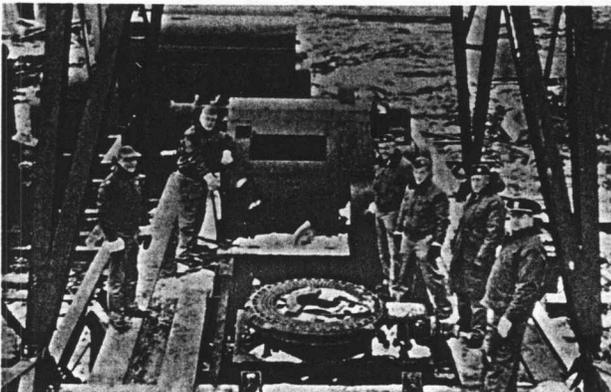


Figure 11. LtCmdr William H. Rex, right foreground, inspects the National 50 rig drilling Umiat #1. U.S. Navy photo.

small creek nearby the location that could not supply the needed 200 barrels a day when freezeup started. Cement used for setting casing had to be warmed by standpipe in order to set. The crew did not have the same problems drilling through permafrost as they had had during rig testing on the coastal tundra, but there were other problems. George Gryc remembers "the permafrost was 356 meters deep on the Umiat anticline" (Umiat no. 6) and "that the camp nearly sank out of sight and a very substantial gravel pad had to be built..." The last entry in the drilling log for Umiat #1 is: "Shut down for winter, P.T.D. 1,816' 16 Sept." Nearby creeks had frozen. The Navy had run out of water (Fig. 12).

Five oil shows were logged, at 535'-555', 919'-934', 1,305'-1,308', 1,335'-1,386', and 1,736'-1,782'. No production test was run, and as the season ended, the atomic age burst on the war scene. After V-J Day, on September 26, 1945, LtCmdr William H. Rex went home to Kansas, where his successful drilling

DRILLING DATA

Umiat Test #1

Loc.: approx 69°23' N. Lat., 152°18' W. Long.  
(approx 1500 yds. N. and 10,000 yds. W. of 1945 Umiat camp-site)

Elev.: 818' D.F. (based on approx. elev. of 350' at Umiat Lake; may be too high)

Started digging cellar (used jack-hammer): 13 May 1945  
Derrick up:..... 27 May  
Started drilling (2 1/2" j-way drag bit)..... 15 June  
(Rock too hard for drag bit, had to finish spudding with jack-hammer)

2 1/2" conductor set at 19' and cemented .... 16 "  
resumed drilling, below conductor ..... 23 "  
(5 1/8" hard formation core-head, and reaming with 1 1/2" rock bit; subsequently reamed with 2 1/2" rock bit)

10" surface casing set at 97' & cemented . 30 June  
(Set higher than originally planned because lost circulation into fissures in strata from 25' to 75')

Resumed drilling (first coring, then reaming with 1 1/2" rock bit)..... 15 July  
11 3/4" surface casing set at 685' & cemented ..... 4 Aug.

Resumed drilling (spot coring, then reaming & drilling with 10 5/8" bit)... 9 "  
Shut down for winter, P.T.D. 1816' 16 Sept.

G&S odor, shale, 250'-252'  
OIL show, sandstone, 535'- 555'  
OIL odor, " 555'- 584'  
OIL odor, " 749'- 766'  
OIL show, " 919'- 934'  
OIL show, " 1,305'-1,308'  
OIL show, " 1,335'-1,386'  
OIL show, " 1,736'-1,782'

Footage cored:		Core Recovery
Conventional barrel:	246'	71.8%
Wire-line barrel:	881'	84.4%
Total:	1127'	81.5%

Figure 12. Drilling log of Umiat #1, from U.S. Navy records.

business made him a leading member of the community in El Dorado, Kansas until his death on September 5, 1991 (Fig. 13).

What did these intrepid oil men-Seabees accomplish? Bill Rex gave some insight not found in the official records. "We



Figure 13. LtCmdr William H. Rex, from portrait by Rusty Huerlein, ca. 1945.

invented a lot of stuff, including the sledge trains and how to drill in the Arctic cold and ice. We located a pipeline route to the south to get oil out if necessary (Fig. 14). But most of all, I think, we had to learn how to survive and work under Arctic conditions. Later on they sent all kinds of people up there, and there was another reason. You see, the Russians had just kicked the hell out of the Germans under winter conditions, and we could see we would probably have to fight in Siberia some day. I think the second purpose of this expedition was to learn how to operate in the Arctic, so we could fight when we had to. "

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Bill Rex helped make oil field history - he was a "Can Do!" Kansas oil man. The Arctic was open. This was only the first chapter in Arctic oil exploration (Figs. 15, 16).

#### ACKNOWLEDGMENTS

I appreciate the help of AAPG members and explorers George Gryc and Earle Taylor who filled in gaps in Bill Rex's notes and memories and who contributed freely of their own memories and materials. Paul Germann's recollections of the perils of transporting men and materials were of great help. Dr. Vincent

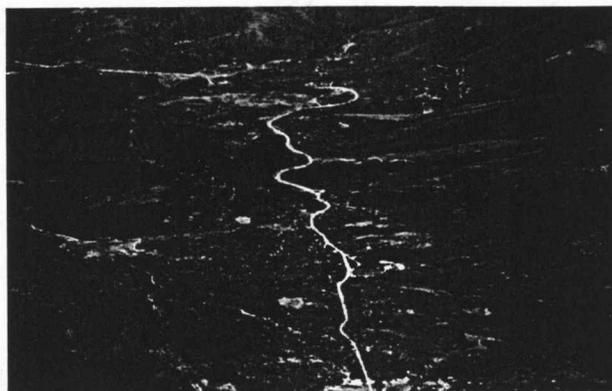


Figure 14. Pipeline route through the Brooks Range. Photo by author.



Figure 15. Alaska glaciers, emblematic of the rigors faced by the 1,058th. Photo by author.

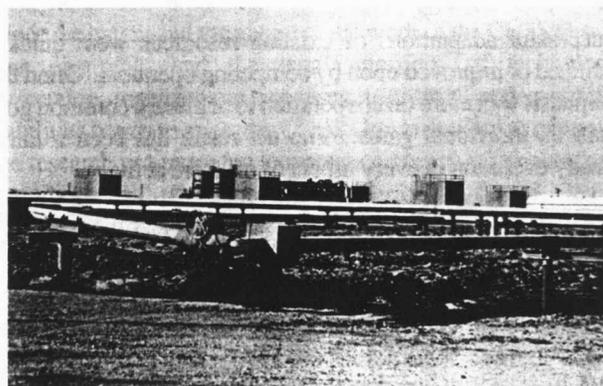


Figure 16. Prudhoe Bay oil field, Alaska, 1994. Photo by author.

A. Transano, Command Historian, Naval Facilities Engineering Command kindly supplied several summary reports that materially assisted my writing of the story. Bill Rex graciously consented to an extensive, recorded, interview and photographic session.

#### REFERENCES

Much of this paper was first published in the AAPG Explorer, v. 15, no. 7, as *Oilman-Seabees Blazed Arctic Trail*. I appreciate permission of the AAPG to republish the original material.