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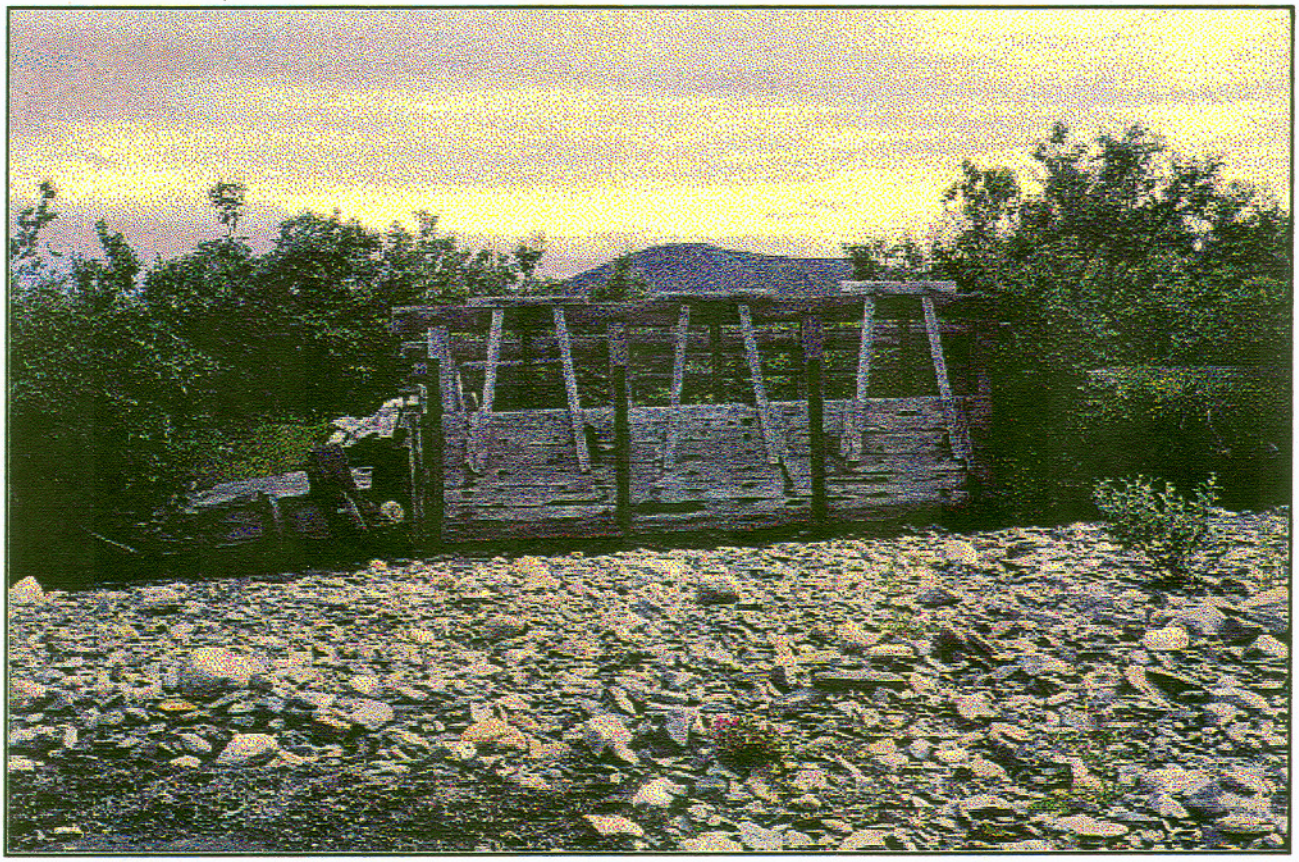
Nome River Water Control Structures

Howard L. Smith



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Author

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Cover Photo: Headgate of the Miocene Ditch on the Nome River, Alaska. Photo by Howard L. Smith

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Abstract

The Fairbanks office of the Bureau of Land Management has reviewed realty actions potentially affecting several major water control structures along the Nome River on the Seward Peninsula. The office has also conducted base-line inventory of other, related structures in the nearby Grand Central River valley. Histories and descriptions of the various ditches, pipelines and related features are presented, and the sites are evaluated for their eligibility for the National Register of Historic Places.

In 1987 two events occurred that focused the efforts of the Kobuk District of the Bureau of Land Management on several historic water works in the Nome area. First, the district's regular program of base line cultural resource inventory occurred in the Kigluaik Mountains north of Nome that year. As a result of this field work, we began to research the history of the Wild Goose Pipeline, a unique wood-stave pipeline constructed in the first decade of the twentieth century to bring water to mining operations near Nome. Realizing that this site was special in several respects, we began to gather the information necessary to nominate it to the National Register of Historic Places.

Second, as the district was working on documenting the pipeline, we received an application from Alaska Gold Company to relinquish the rights-of-way it held on the Miocene and Seward ditches, two of the historic ditches located along the west side of the Nome River. As part of processing this application, it was necessary to conduct research into the history of the ditches, in order to evaluate their significance. These ditches supplied water to the mining operations near Nome, and their history and that of the Wild Goose Pipeline overlap to a significant degree. Consequently, the two projects grew into one.

This report presents the results of historic research and on-the-ground inventory conducted for both of these projects. Somewhat different information was needed for the two projects, so coverage of the ditches and the pipeline is not equal. Far more time was spent on the ground investigating the pipeline, and consequently, it is possible to present much more detailed descriptions of the line and its associated features. Because we contemplated only very localized impacts as a result of accepting the relinquishment of the two ditches, we did not conduct detailed surveys, but relied almost entirely on historic accounts for descriptive material.

The sites described in this report are among the most obvious and impressive of the extant remains of early mining on the Seward Peninsula, and as such, they are clearly deserving of preservation. Because of the linear nature of the sites, they are located on lands managed or owned by a number of different entities, including state and federal agencies, individuals, and Native corporations at both the village and regional levels. Cooperation among these entities will be needed if these important historic remains are to be preserved for the enjoyment of future residents and visitors.

Background

Discovery of Gold

The Nome gold rush began with the discovery of gold on Anvil Creek in 1898. Although there has been long-standing confusion about who can rightly claim to have made the first discovery of gold, it seems fair to attribute the beginnings of the rush itself to those who first staked the rich deposits on Anvil Creek and neighboring streams. Three men, Jafet Lindeberg, Erik O. Lindblom and John J. Brynteson, the three "lucky Swedes," were the first to claim these rich grounds in the Cape Nome mining district, staking claims on Anvil, Snow Gulch, Dry Creek and Rock Creek in September 1898 (Brooks 1908:18).

Almost from the first, however, there were conflicting claims over who had made the first discovery of gold in this area. Several men, including N. C. Hultberg, Brynteson, H. L. Blake and J. L. Haggalin, visited Anvil Creek and the surrounding area in August 1898 while investigating rumors of gold on the Sinuk River. Other individuals may also have been part of this group (Brynteson 1913:23). Becoming storm-bound near the present site of Nome, they prospected along the Snake River and discovered some gold there and on what would later be called Anvil Creek (Brooks 1908:16). Apparently these discoveries were not thought to be significant by most of the party, as no claims were staked. On returning to Golovin Bay, Brynteson organized a second party

consisting of himself, Lindeberg and Lindblom.

This party returned to the Nome area in September, at which time the first claims were staked. The men who thus began the chain of events that would lead to the Nome gold rush were anything but experienced placer miners. Only one of the three had any previous mining experience, and all were recent arrivals in Alaska.

Lindeberg was born in Norway, and came to Alaska in the spring of 1898 with Sheldon Jackson to assist with the acquisition of Siberian reindeer for importation to Alaska. According to Lindeberg, on their arrival in St. Michael they learned of difficulties with Natives in Siberia, making it unwise to send Lindeberg on to his intended post. Jackson allowed Lindeberg to leave government service, at which time he traveled to the recently discovered gold diggings at Council City, where he met Lindblom and Brynteson in August of 1898 (ibid:17). A slightly different account is provided by Kittilsen (1913:17) who states that Lindeberg refused to continue on to Siberia, at which time Jackson discharged him.

Lindblom, the son of a school teacher, was born in Sweden in 1857, grew up there and learned to be a tailor. He emigrated to the United States in 1886, and was in San Francisco practicing his trade at the time of the stampede to the Kotzebue area. He signed on as a crew member of the bark *Alaska* in April of 1898, and on learning that no real discovery had been made in the Kotzebue area, jumped ship at Grantley Harbor. With the help of Promarshuk, a local Eskimo engaged in a trading expedition, he made his way to the station at Golovin Bay and thence to the gold diggings at Council (Harrison 1905:210-211).

John Brynteson was born in Sweden in 1871. He emigrated to the United States in 1887, and worked in the mines of northern Michigan for several years before traveling to Alaska in the spring of 1898. He did a little prospecting in the Fish River area before becoming involved in the early development of the Cape Nome district (ibid:204).

Following the discovery of paying quantities of gold, the three men returned to Golovin Bay, where they revealed their find to several other individuals, including Dr. A. N. Kittilsen and G. W. Price. This larger group then returned to the Nome area, and on October 18, 1898, the Cape Nome mining district was formed, with Kittilsen elected as recorder (Brooks 1908:18). The party stayed in the Nome area until early November, when it became too cold to continue mining. On their return to Golovin Bay word of the discovery began to spread, and the Nome gold rush was underway.

Kittilsen, who was born in Wisconsin in 1870, had been in Alaska since 1896, employed as a physician at the Teller reindeer station (Kittilsen 1913:17). He also acted as assistant superintendent of the reindeer station, first at Port Clarence and later at Unalakleet. At the time Brynteson, Lindeberg and Lindblom returned from their discovery, he had quit government service and was at Golovin Bay (Harrison 1905:215-216).

Price had been part of an expedition to Kotzebue Sound organized by his employer Charles D. Lane, a successful California miner and millionaire. When Lane returned to California for the winter, Price remained behind. Hearing of the strike at Council, he made his way to Golovnin Bay, arriving three days before Lindblom, Lindeberg and Brynteson returned with news of their discovery. Price was the only experienced placer miner in the group and played a major role in establishing the rules of the new mining district (Kittilsen 1913:19). He may also have saved the first locators from their own ignorance, as the initial staking of claims had not been done properly (Cole 1984:23). In January of 1899 it was deemed necessary to begin keeping the records of the new mining district at Nome, and Kittilsen appointed Price as deputy recorder. Price moved to Nome and constructed the first log cabin in the new town (Harrison 1905:214). Price also wrote to Lane in California, informing him of the discovery.

After the new mining district was properly established on October 18, the locators settled down to do what mining and development work they could in the remaining few days before streams froze solid. They spent about a week working on Snow Gulch, finally leaving for Golovin Bay on November 10, with about $1,800 worth of gold (Kittilsen 1913:17).

Events in 1899

Through the winter of 1898-99 there was modest interest in the new find at Nome, with men traveling to the area from St. Michael and the diggings on the Yukon, but with little excitement in the outside world. Brooks estimated the popula-

tion of Nome to have been about 250 by May of 1899, growing to 400 by June (1908:19). Once the richness of the ground at Nome was confirmed by the mining that took place in the early part of the summer, interest in the area increased. Many of the miners along the Yukon joined the first rush to Nome, along with several shiploads of hopefuls from the outside world, increasing the population to nearly 3,000 (ibid).

Among those arriving in 1899 was Charles D. Lane, responding to Price's letter from the previous year. Lane was born in Missouri in 1840, crossing the plains to California with his family in 1852 and settling in Stockton (Harrison 1905:198). He began gold mining at twelve, and pursued this career in Nevada, Idaho, Arizona and California prior to coming to Alaska. At the age of fifty he made a major strike at the Utica Mine at Angels, California, from which millions of dollars were produced (ibid:198-199). He also produced the Fortuna mine in Arizona, another successful operation. He was described as ". . . plain spoken, straight-forward, frank and honest in his methods, and as easily approached by one of the toilers in his mines as by the man of title or wealth (ibid)." Lane and his company, the Wild Goose Mining & Trading Company, were to be a major force in the early development of the Seward Peninsula.

Those who arrived in the early summer of 1899 found that large tracts of land had already been staked through the use of powers of attorney, even though relatively little mining was being done (Trezona 1900:5-6). Brooks (1908:24) estimated that "...as of January 10, 1900, about 4,500 claims were recorded in the Cape Nome district, but probably not more than 50 claims were developed and not more than 100 even prospected." The list of those who did operate in a significant fashion in 1899 contains many familiar names:

> The first gold taken out in any quantity was taken out by G. W. Price, from Anvil Creek. Mr. Price took out $10,000 in eight days in June, 1899, from a space twenty-five feet square and six feet deep. A great deal of work was done by the other locators after this with excellent results. Lindeberg took from his claim (No. 1 below discovery) 10,600 ounces, or almost $200,000, having worked only ten weeks. Dr. Kittilsen took out $150,000 in the same time. Lindbloom (sic) took out over $100,000 from discovery and Lane and Price $125,000 from No. 8 above discovery. On Snow Gulch three claims were worked by the Pioneer Mining Company (Lindbloom (sic), Lindeberg and Brynteson, the owners), and it is estimated that $200,000 was taken from the three [Trezona 1900:7-8].

In 1899 an event occurred that would fundamentally change the nature of the Nome gold rush. Gold was discovered on the beach, where it could be profitably mined by one or a few individuals with simple technology. As word of this spread, a large part of the population took up beach mining with shovel and rocker, removing an estimated $1,000,000 in less than two months (Brooks 1908:22). Tales of the easy pickings on the beaches, in conjunction with the millions taken from a few creeks, laid the ground for the major rush of 1900.

The rush to the beaches also defused growing tensions over the discontent felt by later arrivals who found most of the paying ground already claimed. Brooks estimated that by early July there were probably less than 700 miners engaged in mining, while over a thousand were idle, with no promising ground available. Many apparently questioned the validity of the original discoveries, and promising claims were often staked multiple times by conflicting claimants (1908:20). The miners held a meeting on July 10 and a resolution was presented declaring all previous locations void. Those behind the resolution had men stationed near the original claims on Anvil Mountain, ready to restake them at the sight of a fire signalling that the resolution had passed. A small military detachment from St. Michael arrived in Nome and broke up the meeting prior to the resolution being adopted (Wickersham 1938:339). Resentment over the lack of mining ground would have continued and might have been the source of strife and perhaps even bloodshed, but the news of easy profits to be made on the beaches relieved much of the tension (Brooks 1908:22).

In this first full summer of mining, two developments occurred that were to characterize much of the ensuing period. First, it became apparent that water for working the claims was in short supply on many of the creeks; second, two newly formed companies began to play major roles in the development of the Seward Peninsula.

Charles Lane's Wild Goose Mining and Trading Company, and the Pioneer Mining Company, formed by Lindeberg, Lindblom and Brynteson, began to establish records as important sources

of capital and innovation in the early growth of the mining industry. These two companies would be behind many of the developments on the peninsula for much of the next two decades, and had begun to be major operators already in 1899. For example, one source estimated that the Pioneer Company was responsible for mining about two thirds of the gold taken from creeks in the 1899 season (Trezona 1900:15), and C. D. Lane began the first of many development projects with a proposal to build a large plant to pump water from the Nome river to claims on Dexter Creek (ibid.:8).

Events in 1900

The season of 1900 was dominated by two events: the massive stampede that started the summer, and the scandal involving Alexander McKenzie and Judge Arthur Noyes. When the sea lanes opened to Nome in 1900, hopeful stampeders flooded into the area. According to one source, 15,000 people arrived at Nome within a period of two weeks (Harrison 1905:15). Brooks (1908:25) states that more than 50 vessels had landed at Nome by the first of July, and that the first and second sailings had brought over 20,000 to the area. Whatever the exact figures, the overall effect was that almost overnight a large community developed where less than two years previously there had been only vacant tundra. While many of these hopeful miners concentrated on the beaches in the hopes of quickly striking pay dirt, a number of prospectors spread throughout the peninsula. The first discovery of gold in the Bluestone and Kougarok valleys came in 1900 (Brooks 1908:27).

Throughout 1899 the only genuine authority in Nome was the military; but by the 1900 mining season the United States Congress had established the Second Judicial District, which included the Seward Peninsula, and had appointed Arthur H. Noyes as District Judge. The appointment of Noyes had been the result of behind-the-scenes machinations by Alexander McKenzie, Republican National Committeeman from North Dakota. He had been retained by that faction of Nome miners that had tried in the previous year to appropriate the rich claims on Anvil Creek (Wickersham 1938:346).

McKenzie and Noyes arrived in Nome on July 19, and by the 24th Judge Noyes had appointed McKenzie receiver for five claims on Anvil Creek, with instructions to take over the claims and continue working them (ibid 352). McKenzie didn't even wait until the next day, but gathered his men and went immediately to Anvil Creek, apparently arriving late that night and waking up original claimants to take possession of the properties (Harrison 1905:215).

Opposition to Noyes and McKenzie was led by two men, Charles Lane and Jafet Lindeberg:

> While McKenzie was a powerful man, physically, and had remarkable influence over other men by reason of his pugnacious disposition and fearless entry upon extreme measures, he now found himself face to face, in these cases, with another man of courage—Charles D. Lane, frontiersman and a successful miner from California. Mr. Lane was six feet tall, clean limbed, powerful, quick, and willing to fight in or out of court. Jafet Lindeberg, a former reindeer herder, lacked the physical prowess and courage of Mr. Lane, but he was a shrewd businessman and had an intimate knowledge of the facts relating to the mining locations, and full acquaintance with the witnesses necessary to defend the cases [Wickersham 1938:350].

