CHRONOLOGY OF CAMP LONELY RECORDS

Nov. 30, 1976 - State to Husky PRP letter to Husky on solid waste.

Dec. 9, 1976 - Husky guidance on spill reporting.

Feb. 16, 1977 - State acknowledgement of solid waste disposal plans.

June 1, 1977 - USGS takes control of Camp Lonely.

July 13, 1977 - State letter to Husky on environmental concerns at Camp Lonely.

Nov. 2, 1977 - USGS letter of intent to obtain a new solid waste permit.

March 29, 1978 - USGS letter and application for solid waste permit.

Aug. 25, 1978 - Solid waste permit issued.

Oct. 13, 1981 - Inventory of drill mud stored at Camp Lonely.

Dec. 5, 1981 - USGS closeout of Camp Lonely.

Sept. 21, 1981 - 2 Geophysical Service Inc. request to lease part of Camp Lonely.

Oct. 8, 1981 - Brewer letter to James Devine on GSI request. And Brewer response to GSI.

Nov. 17, 1981 - GSI letter to USGS Asst. Dir.

Nov. 19, 1981 - Air Force response to GSI.

Apr. 29, 1982 - BLM permit letter to GSI.

June 24, 1982 - BLM letter to Brewer on GSI.

Feb. 23, 1983 - Alaska Report notice of BLM intent to lease Camp Lonely to CIRI.

Aug. 83 - Clean up & Environmental Rehab 1975 - 1982 report.

Aug. 83 - History of the Second Exploration 1975 - 1982 report.

Oct. 5, 1983 - Camp Lonely Support Services Document covering 1975 - 1981.

Jan. 29, 1988 - USAF Point Lonely SRRS Alaska report AR-04

Oct. 12, 1987 - USAF Point Lonely SRRS Alaska report AR-06

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

POUCH O — JUNEAU 99811

CERTIFIED MAIL
RETURN RECEIPT
REQUESTED

November 30, 1976

M.F. Westfall, Exec. V.P. & Opns. Mgr.
Husky Oil NPR Operation, Inc.
3201 C Street, Suite 600
Anchorage, Alaska 99501

Dear Mr. Westfall:

Major solid waste management problems exist on Alaska's North Slope. By this letter, the Alaska Department of Environmental Conservation is informing you that it is initiating the correction of these problems through actions directed at the legally responsible parties--the waste generators. This letter contains an outline of the standards for solid waste processing and disposal that the department is pursuing, and an outline of the responses we expect from you.

The department's standards for solid waste processing and disposal for the North Slope and Arctic development activities are as follows:

1. Solid waste disposal shall be allowed only at facilities with a valid WASTE DISPOSAL PERMIT (Solid Waste Management Permit) issued in accordance with Alaska Statutes, AS 46.03.100-120.

2. Disposal at permitted facilities shall be limited to inert incinerator residue unless otherwise specified in the permit conditions and stipulations.

3. Permits for solid waste disposal sites shall be issued for regional, multiple-user sites only unless extenuating circumstances dictate otherwise. Mobile operators, such as seismic exploration parties, will deposit their wastes in the nearest regional facility or will establish a single, permitted facility if no other is available. Multiple camp activities such as pipeline construction or oil field development shall utilize a limited number of regional facilities as approved and permitted by the department.

4. Waste oils and greases, other petroleum products and petroleum contaminated materials shall <u>not</u> be open-burned or buried, with the exception that spilled oil or oil spill cleanup materials may be open-burned if special permission is previously obtained from this department in each instance.

5. Drums and barrels may not be open-burned or buried. No drums or barrels shall be left for more than ninety (90) calendar days,

after an operator leaves an area or, after an operation is reduced to maintenance or custodial levels.

6. Tires and batteries shall not be open-burned or buried.

7. Waste metals, equipment and rolling stock or parts thereof, camp fixtures, buildings, insulation, wiring, lumber, or other wastes not otherwise specified herein must be disposed of in accordance with specific plans previously approved by the department.

The department policies, schedules, and the actions expected of you for realizing these standards are as follows:

1. Each operating organization shall submit to the department on or before December 31, 1976, a detailed statement of its proposed actions and schedules for meeting the above standards.

2. If the proposed actions require a Solid Waste Management Permit, the submitted statement must include a completed permit application. (An application form is enclosed).

3. All proposals must include a compliance date no later than March 31, 1977.

It should be noted that the department recognizes the North Slope Borough's authority for mandatory solid waste collection and disposal service in Service Area 10, but until such service is initiated, the generator of solid waste is not relieved of his responsibility for its proper disposal.

If you have any questions concerning this letter please contact our Northern Regional Office in Fairbanks. All statements of proposed action and permit applications should be submitted to:

Department of Environmental Conservation
Northern Regional Office
P.O. Box 1601
Fairbanks, AK 99707

We hope these problems can be corrected through cooperative actions, and your efforts will be appreciated.

Sincerely,

Ernst W. Mueller
Commissioner

Brewer
35
000004

M E M O R A N D U M

TO: All Managers December 9, 1976

FROM: M. F. Westfall

I previously issued instructions that all oil spills, regardless of size were to be reported to my office verbally immediately. Either my secretary or I will report to LCDR Corcoran and/or Lt. Goltz and Dr. Brewer. As stated at the time, the purpose is to keep everyone informed so that a small spill cannot be blown into a major catastrophe. Our established procudure would then be followed for confirming in writing and spill for which a written report to the State or EPA is required.

It is important this procedure be followed. Last week we had an incident in which a small spill was reported to me in writing. I was out of the office on Thursday and was too busy on Friday to look at my mail. On Monday I returned to the Slope. As a consequence, the report of the spill was not passed on until Tuesday of this week.

M. F. Westfall

M. F. Westfall

MFW/cs

cc: LCDR Corcoran
Max Brewer
John Schindler

9

Info cy 000005

→ Mat Brewer

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

NORTHERN REGIONAL OFFICE / P.O. BOX 1601 — FAIRBANKS 99707

February 16, 1977

M.F. Westfall
Executive Vice President
Husky Oil
NPR Operations, Inc.
Suite 600
3201 "C" Street
Anchorage, Alaska 99503

Dear Mr. Westfall,

Your letters of February 4, 1977, and February 7, 1977, regarding proposed solid waste disposal plans for Lonely Camp and the NPR Cleanup Program have been received. A preliminary review by the Northern Regional Office staff indicates general approval of the proposed plans. Open burning of any burnable items must be done in accordance with the open burning regulations. A copy of these is enclosed for your information.

Your letters, application and outline of proposed programs has been forwarded to our Juneau office for final review and approval. They will contact you if any further information is needed. Please call if you have any questions.

Sincerely,

Douglas L. Lowery

Douglas L. Lowery
Regional Environmental Supervisor

Attachment: Air Quality Regs.

vb

cc: A.E. Corcoran, LCDR, CEC, USN OIC/Pet 4

000006

Info cy to Max Brewer

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

July 8, 1977

NORTHERN REGIONAL OFFICE / P.O. BOX 1601 – FAIRBANKS 99707

JUL 13 1977

Mr. John F. Schindler
Director - Environmental Affairs
Husky Oil
Suite 600
3201 "C" Street
Anchorage, Alaska 99503

Re: Husky's Camp - Lonely
Environmental Concerns

Dear John:

On June 16 and 23 staff of the Northern Regional Office of the Alaska Department of Environmental Conservation inspected Husky's camp at Lonely. Generally speaking the camp needs a good spring cleaning.

Specifically, the landfill area you have selected has numerous items in it that should have either been incinerated, or open-burned. All putresible garbage, tin cans, grease, etc. should be incinerated in the camp incinerator to avoid attracting animals. Wood and cardboard should be open-burned in a manner that will not create black smoke or present a safety problem.

The solid waste permit application which you submitted should be issued to your firm in the next two weeks. This permit will contain various operating stipulations, such as those listed above. A copy of the permit should also be on file at Camp Lonely.

The Department's policy is to issue solid waste permits for regional facilities and it is our sincere hope that Husky and the DEW site will run a cooperative landfill. The old dump, located on the lagoon beach, should be phased out, burned, covered and closed as soon as your new landfill is operational.

The new sewage treatment plant appears to be operating in an acceptable manner. Both field observations and your operational data indicate that the plant is "coming on line". This type of plant has a good operating record and should be more than capable of meeting State standards if it is operated correctly.

The present effluent discharge location may have the potential to reach navigable waters. Should you desire to leave the discharge point in this new location you should contact E.P.A. for any needed permit.

Mr. Dwain Rush, Camp Manager, informed me that a cleanup was planned for the immediate area, and for the drill sites that were drilled last season. Please contact this office when your cleanup plans are solidified.

Thank you for your continued cooperation.