Resolution of the litigation resulting from McKenzie's appointment as receiver took two appeals to the Circuit Court in San Francisco, and control of the claims and the gold produced from them was not returned to the original locators until the Circuit Court sent a marshal to Nome in October 1900. The marshal had to call upon the army stationed at Fort Davis to retrieve gold deposited in the bank by McKenzie (ibid:355-56). Ultimately, both Noyes and McKenzie were found guilty of various crimes, with the Circuit Court of Appeals referring to their actions as "...high-handed and illegal proceedings...which may be safely and fortunately said to have no parallel in the jurisprudence of this country (ibid)." In a resolution of the Nome Bar petitioning President McKinley to remove him, Noyes was referred to as "...vacillating and dilatory, weak and partial, negligent, careless, and absolutely incompetent..." (Nome Bar Association 1901) .

In 1900 C. D. Lane continued his role as a major developer on the Seward Peninsula, through the Wild Goose Mining and Trading Company and also the Wild Goose Railway Co. (Harrison 1909:66). Despite the uncertainties that must have

prevailed because of the McKenzie receivership, Lane continued with development projects, building a four-mile stretch of narrow-gauge railroad from Nome to Anvil Creek. The Wild Goose Railroad was the first railway constructed on the Seward Peninsula, and its design was of the simplest nature:

> No grading was done. Heavy planks were put down on the muddy and mossy surface of the tundra and on this bed the ties were laid. The rails were rapidly spiked down and the road put into operation. The plank bed steadily sank and often the rails were out of sight for considerable distances, but the trains were kept running, hauling passengers and freight in the daytime and ballast at night [Leedy 1905:50].

Events after 1900

With the resolution of major controversy over title to the rich claims on the flanks of Anvil Mountain, the mining industry on the Seward Peninsula stabilized somewhat, and development continued in a more secure environment. The next few years would see considerable effort and resources devoted to developments in support of mining, including the extension of the railroad up the Nome River valley, the building of a railroad along the Solomon River, and various projects designed to deliver the necessary water to claims in the Nome area.

Charles D. Lane and his family continued to play a central role in developments on the Seward Peninsula for the next several years, and the Wild Goose Mining and Trading Company became one of, if not the largest mining company in the area. Construction on the Snake River pumping plant began in 1901 (Brooks 1908:29), and the plant was formally put on line in August 1902 (Webb 1902:95). It was designed to deliver 4,500,000 gallons of water per day through about four miles of eighteen-inch pipe to an elevation nearly 800 feet above the intake (ibid, Leedy 1905:51). Water from the plant was run through two and a half miles of ditch and flume from the discharge of the pipeline to the Mattie claim, where it was used by a monitor; then run by ditch to No. 8 above discovery on Anvil Creek and used for ground sluicing; then discharged into the creek to be diverted again at the top of No. 7 above and run through ditch and flume to No. 4 above, where it was used one last time (Leedy 1905:51).

The Wild Goose Company was also an important developer in the Council area, where it built seven miles of railroad from Council to the company's claims on Ophir Creek, and constructed nearly 40 miles of ditches (Harrison 1905:68). The company became probably the largest single producer in the Council area, purchasing about nine miles of the rich claims on Ophir Creek (Nome Nugget 1908c).

The Lane family, in the person of Mrs. Anna G. Lane and eldest son Tom T. Lane, were owners of the first producing quartz mine on the Seward Peninsula (Nome News 1903e). Located on Big Hurrah Creek, a tributary of the Solomon River, the Big Hurrah quartz mine was started in 1902 (Harrison 1905:47) and a ten-stamp mill went into production in July of 1903 (Nome News, 1903f). The mill was expanded the next year to twenty stamps (Nome News 1904b), and operated in 1905 (Moffit 1906:137). As of 1906 Big Hurrah was still the only producing quartz mine on the Seward Peninsula (Brooks 1908:38). By 1910 the mine was shut down except for a little winter work (Henshaw 1910a:360).

Tom Lane was one of the early miners in the Kougarok district. He constructed the first long ditch in the region, from the head of Coffee Creek to Dahl Creek (Brooks 1907:169), and built a ditch from Henry Creek to Homestake Creek (ibid:170). He was also responsible for establishing a telephone system in Nome (Harrison 1905:75). One of the original claims on Anvil Creek was staked in Tom Lane's name by G. W. Price (Cowden 1913:5). A second son, Paul, was apparently briefly in the Kougarok country with Tom (Nome News 1905m), and later lost his life in the Susitna area (Nome Nugget 1912b). A third son, Louis, is referred to as 'outside manager' of the Wild Goose Company (Nome Nugget 1903b) and later as manager at the Big Hurrah mine (Nome News 1906b). He later earned some fame as an arctic explorer and master of the *Polar Bear* (Nome Nugget 1911c, 1914b).

In 1905 Charles Lane sold most of his holdings in the Wild Goose Mining and Trading Company, because of dissatisfaction with his partners, although he apparently retained a cordial feeling toward the company (Nome News 1905i, 1905m). The sale occasioned some disagreement within the Lane family, resulting in Tom Lane's filing of a

suit against his father (Nome Nugget 1905c).

Lane's interest in Alaska was not confined to the Seward Peninsula. He expressed an interest in the interior of the state (Lane 1903) and became involved in development of some lode deposits near Seward (Nome Nugget 1905b). Advancing health problems put an end to Lane's active participation in the development of Alaska's mining industry in 1906 (Harrison 1909:552, Nome Nugget 1906a) and he died in Palo Alto, California in May 1911 after a lingering illness (Nome Nugget 1911a).

The Pioneer Mining Company also continued in a preeminent role following the initial Nome gold rush. In 1902 five additional partners or stockholders were added to the company, including J. E. and Eugene Chilberg of Seattle, who were elected secretary and treasurer (Webb 1902:64). The company continued to be a major producer on the Seward Peninsula (ibid:117) and also began acquiring a number of other companies involved in mining or support of the mining industry in the Nome area. In 1903 the Wild Goose Railroad was obtained (Nome Nugget 1903b); in 1904 the Nome Exploration Company was acquired (Nome News 1904a), and by 1905 a "large interest" in the Miocene ditch was added to the company's holdings (Harrison 1905b:92).

The Pioneer company also continued to be heavily involved in development of the area. They introduced the first steam shovel on Anvil Creek in 1904 (Brooks 1905:21) and began construction of ditches in 1905 (Nome Nugget 1905a). By 1914 the list of companies affiliated with the Pioneer Mining Company also included the Moonlight Water Company, which supplied domestic water to the town of Nome, the Pioneer Ditch Company, the Nome River Ditch Company, the Penny River Ditch Company, the Kougarok Mining & Ditch Company, and the Blue Goose Mining Company (Lomen 1914).

Water Control Structures

As gold mining matured on the Seward Peninsula, mining techniques changed from the simple "pick and shovel" approach that characterized the first few years. In part, this was a necessary result of the richest placers becoming exhausted, for only very productive ground could be profitably worked with the simplest methods (Brooks 1908:29). Improvements in mining methods required a larger and more reliable supply of water, and the years immediately after 1900 were characterized by the construction of numerous projects designed to supply water to working mines.

Water was a crucial resource for the mining industry on the Seward Peninsula for several reasons. First, water was used then, as it still is today, to separate the gold from the surrounding soil matrix. Almost all gold placer mining, regardless of what techniques are used to strip overburden or to handle pay dirt and tailings, eventually requires a sluice box of some sort. In this device, the gold-bearing soil is washed across a series of short baffles, usually placed perpendicular to the flow of the water. The gold, being heavier than the surrounding soil, tends to collect in the area between the riffles, while the soil is washed out of the box.

This use of water is consistent for all mining methods, however, and while ditch construction may have been necessary to supply sluicing water to some claims, the demand for water and ditches to deliver it was mostly a result of mining techniques that required the use of water under considerable pressure.

As the richest grounds were rapidly worked out, an inexpensive method for removing overburden became crucial if deposits of poorer quality were going to be mined with a profit. One cheap method of overburden removal was hydraulic stripping, in which water under pressure was used to simply flush the soil overlying pay dirt into the streams and away from the mine site. A head of pressure was achieved by delivering the water to an elevation considerably above the mine, then running the water through pipe down the slope to the mine. At the working end of the pipe a giant or monitor would function much like the nozzle on a garden hose, constricting the flow and thereby creating pressure. The giant or monitor would then be used to direct the stream of water to the point at which it was needed. One advantage of hydraulic stripping over mechanical removal of overburden, in addition to its relative cheapness, is that it can be used on frozen soils. The flow of water then both thaws and removes material overlying pay dirt.

A number of operators on the Seward Peninsula used hydraulic elevators, which also required the use of water under pressure. Elevators were used to cope with the relatively flat topography of much of the mining country on the peninsula.

This lack of relief created problems for early miners because it made it difficult to achieve sufficient grade to operate their sluice boxes and also made disposal of tailings a problem (Harrison 1905b:56). The solution was to construct an elevated sluice box, which was often located on the edge of the excavation, at a considerable height above the pay dirt and running away from the pit. This allowed for enough drop to efficiently run the sluice and also provided for disposal of tailings outside of the excavation where work was taking place. Hydraulic elevators were used to lift the gold-bearing gravels to the height of the sluice box for processing.

The elevator, essentially a long, tapering tube, worked on the venturi principle, whereby passing a stream of water past the lower end of the tube at right angles to the long axis of the tube, creates a pressure differential sufficient to lift a mixture of water and pay dirt up the tube to the top of the sluice box. Photographs of historic mining operations using elevators indicate that pay dirt could be lifted as much as 30 to 40 feet with this technology (Moffit 1906 Plate XIV).

As hydraulic methods of mining began to dominate the industry, water became a crucial resource. Litigation ensued over water rights at the head of the Nome River (Nome Nugget 1904c, 1905d, 1912a) and at Salmon Lake (Nome Nugget 1906g). Control of the ditches and the water they delivered became nearly as important as ownership of the claims themselves. Miners were unable to operate in certain areas until water could be delivered via ditch (Nome News 1903d) and refused to operate because of the high prices charged for water (Nome News 1905c). Congress and the President were petitioned to regulate the "water monopolies" on the Seward Peninsula, and the value of the flow of a single ditch for a season was estimated at $750,000 (Nome Nugget 1906d).

The success of some of the earliest ditches seems to have led to an uncritical approach toward water projects and to construction that was sometimes not justified by the value of the gold to be obtained:

> It appears that the matter of ditch building is overdone in Seward Peninsula. The striking success of several long ditches has led the less conservative and less experienced operators to lose sight of the fact that certain classes of placers can be mined at lower cost by other methods. When thousands of dollars are invested in water conduits to exploit shallow placers, as has been the case in many localities which might have been much more cheaply mined, it is time to call a halt to the injudicious construction of ditches. No one who has watched the maturing of the mining industry in this field will deny the important part which the ditches have played and will play, but it is equally patent that there have been many misapplications of this method of exploitation. This is because the less experienced operators have come to regard the ditch as a panacea for all difficulties in placer mining [Brooks 1908:32-33].

The period of intensive ditch building on the Seward Peninsula lasted for less than a decade. After a survey of the water supplies of the Seward Peninsula in 1908, Henshaw (1909:373) observed a marked decrease in ditch construction over previous years. He attributed this to several factors, including the appropriation of most of the available water, a scarcity of capital resulting from a financial depression, and increased reluctance of investors to become involved in ditch construction because of the failure of many projects. He concluded: "In a survey of the whole peninsula it is difficult to see where more than two or three new ditches could be built that would have a chance of success" (ibid).

Despite this relatively short period, a phenomenal amount of work was accomplished. In less than ten years of construction, hundreds of miles of ditches were built. Harrison (1909:553) lists 42 different ditches on the Seward Peninsula, and credits a single man, C. L. Morris, with building 350 miles of ditches in the years between 1903 and 1907 (Harrison 1907:283-285). Today, remains of the various ditches, flumes and siphons are among the most obvious reminders of the heyday of gold mining on the Seward Peninsula. Those located along the Nome River valley, which were constructed to bring water to the rich claims on Anvil Creek and the surrounding area, were among the largest projects and are also some of the most significant historically.

The Miocene Ditch

Description. The Miocene ditch begins at the Nome River in Sec. 24; T. 7S; R. 33W; just below the confluence of the river and Buffalo Creek (Figure 1). It has the highest elevation of the three long

ditches running along the west side of the Nome River valley, although for a few miles above Dorothy Creek the four-to-five-mile segment of the Campion ditch is located higher on the slope. It is the longest of the ditches in the Nome River drainage, totaling at one time a little more than 50 miles (Purington 1905:124).

The flow of the ditch was augmented by a lateral ditch that diverted water from David Creek on the east side of the Nome River and by branches along Grouse Creek and Glacier Creek. Hobson Creek and a number of other creeks on the west side of the Nome River were interrupted by the ditch and the water of these streams was diverted into the ditch (Henshaw 1909:376). By at least 1907, three small feeder ditches were excavated to divert water from Nugget Creek, Jett Creek and David Creek into the Miocene ditch. Henshaw (1908:273) lists discharge measurements taken on Nugget and David creeks at the "Miocene intake" and further discusses how he calculated the flow of the Nome River at the Miocene intake by subtracting the flows of Nugget, David, and Jett creeks, and adding in the flow of the Campion ditch (ibid:277, footnote a).

The ditch forks a little more than a mile north of King Mountain in Sec. 17; T 10S; R. 33W; one fork running around the east side of King Mountain to supply water to the top of Dexter Creek while the other fork runs around the western side of the mountain to the top of Snow Gulch, in the Glacier Creek drainage (Figure 2). An 1800-foot tunnel was constructed from the Glacier Creek drainage through a low pass into the Anvil Creek drainage, making the Miocene ditch the only one to supply water to the claims on this creek (Purington 1905:126).

The upper and lower portions of the ditch were built to be eight feet wide at the bottom and 11 feet at the top, with a depth of three feet and a grade of four and one-half feet per mile on the top section and six and one-half feet per mile on the bottom section. The middle section of the ditch was built to be 10 feet wide at the bottom and 14 at the top, with a depth of three feet and a grade of 3.37 feet per mile. The ditch was designed to carry 3,000 miner's inches of water, or about 28,500 gallons per minute (ibid:124).

Ditch construction involved a crew of 60 to 70 men and 50 to 100 horses. Total cost of the ditch, including maintenance for four years was in excess of $300,000. Construction generally involved the following process:

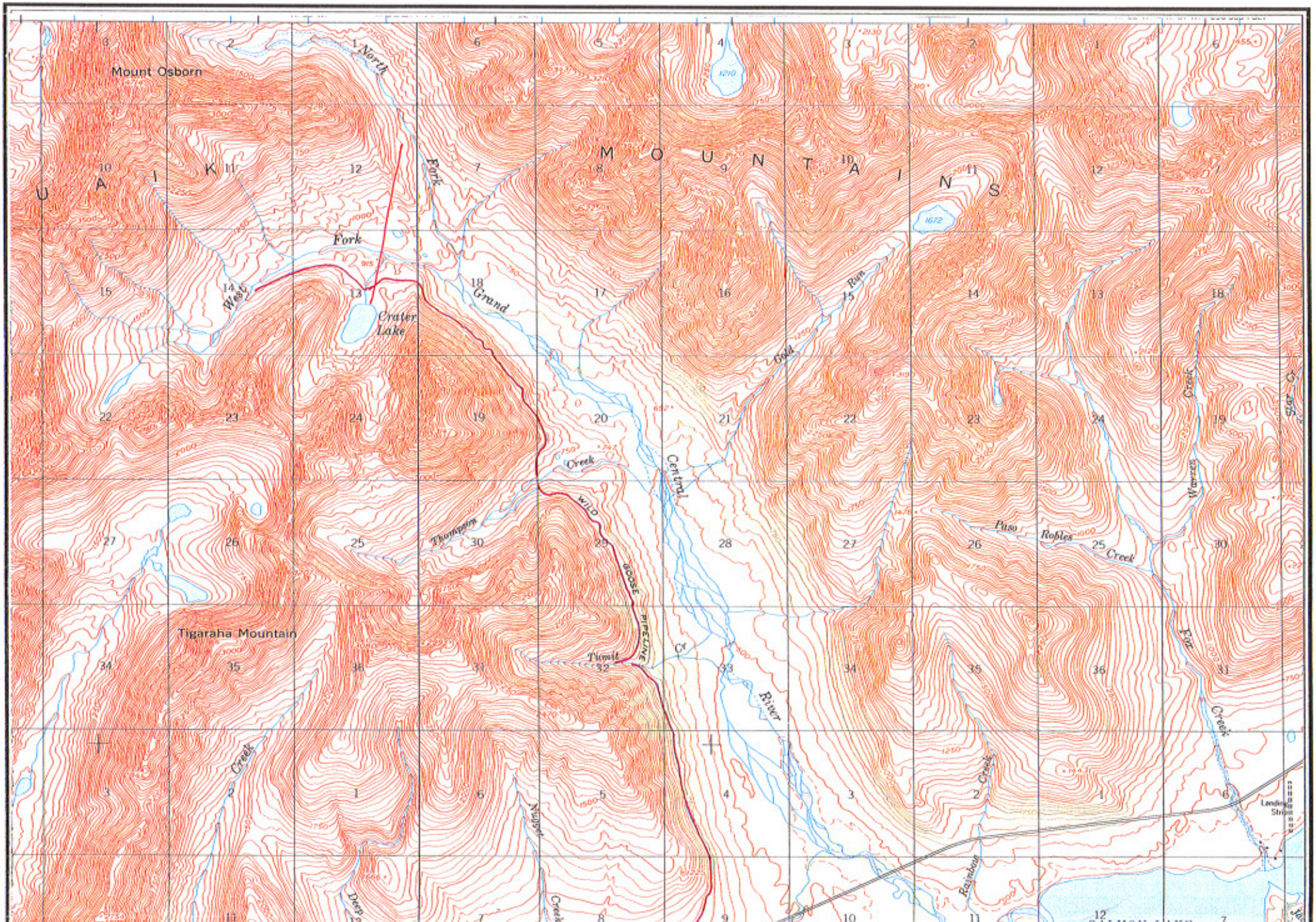
> All being ready, the driver is instructed to plow a single furrow, following as closely as possible from one survey peg to the next following the natural contour of the country. This he does for say a distance of one-half mile, thus establishing the ditch line. The plowing is continued to a width sufficient so that, allowing plenty of slope for the inner bank, the required depth of ditch may be obtained. The grader is next used for the purpose of removing what has been plowed to the outer bank of the ditch. This being done the ditch will look much like a wagon road. Then the plow is used again, plowing as before a single furrow, following as nearly as possible the first furrow plowed, which is plainly visible. This second plowing being done, the scraper is resorted to, and the loose plowed material is scraped from the ditch to the outer bank, building it up. This work is repeated until the ditch is almost completed. All that remains to make an excellent ditch is to level up the bottom and to slope the ditch to required dimensions. This work is done by hand with pick and shovel. [ibid:121]

Problems with permafrost were encountered, and were dealt with in different ways:

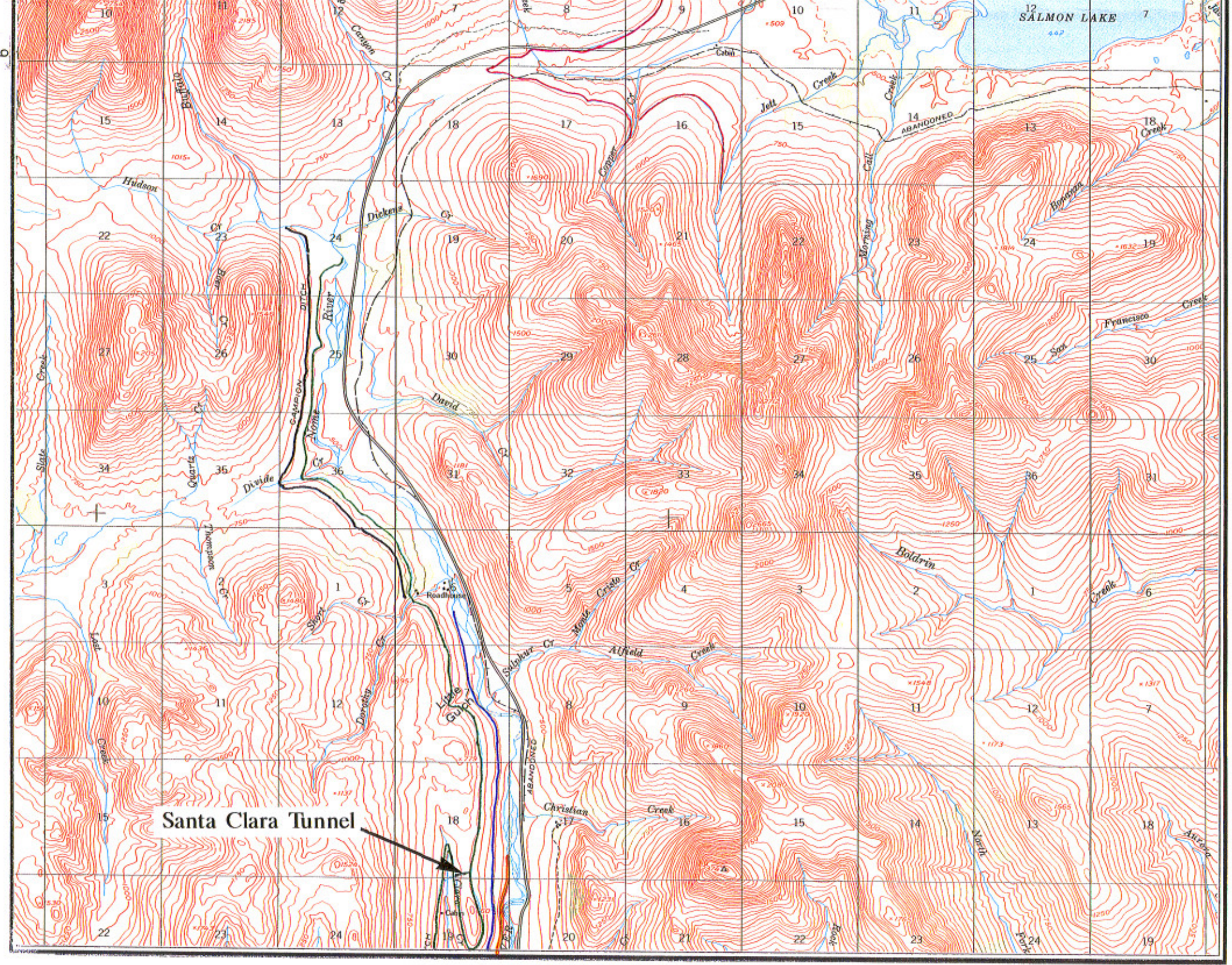
> The difficulties with ground ice were very great. At one place 800 feet of such an ice sheet was found, and here the cost of maintenance is exceedingly high. The only way to maintain the ditch is to haul clay down the ditch in boats and dump it in. It is found that if sufficient clay is dumped on top of the ice it stops thawing, but this operation has to be annually repeated. At another point 1,100 feet of flume (8 feet by 33 inches, with double grade) were built over an ice sheet, and so far the ground has settled very little. [ibid:125].

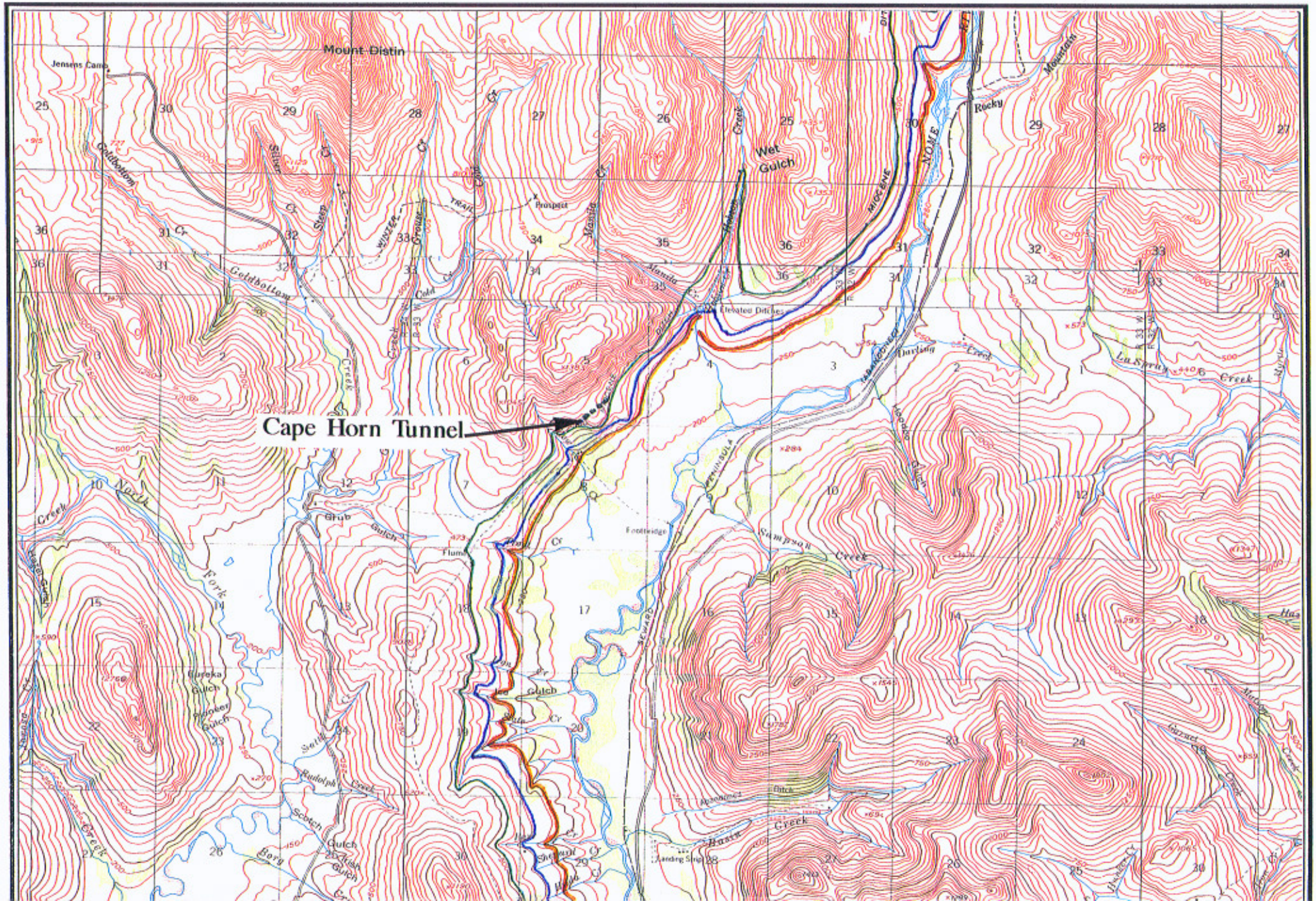
Two inverted siphons were incorporated into the ditch line: one over Manila Creek, for a distance of 1,000 feet, and another at Dorothy Creek, for 300 feet. Around the ridge known as "Cape Horn," $12,000 was spent in blasting and constructing 1,300 feet of rock work (ibid:126).

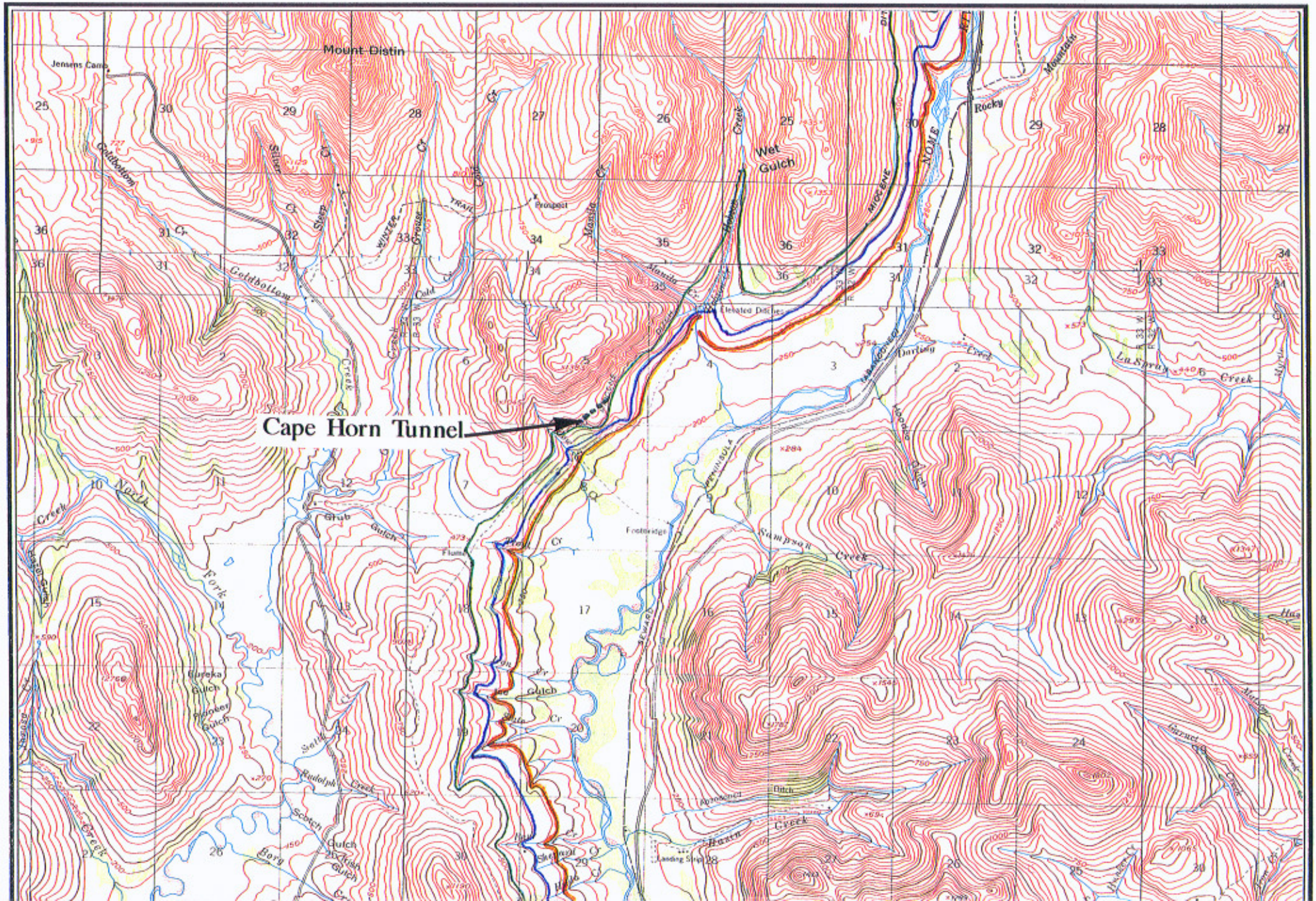
Water from the Miocene ditch was essential for operations on some of the creeks in the Anvil Mountain area. Mining on Dexter Creek, for example, was virtually impossible in 1902 and 1903 until the Miocene Ditch Company had the ditch in working order and was able to supply water to the creek (Nome Nugget 1902d, Nome News 1903d). Water supplied by the ditch allowed for an increased level of production on Dexter Creek