Sincerely,

Jerry Brossia

Jerry Brossia
EFO

JB:sg
cc: J. Santora/BLM

United States Department of the Interior

GEOLOGICAL SURVEY

National Petroleum Reserve in Alaska
2525 'C' Street - Suite 400
Anchorage, Alaska 99503

ENV/cu
MCB:kw
2 Nov 77

Honorable Ernst W. Mueller
Commissioner
Department of Environmental Conservation
Pouch O
Juneau, Alaska 99811

Dear Commissioner Mueller:

As you are aware, the responsibility for Naval Petroleum Reserve No. 4 was formally transferred from the Department of the Navy to the Department of the Interior on June 1, 1977, under P.L. 94-258, and the Reserve renamed the National Petroleum Reserve in Alaska (NPRA). The Secretary of the Interior delegated the responsibility for continuing the petroleum exploration program, mandated by P.L. 94-258, to the U.S. Geological Survey; the responsibility for surface management to the Bureau of Land Management. In the latter instance, the responsibility was vested as of April 5, 1976, the date when the Bill was signed into law.

One of the mandates of P.L. 94-258 required the Secretary of the Interior to assume responsibility for any existing ongoing contracts previously entered into by the Secretary of the Navy. One of the contracts assumed was that of Husky Oil NPR Operations, Inc. for the management of the petroleum exploration program. Husky in turn, acting as the Government's agent, subcontracts most of the actual work in the exploration, for example the drilling, construction of drilling pads, the geophysical exploration and the myriad of ancillary support and procurement functions.

The U.S. Geological Survey continued the Navy's contract, with its several amendments basically unchanged until recently when, with the advent of the new fiscal year, it was possible to provide additional funding and to define the scope of work to be accomplished with that funding.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

The contract is essentially a cost plus fixed fee contract. Husky manages the exploration program, advises the Government on the exploration program and, once the program has been approved by the Government, ensures that it is implemented as approved. The Government approves, through a job order mechanism, all major expenditures and therefore controls these on an individual basis. Thus, for example, Husky cannot buy a crash truck, rent building space, or buy a sewage treatment plant on its own volition under the contract.

Because of the above constraints on Husky's freedom of action and because they are acting as the Government's agent in the conduct of specific tasks, it has been determined that the U.S. Geological Survey will apply for the various permits under law that might be applicable to the exploratory program. For example, the Reston, Virginia office of the U.S. Geological Survey signs the applications for FCC permits for radio frequencies for use in NPRA operations; this office will sign the applications for State permits for solid waste (P.L. 94-580) and for air emission sources where applicable under P.L. 95-564. In other cases, such as drilling permits which are issued by the U.S. Geological Survey for drilling on public lands, no permits will be applied for, althrough the Conservation Division of the Survey will be asked for their technical input into the plans for drilling. Through providing an informational copy, the appropriate State agency also will be provided an opportunity for comment.

In the case of Husky Oil NPR, Inc. subcontractors, where the successful bidders are't known until after the opening of the bids, the subcontractors will, as a condition of the bid, be required to obtain all applicable licenses and permits, including those from the DEC.

Because of the apparent confusion by some concerning the Husky contract, under which they at times have been referred to as lessees or licensees, it was thought to be desirable to explain their position as an Operator on NPRA in considerable detail. It also explains why Husky would be placed in an intolerable position, as regards both cost and liability, if the Company were to be required to do something under an agency directive whereas their capability to comply was controlled by a Governmental contracting officer.

In reviewing the Husky contract I note that they presently possess Solid Waste Disposal Management Permit NR-32-77 which is due to expire on December 31, 1978. This permit is for disposal of solid wastes at Camp Lonely. The U.S. Geological Survey is presently preparing an application for a solid waste permit at the Lonely location to not only take care of the Camp's solid waste, but also to handle the garbage, paper and packing wastes from the nearby DEWLine Site, POW-I. In turn the Survey will request that Husky surrender its solid waste permit, NR-32-77.

This office also is checking the possible requirement, considering equipment rated capacity, for an air emissions permit for the power generation at Lonely. Looking further into the future, this office would appreciate knowing how the Department is now handling the problem of open burning required for the testing of wells, such as the testing of the development well at Prudhoe Bay on 17 August or more recently the exploratory well at Point Thomson.

This office wishes to cooperate with the DEC in the protection of the environment on NPRA and has confidence that this protection can be accomplished, while at the same time carrying out the mandates of P.L. 94-258.

Sincerely,

Max C. Brewer

Max C. Brewer
Chief, Operations - NPRA

cc: M. F. Westfall
Husky Oil NPR Operations, Inc.

United States Department of the Interior

GEOLOGICAL SURVEY

National Petroleum Reserve in Alaska
2525 'C' Street - Suite 400
Anchorage, Alaska 99503

29 Mar 78

Mr. Douglas Lowery
Northern Regional Office
Department of Environmental Conservation
P. O. Box 1601
Fairbanks, Alaska 99707

Dear Mr. Lowery:

As previously discussed with Mr. Jerry Brossia, this office herewith is submitting an application for a Waste Disposal - Solid Waste Management Permit for Camp Lonely on the National Petroleum Reserve in Alaska.