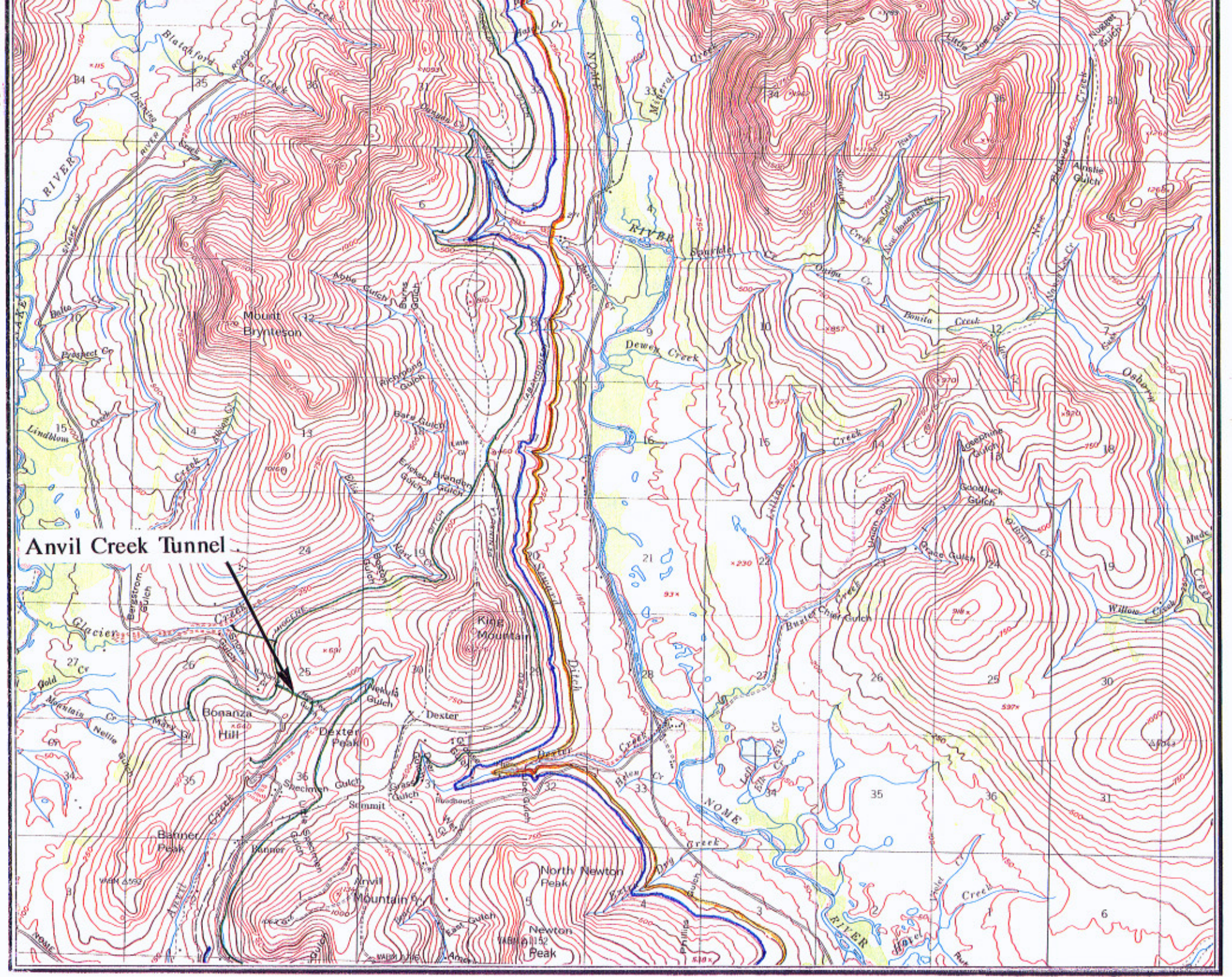


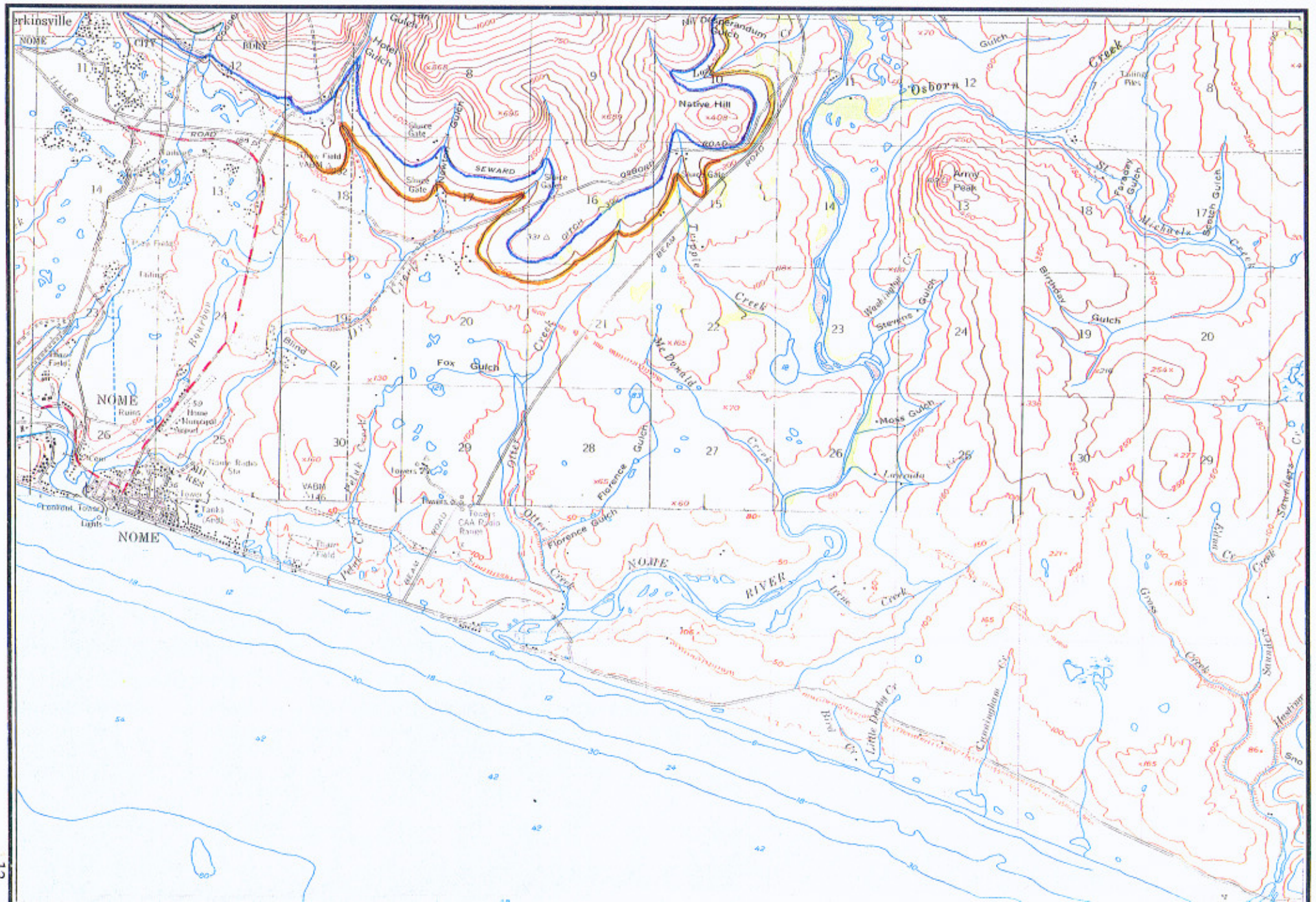
Mount Osborn
U A I K
M O U N T A I N S
North
Fork
West
Fork
Crater Lake
Grand
Gold
Run
Creek
Central
Thompson
WILD GOOSE PIPELINE
Tumit
Cr
River
Paso Robles Creek
Warren
Fox
Creek
Tigaraha Mountain
Creek
Nugget
Creek
Deep
Rainbow
Creek
Landing Strip


Santa Clara Tunnel
SALMON LAKE
Roadhouse
Little Gulch
Hudson
Dickens
David
Divide
Boldrin
Alfield
Christian
Creek
Jett
Morning
Cail
Bonanza
San Francisco
Monte Cristo
Salphur
Dorothy
Thompson
Quartz
Slate
Buffalo
Canyon
Copper
Cabin
ABANDONED
CAMPION DITCH
Nome
River
Cr
North
Aurora


Cape Horn Tunnel
Mount Distin
Jensens Camp
Goldbottom
Wet Gulch
Prospect
Elevated Ditches
Rocky Mountain
Sampson Creek
Footridge
Flume
Grub Gulch
North Fork
Eureka Gulch
Pioneer Gulch
Rudolph Creek
Scotch Gulch
Basin Creek
Landing Strip
Darling Creek
La Spray Creek
Garnet Creek


Cape Horn Tunnel
Mount Distin
Jensens Camp
Wet Gulch
Goldbottom
Silver
Steep
Cr
Creek
Prospect
Elevated Ditches
Rocky
Mountain
NOME
MIOCENE
Darling
La Spray
Sampson
Creek
Footridge
Flume
Grub
Gulch
North
Fork
Eureka Gulch
Pioneer Gulch
Rudolph
Scotch
Gulch
Borg
Basin
Creek
Landing Strip
Ditch
Garnet
Creek


Anvil Creek Tunnel
Mount Brynteson
King Mountain
Bonanza Hill
Dexter Peak
Banner Peak
Anvil Mountain
North Newton Peak
Newton Peak
Glacier Creek
Dewey Creek
Bonita Creek
Osborn
Willow Creek
Buster Creek
Goodluck Gulch
Grace Gulch
Josephine Gulch
Richmond Gulch
Erickson Gulch
Brandon Gulch
Specimen Gulch
Summit
Anvil Creek
NOME RIVER
Seward Ditch
Lindblom
Prospect Cr
Blatchford Creek
Mineral Creek
Alaska Creek
Ainslie Gulch
Nugget Gulch
Little Joe Gulch
Sparkle Cr
Bare Gulch
Abbe Gulch
Burns Gulch
Bergstrom Gulch
Nellie Gulch
Gold Cr
Mountain Cr
Helen Cr
Dog Creek
Phillips Gulch
Chief Gulch
Union Gulch
Lillian Creek
Mud Creek
Havel Creek
Dexter
Roadhouse
Phillips
Lake
Snake River



Nil Desperandum Gulch
Native Hill
Osborn
Creek
Army Peak
Faraday Gulch
Scotch Gulch
Birthday Gulch
Stevens Gulch
Moss Gulch
Lawenda
Turpple Creek
McDonald Creek
Fox Gulch
Florence Gulch
Otter Creek
NOME RIVER
Irene Creek
Little Derby Cr
Cunningham Cr
Grass Creek
Sanders Cr
Blind Gl
Dry Creek
Pelak Creek
Bourbon
Hotel Gulch
Sluice Gate
SEWARD ROAD
OSBORN ROAD
BEAM ROAD
TELLER ROAD
NOME
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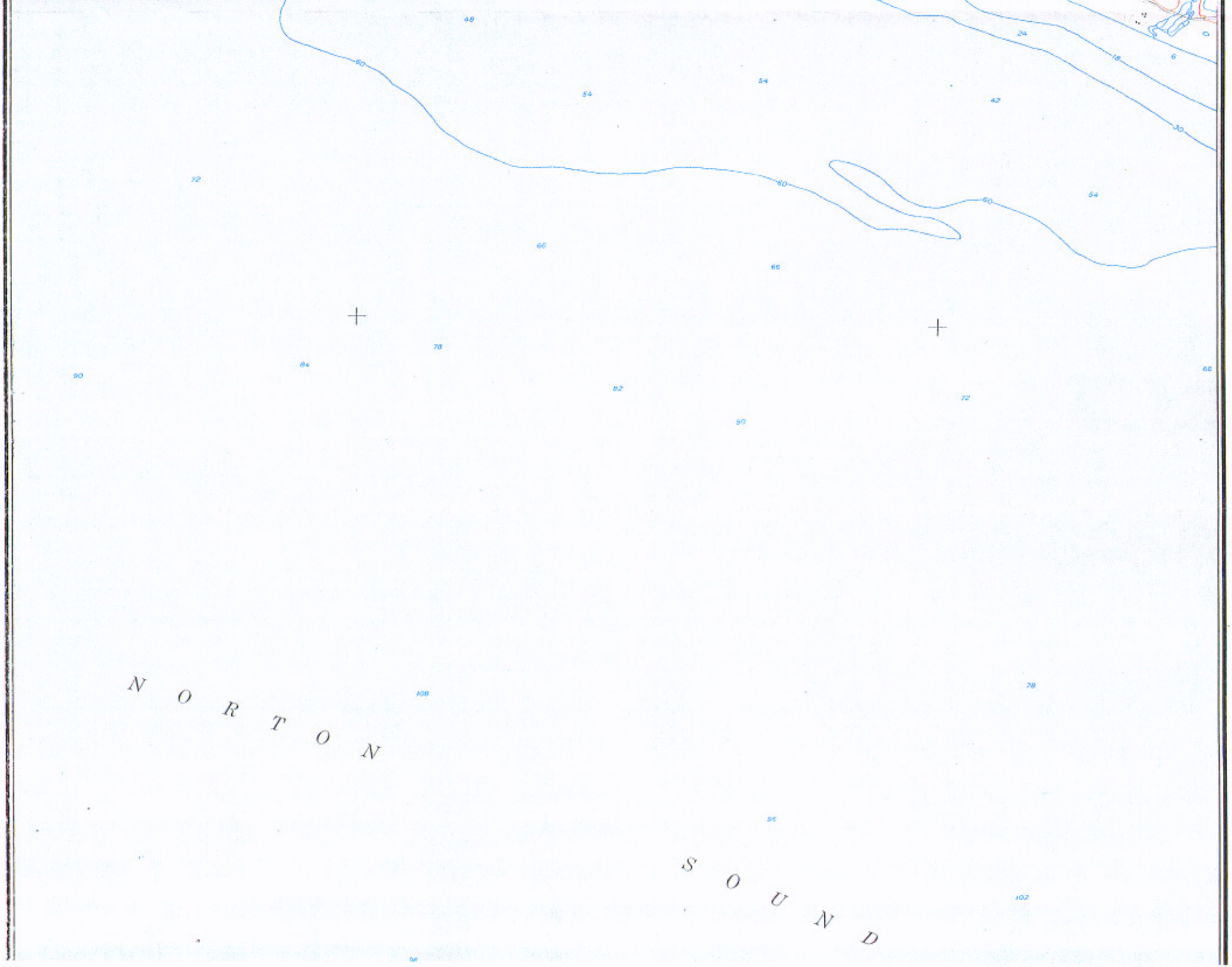
Tanks
Lights
Tower
Towers
Towers CAA Radio Range
Thaw Field
Tailing Piles


NORTON
SOUND

in 1903 and was apparently used by a number of different miners in the area (Nome News 1903c).

During the summer of 1991 the Kobuk District conducted a brief examination of the two tunnels on the Miocene ditch to describe their current condition and to gather photographic documentation. The following description is based on this examination and on information gathered during on-the-ground inspection by district realty staff in 1987.

The Cape Horn tunnel is located in a rocky outcropping approximately one and one-quarter miles southwest of Hobson Creek (Fig. 2). It runs from northeast to southwest and is between 450 and 500 feet elevation. The north end of the tunnel is almost entirely blocked by what appears to be natural collapse of the soils around the tunnel mouth. Enough of the tunnel is buried so as to make it difficult to determine most of the details of its construction, but it is possible to see rough-cut 10-by-10-inch timbers making up both horizontal and vertical timbering. The vertical or near-vertical members appear to be set at intervals of about three and one-half feet. The sides of the tunnel near the northern end are lined with rough planks two and seven-eighths inches thick. There is enough light to see the first 20 to 30 feet of the northern end of the tunnel. Several roof timbers are sagging and at least one has collapsed.

The southern end of the Cape Horn tunnel contains the most observable construction details, as it is only partially blocked by rock fall. A small area of light can be seen from the far end of the tunnel, indicating that it is not completely blocked, although at least two places can be seen where it has partially collapsed. Figure 4 is a schematic sketch showing construction of the southern end of the tunnel. Near-vertical timbers of 10-by-10-inch rough-cut wood are placed at four-foot intervals, supporting horizontal timbers of the same material. On top of the horizontal timbers is a ceiling of what appears to be 2-inch lumber. There is no indication of horizontal planks along the walls of the southern end of the tunnel, although there is some dry rock masonry lining them. The only place where the tunnel was in good enough condition for measurements of the original dimensions to be taken was at the southern end. Here the tunnel measures ten feet wide at the top and twelve feet wide at the bottom.

The Santa Clara tunnel is located in the ridge just east of Clara Creek (Figure 1). It runs almost due east-west at an elevation of between 500 and 550 feet. The tunnel is so collapsed as to make it impossible to discern construction details. The eastern or upstream end of the tunnel is almost completely blocked by slumpage. What little can be seen in the eastern end appears to be very similar to that of the Cape Horn tunnel. About one-third of the way along the length of the tunnel from the eastern end, an 8-to-10-foot section of the tunnel has collapsed, creating a 10 by 15-foot crater in the surface. The western end of the tunnel and about one-quarter to one-fifth of the tunnel have collapsed, precluding any possibility of it being used without significant amounts of excavation.

Chronology. Construction of the Miocene ditch began on July 6, 1901, making it the first of the many ditches constructed on the Seward Peninsula (Purington 1905:124). The first segment of the ditch to be completed was along Glacier Creek (Nome Nugget 1902b) and was used for the first hydraulic mining on the Seward Peninsula, on Snow Gulch (Harrison 1905b:66). The first water entered the ditch on August 15, 1901, and before the season was completed, the ditch had been extended as far as Banner Creek (ibid.).

The ditch was extended to Hobson Creek in 1902 (Nome Nugget 1902a) and to the current head on the Nome River in 1903 (Nome News 1903g, Purington 1905:125). A branch taking water from the Snake River drainage (probably what Henshaw [1909:376] refers to as the Grouse Creek branch) was constructed in 1902 or 1903 (Nome Nugget 1902b, Purington 1905:125). The tunnel through Anvil Mountain to the top of Anvil Creek was begun in 1902 and completed April 20, 1904 (Harrison 1905b:66).

Construction of the ditch system was begun by J. M. Davidson, W. L. Leland and W. S. Bliss (Nome Nugget 1902b), who incorporated as the Miocene Ditch Company the following winter in San Francisco (Nome Nugget 1902c). By about 1905 the Pioneer Company had acquired a significant interest in the ditch (Harrison 1905b:92) and by 1910 owned the ditch outright (Nome Nugget 1910b, Brooks 1911:42).

Beginning in the winter of 1910, the Pioneer Mining Company began to enlarge the Miocene ditch and also started construction to add water from the Grand Central River to the ditch. Part of this project involved excavation of the two tunnels, at Santa Clara Creek and Cape Horn.

The Santa Clara diversion required about 700 feet of excavation, with about 500 feet of tunnel,

while the Cape Horn excavation was over 1,100 feet long with 960 feet of tunnel (Nome Nugget 1910a). Both tunnels were described as being 12 feet wide and six feet high (Nome Nugget 1911b). The Santa Clara tunnel was apparently completed in the spring of 1911, while the Cape Horn tunnel was not finished until April of 1912 (Nome Nugget 1912d).

Steam shovels were used to widen the ditch and two large siphons were installed, one at Hobson Creek and one at Santa Clara Creek (Nome Nugget 1911d). Both of these siphons were completed by early summer of 1912, and construction of a third and larger siphon was begun at this time (Nome Nugget 1912c). Widening of the ditch was undertaken to accommodate anticipated additional water flow from the Grand Central River

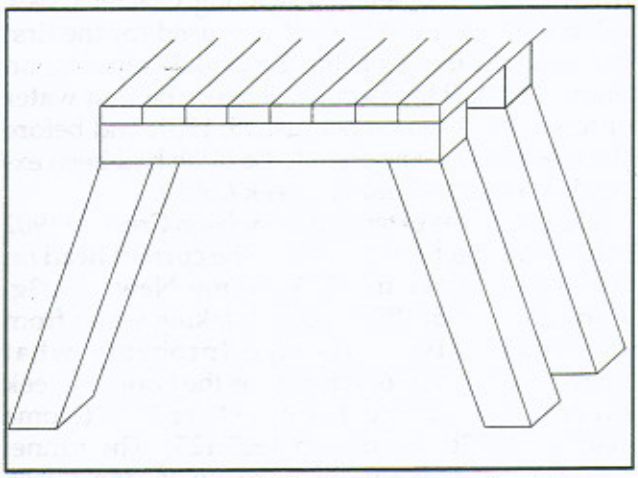


Figure 4. Schematic sketch showing the construction of the Cape Horn tunnel, Miocene Ditch.

drainage (Nome Nugget 1910a).

Specifics about the history of the Miocene ditch are sketchy after the first few years. In 1914, water from the ditch was used for hydraulic mining on Center Creek (Eakin 1915:369), and (Wimmler 1927:53) reports that by the mid-1920s only 40 miles of the original system were still in use, and the ditch had not been cleaned since it was widened in 1910-1912.

Associated People. The individuals primarily responsible for construction of the Miocene ditch were J. M. Davidson and W. L. Leland, who began their cooperative effort in 1900, although they did not incorporate into the Miocene Ditch Company until 1902 (Harrison 1905b:66). W. S. Bliss was also associated with the early days of the company, although Davidson and Leland are credited with conceiving and building the first ditch (Brooks 1908:29). Davidson was responsible for design and construction of the Miocene ditch, while Leland and Bliss apparently were in charge of the company's mining ventures (Harrison 1905:226). The Pioneer Company and its president, Jafet Lindeberg, were also associated with the ditch, particularly the Cape Horn and Santa Clara tunnels and other modifications made in the period from 1910 to 1912. Louis Stevenson, Art Gibson, Arthur Jett and Frank Preseley are credited with on-the-ground responsibility for construction of the tunnels and siphons (Nome Nugget 1911d, 1912d).

J. M. Davidson was born in California in 1853 and arrived in Nome early in 1899 (Harrison 1905:225). He had tried his hand at mining and farming in California, and first came to Alaska in 1898 on his way to the Klondike. He left Dawson and moved to Circle before the end of the 1898 season, working on Mastodon Creek (ibid:225-226). On hearing of the discovery on Anvil Creek near Nome, Davidson took ship on the first steamer down the Yukon, and arrived at Nome on July 4, 1900, spending much of that first season surveying claims near Nome. In September he located a water right on Moonlight Springs, and with financial backing from the Pioneer Mining Company, formed the Moonlight Springs Water Company and constructed the town's first water works.

Davidson was also active in the development of other areas on the Seward Peninsula. By 1904 he had moved into the Kougarok country, forming the Kougarok Mining and Ditch Company (ibid:226) and becoming one of the larger operators in the district (Brooks 1907:170). In 1905 he was constructing a ditch in the Kougarok district (Nome News 1905e) completing about seven miles of it by the end of the 1905 season (Nome News 1905h). Davidson also appears to have enjoyed some prominence outside of Alaska. In 1906 he was appointed by Governor Hoggatt as secretary-treasurer of a committee of Alaskans organized in Seattle for the relief of those impacted by the San Francisco earthquake (Nome Nugget 1906c).

Prior to the extension of the railroad into the Kougarok country, Davidson and Andrew J. Stone established a trans-shipping point on the Kaviruk River, and built a road approximately 40 miles from there to the upper Kougarok (Brooks 1907:170). The location bears the name of

Davidson's Landing on current USGS maps. Sometime later, Davidson moved to the Fairbanks area where he engineered the long ditch on Faith Creek that supplied water to mines at Fox and bears his name today.

One of the other principals behind the Miocene ditch was W. L. Leland. Little information is readily available about his background, but in addition to being involved in the Miocene ditch, he was associated with Davidson in the Topkok ditch (Webb 1902:67). He helped manage the Wild Goose Company's efforts in the Council area at least one summer (Nome News 1906a) and was a major supporter of the extension of the Seward Peninsula railroad to the Kougarok River (Nome Nugget 1906e). He also was involved as an officer of the Candle Ditch Company (Nome Daily Gold Digger 1908). Perhaps his most ambitious project involved an attempt to harness the waters of Salmon Lake to generate hydroelectric power for the Seward Peninsula (Nome News 1906c, Nome Nugget 1906h).

The Seward Ditch

Description. The Seward ditch heads just below the confluence of Dorothy Creek and the Nome River, and runs down the right limit of the Nome River to Dexter Creek, then around the eastern and southern slopes of Newton Peak, to near the headwaters of Tripple Creek, Otter Creek and Dry Creek (Figure 1, Figure 2, and Figure 3). From its intake to Dexter Creek it essentially parallels the Miocene ditch, at an elevation about 100 feet below it. Much of the water the Seward ditch picked up at its intake had been originally diverted by the Campion ditch. A lateral from Hobson Creek also fed water into the ditch (Henshaw 1909:376).

For the first three and one-half miles below the intake it was constructed to be 14 feet wide at the bottom and 22 feet wide at the top (Moffit 1906:141). The remainder of the ditch was constructed to only 10 feet wide at the bottom, with the idea that melting and sloughing would increase the dimensions of the ditch to those of the first few miles. This would have made the Seward ditch larger in cross-section than the Miocene ditch. Apparently construction plans changed, or the expected natural widening of the channel did not occur. Surveys done in 1946 show a typical cross-section for the Miocene ditch of about 18 feet at the top, while the Seward ditch cross-section measures 11 feet (Bureau of Land Management 1946a, 1946b).

Inverted siphons were necessary to cross Hobson Creek and Clara Creek. At Hobson Creek the siphon was 820 feet long and composed of 40-inch pipe; the siphon at Clara Creek was 615 feet long (Moffit 1906:141). Total length of the Seward ditch is about 37 miles (Brooks 1908:36).

Chronology. The Seward Ditch Company was incorporated in 1904 (Nome Nugget 1904c), although the precise date construction of the ditch began is not clear. Construction may have begun in 1904 (Buzzell and Gibson 1986:18) although local newspapers report only preliminary work accomplished by June of 1905 (Nome News 1905f) and Moffit (1907:144-45) states that construction began in 1905.

Early plans called for the ditch to be constructed about 25 miles to Dexter Creek the first year, and then to be extended to Peluk and Saturday Creeks for use on the Seward Ditch Company's mining claims on these drainages. It was expected that about 200 men and 60 horses would be used for ditch construction (Nome News 1905f).

In September of 1905 the Nome News reported that 200 men and 80 horses were hard at work on the ditch, that the upper end of the ditch was complete and it appeared that the goal of completing the ditch to Dexter Creek would be achieved (1905o, 1905a). Moffit (1906:141) reported that 30 of the planned 37 miles of ditch were completed in 1905. According to Moffit (1907:144-45) the ditch was completed in 1906, and used in that year to supply water to claims on the tundra north of Nome.

In 1905 the Seward Ditch Company acquired the rights of the Central Water Company (Nome Nugget 1906f). The Central Water Company began excavation of a ditch in the Grand Central Valley in 1905 to bring water across the divide into the Nome River drainage (Nome News 1905d).

The Seward ditch changed hands sometime between late 1905 and 1908. The Nome News reported in October 1905 that the Wild Goose Company had "...consummated a deal for the purchase of the Seward Ditch Company's property." In 1906 the Wild Goose Company was reported to be planning on finishing construction of the ditch (Nome News 1906a). Apparently the sale did not take place until late 1908 or early 1909, as the Nome Nugget reported that a temporary injunction was issued in September of 1908 blocking sale of the ditch (1908b). Documents filed with the

Nome recorders office show the sale finally taking place in early 1909 (Nome Recorder's Office 1909).

The Seward ditch was used in 1908 and 1909 for mining on Newton Gulch (Nome Nugget 1908d, Henshaw 1910a). The Wild Goose company continued to use the ditch in 1911 (Nome Nugget 1911f), and in 1914 mined Newton Gulch with water from the ditch (Nome Nugget 1914). In 1920 the Seward ditch was sold to Alaska Mines (Nome Recorder's Office 1921).

Associated People. Several notable figures were associated with development and construction of the Seward ditch, including Dr. Cabel Whitehead and John D. Leedy, who were president and general manager, respectively, of the Seward Ditch Company; and Clyde. L. Morris, who was the contractor for ditch construction from Dorothy Creek to Dexter Creek (Nome News 1905f). All three of these individuals were important figures in the history of the Seward Peninsula.

Whitehead, a native Virginian, came to Nome in early 1900 as the representative of the U. S. Mint, to make a report on the new gold fields (Harrison 1905:241-242). During his stay he established and became manager of the Alaska Banking and Safe Deposit Company, and in 1901 resigned from his position with the government to pursue a career in the private sector. He was one of the individuals involved in the Topkuk (sic) Ditch Company, which built one of the earlier ditches on the Seward Peninsula to supply water to claims on Daniels Creek (Harrison 1905b:68).

In addition to being president of the Seward Ditch Company and manager of a local bank, Whitehead was also involved with the Seward Peninsula Railroad (Nome Nugget 1906b, 1906e). Whitehead died in 1908, following an accident on the railroad (Nome Nugget 1908a).

Leedy is credited with being the first person to land in Nome in 1899 (Harrison 1905:208). He was born in Ohio in 1865, and began mining at an early age. He was an experienced miner, having worked in the Black Hills and in British Columbia prior to his arrival in Alaska. He is credited with the staking of the first quartz claim on the Seward Peninsula (ibid). Apparently he had major responsibility for the concept of the Seward ditch, promoting it for some time (ibid). Leedy spent the winter of 1909 mining in Arizona (Harrison 1909:533).

Clyde L. Morris was born in 1876 in Washington and came to Nome in the spring of 1900, at the age of 24. Despite his relative youth, Morris is credited with constructing 350 miles of ditches on the Seward Peninsula (Harrison 1907:283) and of building more miles of ditch in Alaska than any other man (Harrison 1909:519). He participated in the construction of numerous ditches including the Seward ditch, the Buster Creek ditch (Harrison 1907:287), the McDermott ditch (Harrison 1905b:72), parts of the Flambeau-Hastings ditch (Harrison 1905:278), and several others. He also constructed 72 miles of railroad for the Nome-Arctic Railroad, including the bridge over Iron Creek (Harrison 1907:285). The scope of Morris's activities is illustrated by the fact that in 1906 he employed 1,000 men and 250 horses in various construction projects and in 1907 he employed 600 men and 150 horses (ibid).

The Pioneer Ditch

Description. The Pioneer ditch is the lowest of the three ditches running along the west side of the Nome River to the south slopes of Anvil Mountain (Figure 1)*. It essentially parallels the route of the Seward ditch, but about 60 feet lower (Moffit 1906:141). The ditch heads on the Nome River between Clara Creek and Dorothy Creek, about one-quarter mile below the mouth of Christian Creek and runs around the eastern side of Newton Peak to and slightly beyond Dry Creek (Figure 3). Total length of the ditch was about 33 miles (Nome News 1905n). Like the Seward ditch, the Pioneer ditch took water from Hobson Creek by way of a lateral (Henshaw 1910b:388).

It was the smallest of the three major Nome River ditches, with a typical cross-section measuring nine feet at the top (Bureau of Land Management 1946b), as compared to the Miocene ditch at 18 feet and the Seward ditch at 11 (Bureau of Land Management 1946a). Three siphons were constructed as part of the ditch line: one at Hobson Creek that measured 545 feet long, a 1,500-foot long one at Banner Creek, and one across Dexter Creek that measured 755 feet in length (Henshaw 1908:283).

Chronology. The Pioneer ditch was constructed at approximately the same time as the Seward ditch, beginning in the middle of the 1905 season (Moffit 1906:141-142). About eight miles of the ditch were completed in 1905 (ibid), and construction was far enough advanced that the ditch was

** USGS maps have a mistake in naming ditches.*

used to provide water to claims on the tundra north of Nome in 1906 (Moffit 1907:144-145). The ditch was finished in mid-July of 1907 (Henshaw 1908:283).

The Pioneer ditch was used in 1909 on claims between Little and Moonlight creeks (Henshaw 1910a:358-359) and in 1911 for "...ground sluicing and hand mining..." (Nome Nugget 1911e). The ditch was used in 1914 on Center Creek in conjunction with the Miocene ditch (Eakin 1915: 369) and was still being operated in 1915 (Nome Nugget 1915).

Associated People. The Pioneer Ditch Company was the major force behind the development and construction of the Pioneer ditch. The Pioneer Ditch Company was the incorporation of the ditch-building efforts of the Pioneer Mining Company (Lomen 1914), which was formed by the original Scandinavian discoverers of the Anvil Creek claims. Jafet Lindeberg, who acted as president of the company for many years, continued to play an active role in management of the company's mining operations on the Seward Peninsula even after the other discoverers withdrew from active management (Nome Nugget 1914).

The Pioneer Company apparently continued in the mining business in Nome until the early 1920s at which time its holdings were sold to Hammon Consolidated Gold Co. (Cochran 1922, 1923).

The Campion Ditch

Description. The Campion ditch is apparently the only remaining ditch on the west side of the Nome River that was not constructed as a feeder ditch for one of the long ditches. It was originally intended to be a major construction project, and to collect water from "...all the streams at the head of Nome river, the right and center forks of Sinrock, and the upper waters of Grand Central" (Nome News 1903a). It was to be of about the same size as the Miocene ditch in cross section, and to supply water to Dexter Creek (ibid). These plans were apparently never realized, and the ditch is described as being only four miles long in 1908, with its intake on Buffalo Creek about one-half mile above the mouth and its outlet on Dorothy Creek (Henshaw 1909:376; Figure 1).

The fact that the full plans for the Campion ditch were never realized creates considerable confusion in trying to reconstruct what was actually built. Published articles at the time were often based on plans rather than reporting on completed work, and the unrestrained optimism that characterized much of the newspaper reporting of the day undoubtedly led to inaccurate reports. Differences in the place names between then and now make it difficult to determine locations being referenced in early reports, which also adds to the confusion.

Whatever the cause of the discrepancies, several of the published reports are at odds with one another and with USGS maps and on-the-ground observations in the area concerning exactly what may have constituted the Campion ditch "system." For example, a description of Campion's achievements in late 1903 reads as follows:

> This ditch starts at Divide creek, 700 feet above sea level and 75 feet above the Miocene Company's highest intake and running on the left limit of Nome river, tapping McClellan creek, thence around the head of Nome River, down its right limit, tapping Deep Canyon creek, thence to Buffalo, taking 2,500 inches of water 370 feet below the higher ditch, thence tapping Divide creek. An additional supply is taken from Lost creek which is thrown into Thompson creek and from that stream into the debris ditch [Nome News 1903b].

Harrison (1905b:69) also describes "...a ditch line in the shape of a horse-shoe tapping all the tributaries near the head-waters of Nome River." These descriptions simply do not match ditches shown on USGS maps, or what can be observed on the ground in the area.

It may be that various short sections of ditch constructed around the headwaters of Nome River and later used as feeder ditches for the Miocene ditch were initially built as part of the plan for the Campion ditch. Certainly three of these, the Jett Creek ditch, the David Creek ditch and the Nugget ditch could have been part of the system of ditches described in association with the Campion ditch, although Buzzell and Gibson (1986:41, 54) state that they were built by the Miocene Ditch Company. They apparently base this assertion on a map of the ditch system dating to 1929. Considerable doubt is raised about this assertion because no account published at or about the time of ditch construction mentions any of these smaller feeder ditches, and a map of the Miocene ditch published in 1905 (Purrington

1905:124) does not show them as part of the system. Regardless of who originally constructed them, by 1907 they were apparently used only to supply water to the Miocene ditch (Henshaw 1908:273, 277).

There is considerable question, then, concerning what segments of which ditches should be included in the original Campion ditch system, and doubt as to who built the small feeder ditches near the headwaters of the Nome River. The interpretation that seems most consistent with all of the historical reports would be that the Nugget, Jett and David Creek ditches were initially built as part of Campion's plan for an elaborate ditch system. At a later date, either because of a water rights suit initiated by the Miocene Ditch Company, or because of financial problems affecting the Campion Ditch Company, these ditches became part of the Miocene system.

Chronology. The Campion ditch has the distinction of being the second ditch project begun in the Nome River drainage, with initial construction starting in 1903 (Nome News 1903a). By August 1903, reports claimed that six miles of ditch had been constructed, including five miles of 10-foot ditch from Buffalo Creek to Divide Creek (ibid). By October of 1903 it was reported that 15 miles of ditch had been constructed in the area around the headwaters of the Nome River (Nome News 1903b).

Construction of the Campion ditch continued in the summer of 1904 (Nome Nugget 1904a) but apparently ceased after that year, perhaps in part because of a legal battle over water rights with the Miocene Ditch Company (Nome Nugget 1904c, Nome News 1905j, 1905k, 1905l). Reference is made to a Chicago injunction against the Campion Mining and Trading Company (Nome News 1905k), and construction may also have halted as a result of legal problems affecting the company. At any rate, although Campion is reported as building ditch on Osborn Creek the following year (Nome News 1905b), there is no mention of his doing any additional work on ditches in the headwaters area after 1904.

Associated People. The only name associated with the Campion ditch is that of T. A. Campion. Beyond his being an early developer and originating and producing financing for one of the most ambitious ditch projects in the Nome area, we know very little about Mr. Campion. The Campion Mining & Trading Company is briefly mentioned in 1908, having been granted a temporary injunction postponing the sale of the Seward ditch to the Wild Goose Company (Nome Nugget 1908b).

The Wild Goose Pipeline and Highland Ditch

Description. Although the Grand Central River is not part of the Nome River drainage, but is a tributary to the Pilgrim River, it is proper to deal with water developments in this area along with those on the Nome River. Developments in the Grand Central area were intended to divert water into the Nome River basin, and are thus best understood in conjunction with the Nome River ditches.

There are, or were, two different developments in the Grand Central valley. The first was a ditch intended to divert water across the low divide into the Nome River to increase flows available for the ditches that took water from the Nome River. This ditch has been variously referred to as the Nugget ditch (Buzzell & Gibson 1986:18-19) or the Highland ditch (Nome News 1905p). It is described as having its intake at the forks and being eight feet wide at the bottom with five-foot banks (Henshaw 1910b:388). It runs along the right limit of the Grand Central valley and is located about 50 feet below the Wild Goose Pipeline in areas where the two occur together (Figure 5).

The second development in the Grand Central valley is the Wild Goose Pipeline, also referred to as the "High Pipe Line" (Nome Recorder's Office 1909, 1921, 1946). The Wild Goose Pipeline is unique in the Nome area, and perhaps in the entire Seward Peninsula in that it was intended to be more than an open ditch system using pipe only at inverted siphons, as had been done with the Nome River ditches. The original plan for the Wild Goose Pipeline was to construct nearly 60 miles of pipe to bring most of the waters of the Grand Central River to the tundra claims near Nome (Brooks 1907:145).

Buzzell and Gibson 1986:53-54) describe the Nugget ditch in the following terms:

> The Nugget Creek Ditch is located on the west side of the valley of the Grand Central River. This ditch had its intake at the West Fork of the Grand Central River. It also took in water from nearby Crater Lake. The ditch carried this water south around

the west side of the valley of grand Central River through a covered pipeline. This feature, which was built high on a steep slope, was constructed of lumber. It is sometimes referred to as the Wild Goose Pipeline.

Once again, there is some confusion over developments near the headwaters of the Nome River. No source we have checked in the period from 1900 to 1915 applies the name "Nugget Ditch" to any of the developments in the Grand Central valley, and sources are abundantly clear that the pipeline and the ditch were two separate and distinct developments. Although construction on the two developments occurred at approximately the same time, the ditch was excavated by the Miocene Ditch Company, and the pipeline by the Wild Goose Company (Henshaw 1908:283).

There was a Nugget ditch, and it is clear from historical sources that it diverted water into the Nome River for use by the Miocene ditch (Henshaw 1908:277). However, it seems doubtful that it was ever completed to the extent described by Buzzell and Gibson. All the sources researched for this project speak of the diversion of Grand Central River waters as something yet to be accomplished, and there is little doubt that at least as late as 1912 the Grand Central had yet to be diverted.

Whatever the extent of the Nugget ditch, it seems that three distinct and separate developments have been combined under this name in Buzzell and Gibson's description. The Nugget ditch, Highland ditch and Wild Goose pipeline are three distinct and separate developments, each with their own history, and it is not accurate to describe these developments as one.

Since 1987, the Kobuk District has recorded a number of historic remains associated with water developments in the Grand Central River valley. The following descriptions are based on these on-the-ground inventories.

The pipeline actually consists of three distinct lines: two smaller lines that run from high on the two forks of the river to the vicinity of Crater Lake, and a larger segment of line that runs from Crater Lake down the Grand Central valley (Figure 5). Apparently the plan was to use the lake as a holding pond, supplying it with water through the two smaller feeder lines, then removing water from the lake via the larger line.

Feeder line #1, which runs east-west along the main stem of the Grand Central River to the west of Crater Lake, begins approximately one-quarter mile below a cirque lake near the head of the river. The line measures 30 inches in diameter, and is composed of 18 staves held together with metal hoops. Each stave is slightly bevelled on the edge and has been dadoed on each end to facilitate end-to-end joining of individual staves.

There is no evidence of an impoundment or headgate near the upper end of the line, which ends at a point 20 to 25 feet above the level of the river, and a stockpile of redwood staves is located near the end of the line. The first few hundred feet of existing line run up the slope from the creek, so that use of the line would have required a siphon or pump of some sort to lift water from the level of the creek.

Feeder line #2 runs more or less north-south along the fork of the Grand Central just to the east of Mount Osborn and is identical in size and construction to Feeder #1. It was designed to cross the river, although there is presently no evidence of a siphon, trestle, or other means of bridging the channel. As with Feeder #1, there is no evidence of an impoundment or headgate at the top end of the line.

Between Feeder #2 and the main line, and about 100 feet north of Crater Lake is evidence of a tent camp, consisting of two rock alignments that appear to mark tent sites along with several associated features (Figure 6). Tent Square #1 measures 31 feet north-south by approximately 19 feet east-west, although the eastern edge of the area is indistinct. Tent Square #2 measures 24 by 18 feet, with a small extension on the southern end measuring six by seven feet. A small (ca. 3' 6") fire pit composed of stones placed in a roughly circular arrangement is located in the southeast corner of Tent Square #2.

Immediately adjacent to Tent Square #2, on the north side, is a rectangular wooden frame measuring 13' 8" by 12' and consisting of seven 2" x 3 3/4" pieces of milled lumber laid on edge with one whole plank and a fragment of another nailed to them near the western edge. This apparently represents the remains of some sort of wooden floor.

About 18 feet west of Tent Square #2 is a second, much larger firepit measuring seven feet, six inches by four feet. It has been dug down to a level about 12 to 18 inches below the surrounding ground surface. One of the metal hoops used to

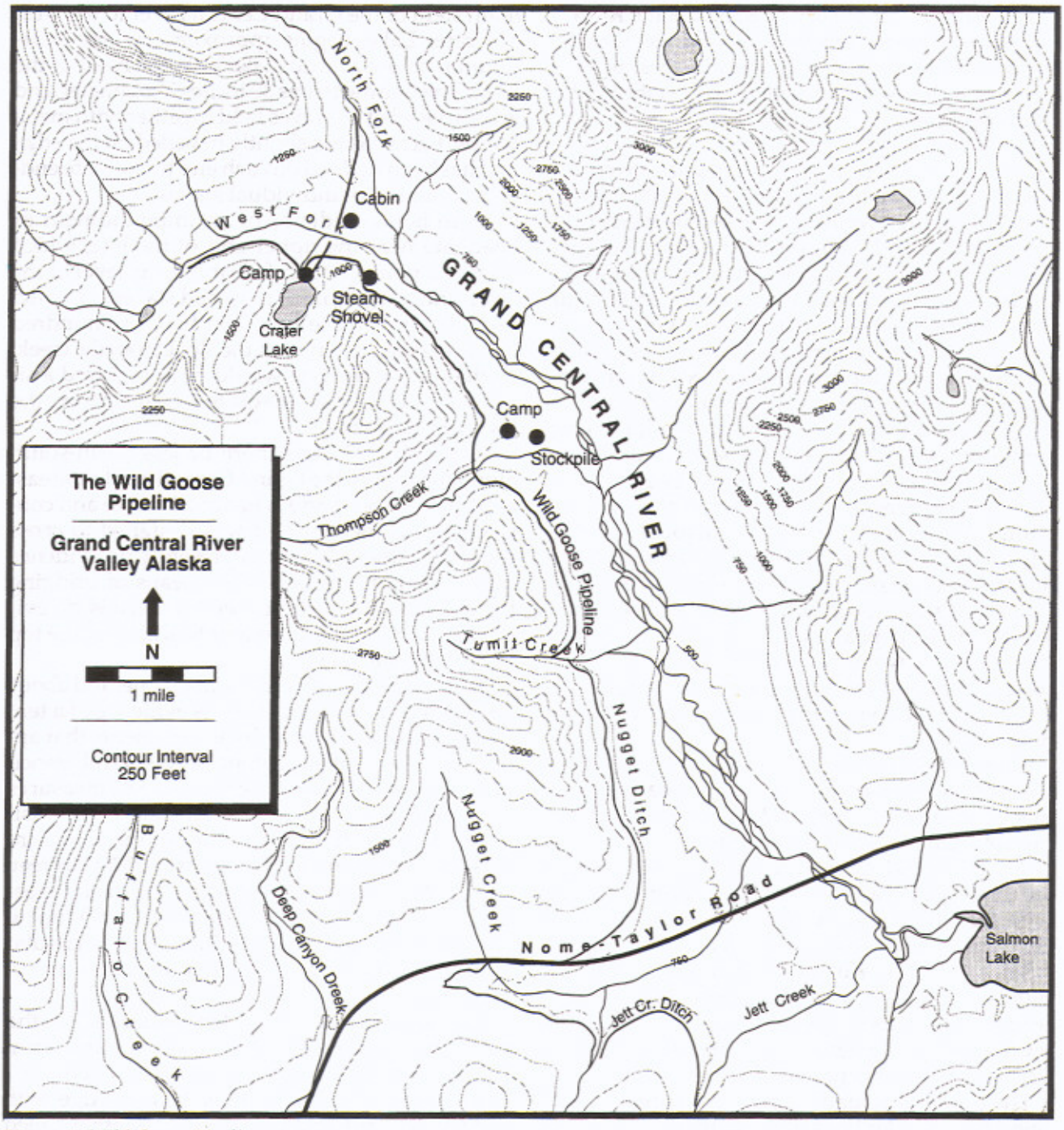


Figure 5. Wild Goose Pipeline.

construct the wood stave pipeline has been bent and placed in the rocks of the firepit to serve as a grate, and several slabs have been placed vertically along the south and west edges of the pit, apparently to provide a windbreak. The two firepits are probably remains of recent camping activity and not part of the original use of the area.

Three distinct midden areas are located in the vicinity of the Crater Lake camp. The first is about 20 feet south of Tent Square #1; a second is about 18 feet west and 25 feet south of Tent Square #2; and the third is about 45 feet north and slightly

west of the wooden frame. Midden materials consist mostly of glass bottle fragments and rusted cans, with some domestic utensils such as a can opener and metal plates and bowls. A single fragment of a kiln or fire-box brick was located to the west of the wooden frame.

The collapsed remains of a wood frame structure are located about 100 feet south of Feeder #2 just to the north of Grand Central River (Figure 7). The structure is so collapsed as to make it difficult to determine the original size and construction, but measurement of floor and roof sections indicate dimensions of about 24 feet 6 inches by 16 feet. It is not possible to determine the number and location of doors and windows. The floor of the cabin was constructed of joists measuring one and seven-eighths by eight and three-quarters inches on top of timbers measuring eight and seven-eighths by seven and one-eighths inches. The floor surface itself consists of planks five and three-quarters inches wide and seven-eighths of an inch thick. Roof and walls of the structure were built of one-and-seven-eighths-by-two-and-three-quarter-inch studs on approximately two foot centers, and the roof was covered with tar paper held in place with roofing nails.

Implements scattered about the vicinity of the structure include domestic items such as knives and forks; metal cups, bowls and plates; and pots and pitchers. Items related to construction of the pipeline are also present, including shovel blades, pick heads and wrenches for tightening the metal hoops. A lantern, stove parts, pieces of threaded pipe and numerous cans and bottle fragments were also observed in the area of the structure. Horseshoes with a single cleat on the front of the shoe were found in this area.

About 41 feet east of the collapsed cabin is a scatter of lumber, including redwood staves, large planks and a small pile of the shake-like pieces used to join the ends of individual staves. An area of about 15 by 19 feet is defined by more-or-less vertical planks on the north and west, and by a low (ca. six-inch) pile of dirt on the south. This may represent the remains of another tent or tent frame, a supposition that is supported by the fact that a metal grommet with scraps of white canvas attached to it was found here. The northern two-thirds of this area are noticeably barer of vegetation than the rest of the area, which might indicate recent use.

A second concentration of lumber is located on the higher ground about 150 feet north of the collapsed cabin. No perceptible pattern could be detected among the material, but there is enough lumber to indicate a stockpile of some sort.

Feeder line #2 in the vicinity of the cabin is constructed as described for the Crater Lake location, except that metal hoops are much closer together, averaging about two to three inches apart. Also, rock has been piled along both sides of the line, burying one-half to two-thirds of the line for much of the distance north of the river.

A ditch begins at the Grand Central in the vicinity of the cabin, in the southern bank of the West Fork. This is apparently the head of the Highland ditch, and the cabin may be associated with the ditch rather than the pipeline.

Another major activity area is located in the vicinity of the mouth of Thompson Creek (Figure 8). There is a large stockpile of material on a low terrace near the mouth of the creek, including several large piles of redwood staves, burst barrels containing a tar-like substance, and the metal pieces for joining ends of hoops together. There is clear evidence of recent activity that has disturbed some of the material piled here: lumber has been piled to form low walls, possibly for a lean-to, and there are one or two fire pits where the redwood lumber was burned.

Another tent camp was located on a knoll on the west side of the material stockpile and on the north side of Thompson Creek. This camp consists of the remains of at least three tents or tent frames, an associated midden, evidence of a telegraph system and a trail carved into the hillside near the pipeline. Tents in this location appear to have been erected in a fashion identical to that located near the intake cabin. Stakes in the corners held vertical planks around the base of at least three walls, and dirt is piled along the outside of the planks.

Tent Square #1 is located closest to the creek, and measures 16 feet by 19 feet. It is the best preserved of the three, showing evidence of foundation planks on three sides and bunks or benches. Tent Square #2 is located approximately 30 feet east of Tent Square #1, and is very indistinct. It is marked chiefly by the mound remaining from the dirt originally piled around the base of the tent. It measures approximately 15 feet by 25 feet. Tent Square #3 is about 25 feet south of Tent Square #2 and is nearly square, measuring about 25 feet on a side. Planks that appear to be remains of a

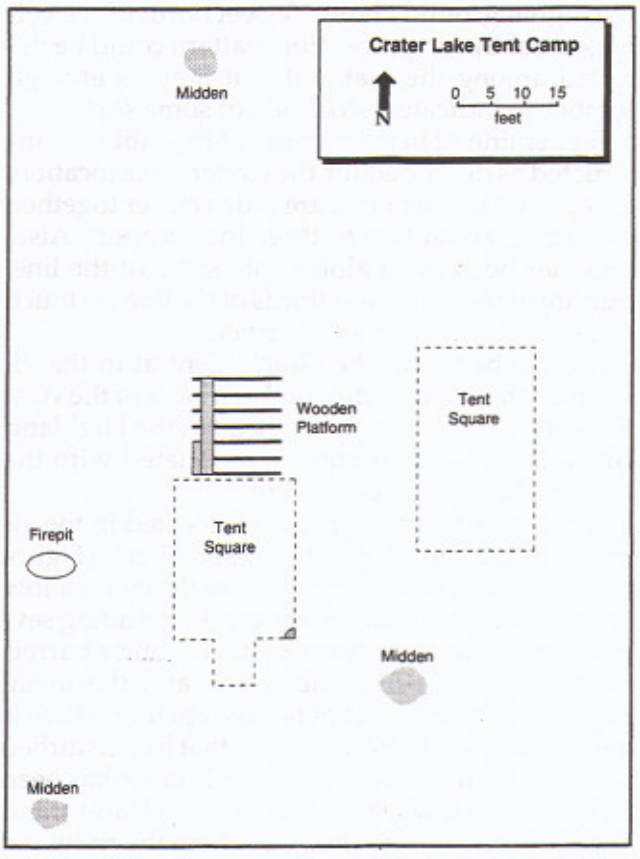


Figure 6. Map of Crater Lake Camp.

wooden floor lie along the eastern edge of the square.

A small midden is located between Tent Square #1 and the creek. As with midden areas in other locations in the valley, midden material is largely bottle fragments and rusted cans. Other implements observed in the area of the line camp include domestic implements and work tools such as enameled metal cups, bowls and basins; and shovel blades, barrel staves and hoops. Sharpened stakes with wire attached and loose wire were also observed.

Running just to the north of the line camp on the hillside below the pipeline is a section of narrow wagon trail cut into the slope of the hill. It measures about two feet in width. The remains of a narrow wagon bed can be seen on the tundra to the east of the line camp.

Located at the base of the talus slope along the right limit of the Grand Central Valley, just above the confluence of the North Fork and the main stem of the Grand Central River, are the collapsed remains of a steam shovel. Identifiable portions of the machine include the boiler, the shovel and what appears to be the framework of the main body. Four wheels are visible, two attached to an axle and two unattached. Miscellaneous pieces of pipe, hose, fittings, sprockets and metal parts are widely scattered about the area.

The boiler measures 37 inches in diameter and seven feet in length, with a smaller (33-inch by 16-inch) sleeve attached to one end. A small (11-inch by 14-and-one-half-inch) hinged door is set in the side, near the end away from the sleeved end. The shovel bucket measures 34 and one-half inches by 28 inches by 24 inches.

The word "Ambria" is stamped into the metal of some of the I-beam members of the steam shovel frame, and the broken fragments of a Stanley© level were recovered from among the rocks of the talus slope. Red-painted wood frag-

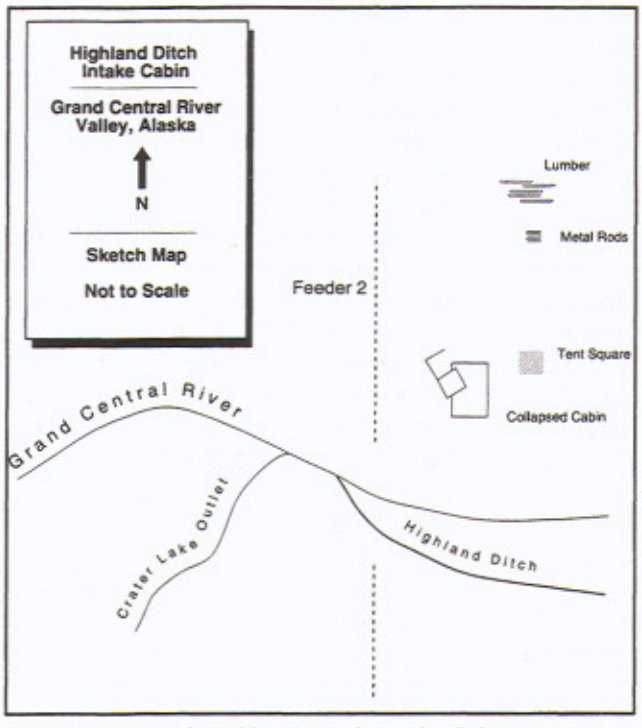


Figure 7. Map of Highland Ditch Intake Cabin.

ments are scattered around the area, presumably from the cabin of the machinery.

Located on the left bank of the Grand Central River just below its confluence with the North Fork is a cache of materials related to construction of the pipeline. Material in this location consists of stacks of metal hoops in two different sizes,

ruptured barrels (some of which contained a tar-like substance), and wood other than staves for the pipeline.

There is scattered evidence, in the form of short tripods with a single cross-piece, of a telegraph or telephone line running up the valley. This line appear to run from the vicinity of the line camp to the intake cabin, or to the camp at Crater Lake, although the entire length of line could not be found.

Chronology. Buzzell and Gibson (1986:19), apparently relying on information on a 1929 map, state that the Nugget ditch was constructed in 1903. This appears to be another example of the confusion resulting from the well-publicized but imperfectly realized plans for the Campion ditch system. Certainly the first accounts that talk of plans to divert water from the Grand Central are attributed to T. A. Campion (Nome News 1903a, Nome Nugget 1903a), but there is little evidence to indicate that he ever started, let alone completed, any such ditch.

The first report of actual construction in the Grand Central valley dates to 1905, when the Central Water Company is reported to have begun construction of a ditch to bring water from the Grand Central River across the divide to the Nome River (Nome News 1905d). Who was behind the Central Water Company is not clear, although there was some speculation that the Wild Goose Company was involved in the ditch construction project (Nome News 1905p). Later in the same year, an article reports that the Wild Goose Company had had "...about 75 men and a large number of teams..." working on the ditch in the Grand Central Valley during the summer of that year (Nome News 1905g).

At about the same time, it was reported that the Seward Ditch Company had acquired the rights of the Central Water Company and planned to spend a considerable amount on its ditch system, including a large ditch from the Grand Central River to connect with the Seward ditch (Nome Nugget 1906f). This was about the same time the Wild Goose Company was buying the Seward Ditch Company, so it may well be that the apparent discrepancy between these two reports is simply a case of different names for the same group of individuals. At any rate, construction of a ditch in the Grand Central Valley was underway in the summer of 1905, although not all of those who would eventually be involved had yet appeared on the scene.

In 1904 and 1905, local courts were involved in a lawsuit over water rights between the Miocene Ditch Company and the Campion Mining and Trading Company. Part of the suit involved water rights to the Grand Central River. An initial settlement of this case, although later repudiated by Campion, apportioned rights to water from the

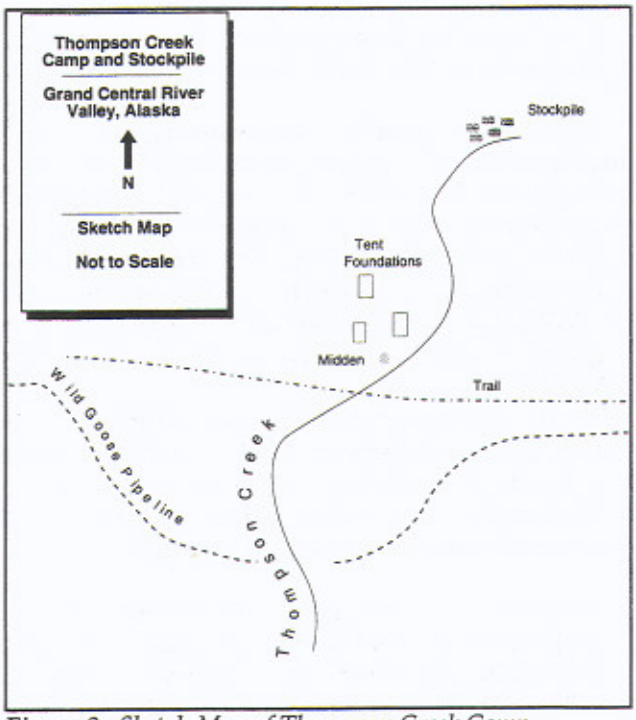


Figure 8. Sketch Map of Thompson Creek Camp and Material Stockpile.

Grand Central River, should it ever be diverted, and also provided that the Campion company would have to reimburse the Miocene company for one-half the cost of any developments necessary to divert water from the Grand Central River (Nome News 1905j). Wording in the settlement makes it clear that by July 1905 water from Grand Central and the David ditch had not yet been diverted to the Nome River.

Thus, in 1905, while construction of the ditch line was underway by the Seward Ditch Co. and/or the Wild Goose Company, two apparently unrelated companies were fighting over rights to the water.

Brooks reported that by the summer of 1906 there were additional developments in the Grand Central drainage:

> A wood-stave pipe line to carry water from upper Grand Central River into the Nome River basin is under construction by the Wild Goose Company. The greater portion of the trench in which the pipe is laid between the intake at Crater Lake and the Nome River-Grand Central divide is completed and about 1 mile of pipe put together. Part of the material for the remainder is on the ground, and more is being taken in this winter (1906-7). This line, if carried to Nome, as is now intended, will furnish water with greater head than any of the ditches yet constructed [Moffit 1907:144-145].

Apparently, disputes over water rights continued to create an adverse situation for water developments in the Grand Central drainage and only a little more work was done in 1907. By this time it was reported that the Miocene Ditch Company had excavated less than a mile of ditch, and the Wild Goose Company had constructed only a slightly longer length of pipeline (Henshaw 1908:283).

Henshaw's report for 1908 does not specify how much, if any, further construction had been done on the ditch and pipeline, but his discussion makes it clear that water had yet to be diverted into the Nome River side of the divide:

> In order to make the waters of Grand Central River available for use near Nome, they must be carried over the Nugget divide, which has an elevation of 785 feet. The diversion must be made about a mile above the forks and 8 or 9 miles of ditch will be required. There are two waterways being built to divert this water—a 42-inch wood pipe line, starting at Crater Lake, with laterals taking water from North Fork at about elevation 1,030 feet and from West Fork at elevation 1,010 feet, and a ditch 8 feet wide on the bottom with a 5-foot bank, having its intake on the forks at an elevation of about 850 feet [1909:380].

In the summer of 1909, almost no work was done on the ditch and pipeline (Henshaw 1910:359), but plans to divert the waters of the Grand Central were still alive. The work done by the Pioneer company on the Miocene ditch in the years 1910-1912 was done to accommodate additional water expected from Grand Central (Nome Nugget 1910a).

The Wild Goose Company continued to work on the pipeline in 1911, completing about five miles of the line. By now the plan to build line all the way to Nome had apparently been discarded in favor of using the pipeline to feed the Seward ditch (Nome Nugget 1911g). Five miles is approximately the extent of pipeline currently existing in the Grand Central valley, and it appears likely that 1911 may have been the last year in which any significant amount of work was done. Certainly there is no more mention of construction in published sources. If this is indeed the last word on developments in the Grand Central valley, then we would expect to find about five miles of pipeline constructed and something less than a mile of ditch.

Both the Grand Central ditch and the Wild Goose pipeline present an unfinished appearance on the ground today. The section of ditch beginning on the West Fork simply ends high on the slope above the river, above where the steam shovel has collapsed, and the pipeline is lacking any impoundment or headgate and ends nearly two miles short of the mouth of the valley. It seems most likely that soon after 1911, as a result of water rights disputes, growing scarcity of capital, and declining gold production, the attempts to divert water across the divide from the Grand Central drainage were simply abandoned.

Associated People. Water developments in the Grand Central Valley are associated with several important historic figures in the history of mining on the Seward Peninsula. Original plans for using Grand Central waters were proposed by T. A. Campion; the first construction involved the Seward Ditch Company, and later stages of construction were carried out by the Miocene Ditch Company (owned by the Pioneer Mining Company at that time) and the Wild Goose Company. Thus virtually all the major corporations involved in Seward Peninsula placer mining were involved to some extent in Grand Central developments.

Significance of the Sites

Criteria for Designation

Federal regulations (36 CFR 60) provide that historic and archaeological sites are deemed to be significant under the law if they possess "...integrity of location, design, setting, materials, workmanship, feeling, and association..." and

satisfy one or more of the following criteria:

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history.

Miocene Ditch

The Miocene ditch appears to have undergone little alteration since its construction in the early years of the twentieth century. The two tunnels at Santa Clara Creek and Cape Horn were constructed in 1910-1912, and the ditch was widened at this same time. Beyond that, alteration of the ditch appears to have been limited to annual cleaning and repair. Maintenance of siphons and flumes may well have introduced materials other than those used originally, but the ditch as a whole appears to be essentially the same as when it was first built. Certainly early maps of the ditch remain accurate as to the location of the ditch and associated structures.

Consequently, the ditch possesses sufficient integrity of location, design, setting, materials, workmanship, feeling and association to qualify it for the National Register of Historic Places. Further, it appears to meet two criteria for eligibility through its association with historic events that made significant contributions to local and statewide history and its association with people who were significant in local and state history.

The critical role of ditches in providing water to allow more efficient hydraulic mining techniques, and the relationship of the Miocene ditch in particular to the important discovery claims near Anvil Mountain, provide a strong tie to historical events associated with gold mining on the Seward Peninsula. Ditch-building was a crucial part of all but the earliest years of mining in the Nome area, and the Miocene ditch was the first to be built and served to demonstrate the benefits of such construction. It played an important historic role in a major aspect of gold mining in the region.

The association with J. M. Davidson is also important. Davidson provided an important impetus to historic events in the Nome area by demonstrating the utility of long ditch projects. He was one of the major developers in the Kougarok district and built the Davidson ditch which supplied water to mines near Fairbanks. He thus played an important role in the development of at least three different mining districts in Alaska. The Miocene ditch, the first of his ditch-building projects, is a significant result of his activities.

In later years the ditch was owned by the Pioneer Mining Company, and modification of the ditch in the 1910s was carried out under the direction of Jafet Lindeberg. This connects the ditch with one of the original claimants on Anvil Creek and one of the most important figures in the early history of the area.

The Miocene Ditch is eligible for inclusion in the National Register of Historic Places due to its association with events that are significant in both state and local history, and also due to its association with J. M. Davidson, an important figure in both state and local history. It does not appear to satisfy criteria "c" or "d."

Seward Ditch

As with the Miocene ditch, the Seward ditch largely retains sufficient integrity of location, design, setting, materials, workmanship, feeling, and association so as to be eligible for the National Register of Historic Places. It qualifies for the Register under criterion "a" because of its association with gold mining, a major historical theme on the Seward Peninsula. It may also qualify under criterion "b" through its association with locally important historical figures, particularly C. L. Morris. Its association with the Wild Goose Mining & Trading Company, one of the two major companies behind much of the development on the Seward Peninsula, may add to its significance. The ditch does not appear to qualify under criteria "c" or "d".

Pioneer Ditch

The Pioneer ditch appears to be eligible for the National Register of Historic Places because it retains integrity of location, design, setting, materials, workmanship, feeling and association; and qualifies for the Register under criteria "a" and

"b". The Pioneer ditch is associated with gold mining, an important historic theme on the Seward Peninsula, and because of its relationship to Lindeberg, Lindblom and Brynteson, is also intimately associated with people that were important in local and statewide history. It does not appear to possess significant architectural qualities as specified in criterion "c" and also does not seem to meet the requirements of criterion "d."

Campion Ditch

The Campion ditch, like other Nome River water control projects, retains integrity of location, design, setting, materials, workmanship, feeling, and association. It qualifies for the National Register of Historic Places because of its association with early gold mining on the Seward Peninsula. However, its role in the history of the area was not nearly as significant as that of other Nome River ditches. The Campion ditch does not appear to satisfy the other three criteria for eligibility. Insufficient information was obtained in the present study to establish that Campion was an important historic figure, and the ditch's association with any other important persons is tenuous at best. The ditch does not satisfy criteria "c" or "d".

Wild Goose Pipeline and Highland Ditch

The water developments in the Grand Central Valley are eligible for the National Register of Historic Places. They retain sufficient integrity of location, design, setting, materials, workmanship, feeling and association, and are associated with early hydraulic mining, an important historic theme on the peninsula. Thus, they qualify under criterion "a". They also appear to qualify under criterion "b" because of their association with historic figures that are locally important. The association with the Wild Goose Mining & Trading Company, the Seward Ditch Company, the Miocene Ditch Company, and the Pioneer Mining Company qualifies the ditch and the pipeline under criterion "b."

In addition, the Wild Goose Pipeline is unique for water developments on the peninsula in that it was the only attempt to construct an entire line out of wood stave pipe. Other ditches used pipe only in siphons. The pipeline also displays a unique symbolism. The miles of pipeline, some of it still standing, that stretch from nowhere to nowhere in the heart of the mountains miles from Nome, express the unfounded optimism the failed hopes, and the brief duration of the gold rush better than any other development. Thus, the pipeline appears to qualify for the National Register under criterion "c" in that it embodies a distinctive method of construction for water developments on the Seward Peninsula.

The Highland ditch does not appear to qualify under criterion "c" and neither the ditch nor the pipeline appear to satisfy criterion "d."

References Cited

Brooks, Alfred H.

1905 Placer Mining in Alaska in 1904. In *Report on Progress of Investigations of Mineral Resources of Alaska in 1904*, by A. H. Brooks et al., pp. 18-31. U. S. Geological Survey Bulletin No. 259. U. S. Government Printing Office, Washington.

1907 The Kougarok Region. In *Report on Progress of Investigations of Mineral Resources of Alaska in 1906*, by A. H. Brooks et al., pp. 164-181. United States Geological Survey Bulletin 314. U. S. Government Printing Office, Washington.

1908 Development of the Mining Industry. In *The Gold Placers of Parts of Seward Peninsula, Alaska*, by A. J. Collier, F. L. Hess, P. S. Smith and A. H. Brooks, pp. 10-39. United States Geological Survey Bulletin 328. U. S. Government Printing Office, Washington.

Brynteson, John

1913 Discovery of Anvil Creek. *The Alaska Pioneer*, Vol. I(4):23-26.

Bureau of Land Management

1946a Right-of-Way Casefile No. F-09113, for the Miocene Ditch. Bureau of Land Management, Fairbanks.

1946b Right-of-Way Casefile No. F-09118, for the Seward Ditch. Bureau of Land Management, Fairbanks.

Buzzell, Rolfe G. and Douglas Gibson

1986 *Nome-Taylor Road: Cultural Resources Survey along Mile 21 to Mile 68, Seward Peninsula, Alaska*. Public Data File 86-5. Alaska Division of Geological and Geophysical Surveys, Anchorage.

Cochran, O. D.

1922 Letter to Thomas Melbourne Reed. Thomas Melbourne Reed papers, incoming correspondence, "C". University of Alaska Archives.

1923 Letter to Thomas Melbourne Reed. Thomas Melbourne Reed papers, incoming correspondence "C". University of Alaska archives.

Cole, Terrence

1984 *Nome: City of The Golden Beaches*. Alaska Geographic #11. Alaska Geographic Inc., Anchorage.

Cowden, Fred R.

1913 Historical Paragraphs, Cape Nome Mining District. *The Alaska Pioneer*, Vol I(4):4-12.

Eakin, Henry M.

1915 Placer Mining in Seward Peninsula. In *Mineral Resources of Alaska: Report on Progress of Investigations in 1914*, by A. H. Brooks et al., pp. 366-373. United States Geological Survey Bulletin 622. U. S. Government Printing Office, Washington.

Harrison, E. S.

1905a *Nome and the Seward Peninsula, History, Description, Biographies and Stories. Souvenir Edition*. Metropolitan Press, Seattle.

1905b *Nome and Seward Peninsula: A Book of Information About Northwestern Alaska*. Metropolitan Press, Seattle.

1907 Ditch Construction at Nome. *Alaska-Yukon Magazine* IV(4):283-286. Harrison Publishing, Seattle.

1909 Nome Issue. *Alaska-Yukon Magazine* VII(6). Harrison Publishing, Seattle.

Henshaw, Fred F.

1908 Water Supply of the Nome and Kougarok Regions, Seward Peninsula, 1906-7. In *Mineral Resources of Alaska: Report on Progress of Investigations in 1907*, by Alfred H. Brooks et al. pp., 272-284. United States Geological Sur-

vey Bulletin 345. U. S. Government Printing Office, Washington.

1909 Water-Supply Investigations in Seward Peninsula, 1908. In *Mineral Resources of Alaska: Report on Progress of Investigations in 1908*, by A. H. Brooks et al., pp. 370-401. U. S. Geological Survey Bulletin No. 379. U. S. Government Printing Office, Washington.

1910a Mining in Seward Peninsula. In *Mineral Resources of Alaska: Report on Progress of Investigations in 1909*, by A. H. Brooks et al., pp. 353-371. United States Geological Survey Bulletin 442. U. S. Government Printing Office, Washington.

1910b Water Supply Investigations in Seward Peninsula in 1909. In *Mineral Resources of Alaska: Report on Progress of Investigations in 1909*, by A. H. Brooks et al., pp. 372-418. United States Geological Survey Bulletin 442. U. S. Government Printing Office, Washington.

Kittilsen, A. N.

1913 Some of the Early Pioneers. *The Alaska Pioneer*, Vol I(4):17-19.

Lane, C. D.

1903 Letter to James Wickersham. James Wickersham papers, MS 107, Box 8, Folder 6. Alaska Historical Museum, Juneau.

Leedy, John D.

1905 Nome's Advent as a Permanent Mining Field. Chapter VII in *Seward's Land Of Gold*, by L. H. French. Montrose, Clarke & Emmons, New York.

Lomen, G. J.

1914 Retainer Contract between G. J. Lomen and the Pioneer Mining Company. Lomen family papers, University of Alaska archives.

Moffit, Fred H.

1906 Gold Mining on Seward Peninsula. In *Report on Progress of Investigations of Mineral Resources of Alaska in 1905*, by Alfred H. Brooks et al., pp. 132-144. United States Geological Survey Bulletin 284. U. S. Government Printing Office, Washington.

Nome Bar Association

1901 Resolution. Lomen family papers, Box 6, Folder 113. University of Alaska archives.

Nome Recorder's Office

1909 Indenture between Albert Fink and the Wild Goose Mining and Trading Co. dated January 30, 1909. Nome Recorder's Office, Vol. 186, p. 147. Document No. 47878.

1921 Indenture between Wild Goose Mining and Trading Company and Alaska Mines Corporation dated February 10, 1920. Nome Recorder's Office, Vol. 204 p. 354.

1946 Indenture between Seward Ditch Company and Albert Fink dated 7 October 1907. Nome Recorder's Office, Vol. 225, p. 85, document No. 84978. Photocopy.

Purington, Chester Wells

1905 *Methods and Costs of Gravel and Placer Mining in Alaska*. U. S. Geological Survey Bulletin 263, Washington.

The Nome Daily Gold Digger

1908 Mining Edition. October. Nome, Alaska.

The Nome News

1903a Campion's Big Ditch. 18 August. Nome, Alaska.

1903b Campion's Big Ditch. 23 October 23. Nome, Alaska.

1903c Much Work on Dexter. 1 September.

Nome, Alaska.

1903d Operations Suspended. 26 June., Nome, Alaska

1903e Planning for Winter. 10 November. Nome, Alaska.

1903f Stamp Mill Begins Work. 17 July. Nome, Alaska.

1903g The Ditch Companies. 17 July. Nome, Alaska.

1904a Makes a Big Change. 4 March.Nome, Alaska.

1904b Will Double Capacity. 14 June. Nome, Alaska.

1905a Are Still Working. 22 September. Nome, Alaska.

1905b Campion Ditching. 18 August. Nome, Alaska.

1905c Dexter Has Troubles. 4 July. Nome, Alaska.

1905d From Grand Central. 15 August. Nome, Alaska.

1905e From the Kougarok. 25 August. Nome, Alaska.

1905f Greatest of Ditches. 20 June 20. Nome, Alaska.

1905g Have Been Very Busy. 13 October. Nome, Alaska.

1905h Kougarok Ditches. 13 October. Nome, Alaska.

1905i Lane Sells Out. 2 June. Nome, Alaska.

1905j Miocene vs. Campion. 28 July. Nome, Alaska.

1905k Miocene vs. Campion. 5 September. Nome, Alaska.

1905l Miocene vs. Campion. 22 September. Nome, Alaska.

1905m The Lane Family. 7, July. Nome, Alaska.

1905n The Pioneer Mining Co. 13 October., Nome, Alaska.

1905o Beyond the Divide. 8 September. Nome, Alaska.

1905p Will Be Big Thing. 18 August. Nome, Alaska.

1906a Hydraulic Elevators. 1 May. Nome, Alaska.

1906b Running Quartz Mill. 20 February. Nome, Alaska.

1906c W. L. Leland Raises $500,000 in New York. 16 March. Nome, Alaska.

The Nome Nugget

1902a In Two Weeks. 30 July. Nome, Alaska.

1902b Miocene Co.'s Big Ditch System. 4 October. Nome, Alaska.

1902c Two Big Projects. 7 June. Nome, Alaska.

1902d Water is Coming. 16 July. Nome, Alaska.

1903a Another Big Ditch Planned. 29 August. Nome, Alaska.

1903b Wild Goose Railroad. 17 June. Nome, Alaska.

1904a A Ditch System. 2, July. Nome, Alaska.

1904b An Extensive Ditch System. 8 October. Nome, Alaska.

1904c Water Rights. 10 August. Nome, Alaska.

1905a A Company that Does Things. 8 July. Nome, Alaska.

1905b Chas. Lane Bonds Claim for $400,000. 2 December. Nome, Alaska.

1905c Son Sues his Father. 3 June. Nome, Alaska.

1905d Water Case Again On. 16 September. Nome, Alaska.

1906a A Newsy Letter. 22 March. Nome, Alaska.

1906b A Railroad from Nome to Kougarok. 26 April. Nome, Alaska.

1906c Alaska Relief Committee Named. 24 April. Nome, Alaska.

1906d As to Water Monopolies. 13 February. Nome, Alaska.

1906e Railroad from Nome to the Kougarok. 6 March. Nome, Alaska.

1906f The Seward Ditch Company. 11 June. Nome, Alaska.

1906g Waters of Salmon Lake Subject of Litigation. 17 May. Nome, Alaska.

1906h Will Build a Big Power Plant. 11 January. Nome, Alaska.

1908a Dr. Cabel Whitehead is Dead. 7 Sep-

tember. Alaska.
1908b Orders Sale Seward Ditch Postponed. 15 September. Nome, Alaska.
1908c Wild Goose Mining & Trading Company. June. Nome, Alaska.
1908d Will Wash Newton Gulch by Acres into the Valley. 29 June. Nome, Alaska.
1910a Pioneer Mining Co. Working on Tunnels. 19 November. Nome, Alaska.
1910b Working on Miocene Ditch. 22 June. Nome, Alaska.
1911a Chas. D. Lane Passes Away. 27 May. Nome, Alaska.
1911b Dogs Furnish Motive Power. 1 May. Nome, Alaska.
1911c Louis Lane Sails Soon. 9 May. Nome, Alaska.
1911d Pioneer Doing Good Work Near Hobson. 29 August. Nome, Alaska.
1911e Pioneer Mining Co. Busy. 16 June. Nome, Alaska.
1911f Wild Goose Closes Ditch. 3 October. Nome, Alaska.
1911g Wild Goose Company Doing Much Work. 22 July. Nome, Alaska.
1912a Miocene Sues Goose for $1,500,000. 6 September. Nome, Alaska.
1912b Paul Lane Buried Seward. 11 April. Nome, Alaska.
1912c Pioneer Mining Company to Construct Huge Siphon. 8 May. Nome, Alaska.
1912d Tunnel Crews Meet in Cape Horn Drifts. 13 April. Nome, Alaska.
1914a News Notes. 16 July. Nome, Alaska.
1914b News Notes. 26 September. Nome, Alaska.
1915 News Notes. 7 June. Nome, Alaska.

Trezona, C. E.
1900 *Cape Nome and the Northern Placer Mines*. Denny-Coryell Co., Seattle.

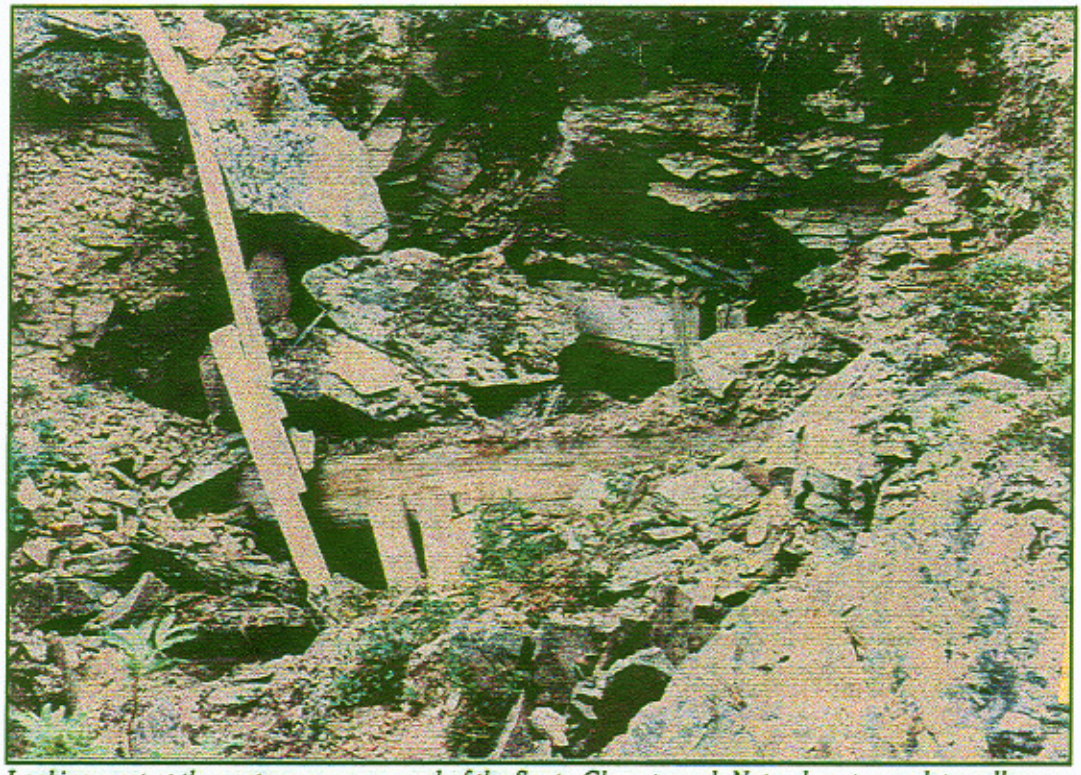
Webb, John Sydney
1902 Scrapbook. Alfred Hulse Brooks papers, University of Alaska Archives.

Wickersham, James
1938 *Old Yukon: Tales Trails and Trials*. West Publishing Co., St. Paul.

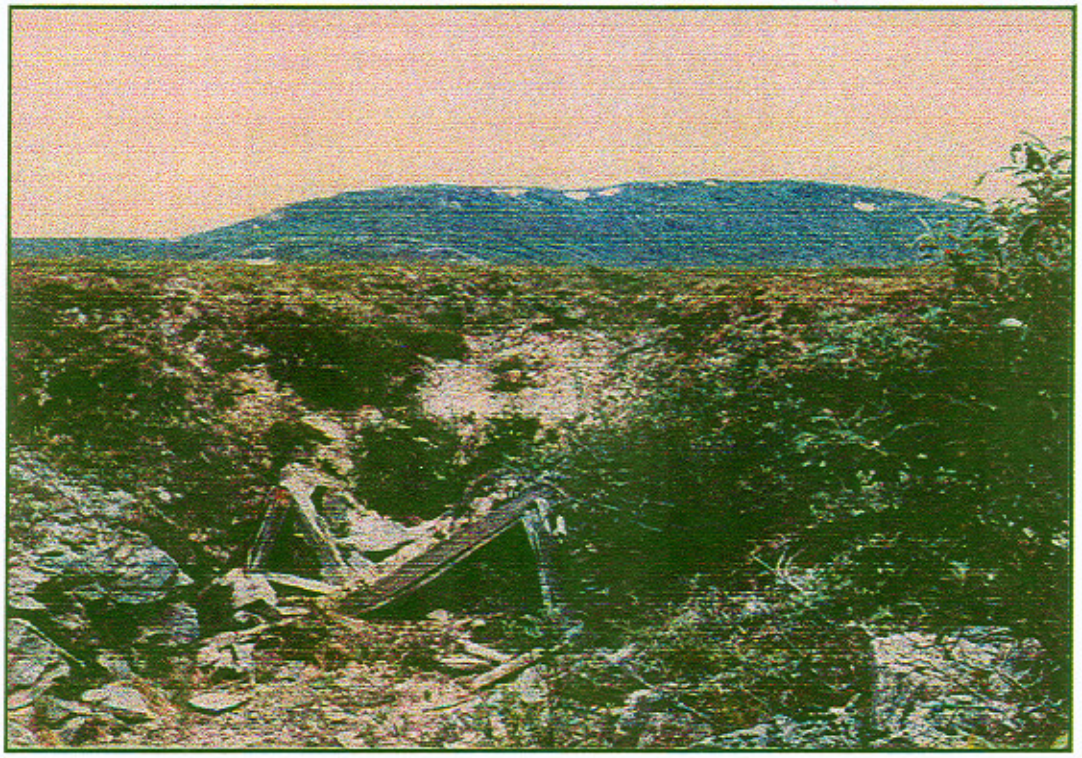
Wimmler, Norman L.
1927 *Placer-Mining Methods and Costs in Alaska*. Bureau of Mines Bulletin 259. U. S. Government Printing Office, Washington.

Appendix 1

Consultation under Section 106 of the National Historic Preservation Act with respect to the Nome River ditches was completed in 1992, at which time the Alaska State Historic Preservation Officer agreed with BLM's evaluation of the sites' eligibility. It was not until later that all issues involved in the request for relinquishment of the rights-of-way on the ditches were resolved. Consequently, it was not until 1995 that Alaska Gold Company completed the sealing of the Cape Horn and Santa Clara tunnels on the Miocene Ditch, and the case files on these two historic ditches were closed. The following photographs of the two tunnels were taken in 1991, and are presented here to document the condition of the tunnels prior to their being sealed. BLM has also made other documentation of the ditches available. In 1946 when the United States Smelting Refining and Mining Company applied for the original right-of-way on the ditches, surveys were made and were submitted with the application, becoming part of the case files. Copies of these surveys have been deposited at the Office of History and Archaeology in Anchorage, and the originals have been donated to the University of Alaska archives in Fairbanks. They were cataloged at the library under accession number 96-006, with the title Nome River Ditch Survey Collection.

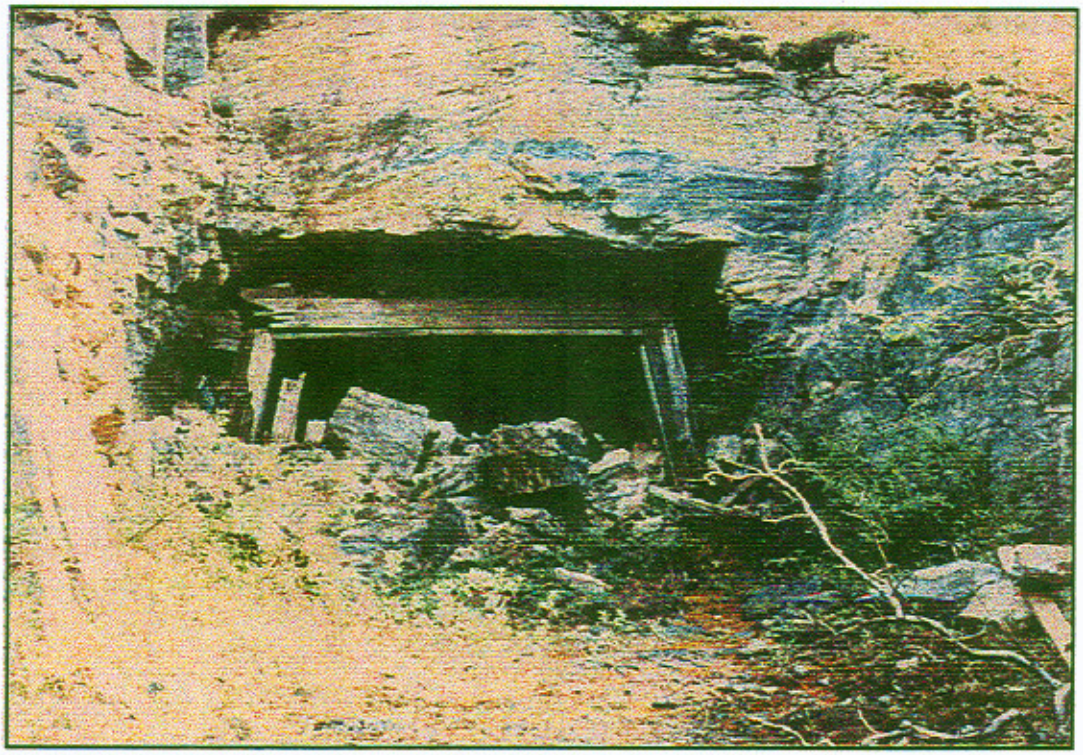


Looking west at the eastern or upper end of the Santa Clara tunnel. Note almost complete collapse of the structure.



Photograph of lower or western end of the Santa Clara tunnel. Note that timbers are broken and that the near end of tunnel is completely collapsed.

North or upper end of the Cape Horn tunnel. Note that the tunnel mouth is almost completely blocked by collapse of the surounding soils and rock.



South or lower end of Cape Horn tunnel. This is the least disturbed of any of the tunnel entrances on the Miocene ditch.

The BLM Mission

The Bureau of Land Management is responsible for the stewardship of our Public Lands. It is committed to manage, protect and improve these lands in a manner to serve the needs of the American people for all times.

Management is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology.

These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness, air, and scenic, scientific and cultural values.