The sanitary landfill at Lonely is intended to serve that camp and the construction/drilling camps that it supports on the NPRA. It is intended to simultaneously serve two purposes: 1) the disposal of inert wastes and 2) the enlargement of the camp storage/working pad at Lonely. In so doing it protects the environment, by suitably disposing of the inert and visually disturbing wastes, while at the same time providing for an economical and badly needed enlargement of the existing working pad.

The sanitary landfill will be for the exclusive use of the Government, its Operator and subcontractors, and for the nearby DEWLine (POW 1) contractor. It will be maintained and the area policed by the ONPRA's Operator whose operation will be periodically reviewed by personnel from this office. Periodic visits by ADEC personnel to inspect the site also are welcomed.

This office has reviewed Permit No. NR-32-77 issued to Husky Oil NPR Operations, Inc. then operating under a Department of the Navy contract. This review was undertaken from several aspects, including those of solid waste disposal in an Arctic environment and the problems posed for both ADEC and Husky with Permit No. NR-32-77.

Basically the original Husky application, approved by the NPR-4 Officer in Charge, requested a permit for the landfill disposal of "metal and ashes only" as part of a combination waste disposal/construction effort. The permit granted, however, restricted the disposal to "incinerator residue and ash only" (A-6) thereby essentially negating the whole intent of the application, as well as frustrating both the efforts of the Operator to

protect the environment and the efforts of the ADEC personnel in monitoring the permit. It was almost a non-permit. As a result it has been suggested that it be returned to the ADEC and that this office would apply for a permit, as required by P.L. 94-580.

This office thus proposes a modification of some of the permit conditions to make them more compatible with the existing environment on the Arctic coastal plain and more useable for both the Government's Operator and for the ADEC monitoring personnel. The suggested changes are as follows:

1) A-4. Litter fencing, where the disposal of papers and other wind-susceptible wastes, except ashes, are prohibited, inhibits good operations in a small disposal area, especially the compaction during the winter months. It is suggested that the words "litter fencing" be eliminated.

2) A-6. It is suggested that this paragraph be reworded to state "Restrict disposal at the facility to incinerator residue, including ash, small metal wastes, glass, and other inert and non-hazardous materials."

3) A-7. The construction of trenches, per se, probably was not intended. Experience along the Arctic coast has shown that the permafrost rises into the bottom one-foot of a 5- or 6-foot fill; thus the requirement for placement of one-foot of gravel fill on the original ground surface is superfluous, at best, from the environmental standpoint. Actually, it just adds to the overall volume, hence area, of the landfill requiring that more sand/pea gravel be used in the fill operation. A suggested rewording for A-7 would be:

   "Utilize a disposal face which shall not exceed one hundred (100) feet in length, twenty-five (25) feet in width, and not rise to a heighth greater than that of the existing pad. The disposal cells shall be located as indicated in the permit application."

4) A-9. It is suggested that "three (3) feet" be changed to "not more than four (4) feet," in order to limit the area of the landfill and to still bring it level with the existing pad surface.

5) A-12. This paragraph is appropriate for this permit application, even though its probability of necessity is negligible.

6) It is requested that the permit be for a period of three (3) years, i.e., expiring 31 December, 1980.

It is the belief of this office that these suggested changes would be in accordance with 18 AAC 60 and that they would be compatible with both the operational needs of the program and the environment existing in the coastal plain of Arctic Alaska.

Sincerely,

Max C. Brewer

Max C. Brewer
Chief, Operationa NPRA

Enclosures: (2) copies of
Application for Solid Waste Management Permit

cc: John Haugh, USGS

000014

Date Received _____
By _____

#2

APPLICATION FOR WASTE DISPOSAL-
SOLID WASTE MANAGEMENT PERMIT

NAME OF [X] OWNER, [ ] OPERATOR: National Petroleum Reserve in Alaska, U.S. Geological Survey
MAILING ADDRESS: 2525 'C' Street - Suite 400
CITY Anchorage STATE Alaska ZIP 99503

Type of facility:

[X] Landfill/Storage Pad
[ ] Transfer Station
[ ] Drop Box Station
[ ] Incinerator
[ ] Hazardous Waste Processing and/or Disposal
[ ] Resource Recovery
[ ] Refuse Baling
[ ] Refuse Shredding
[ ] Sewage Sludge Disposal
[ ] Other _____

Location: NPRA Camp Lonely, Alaska (SE¼, Section 18, T18N, R5W, Umiat Meridian, Alaska

Type of application:
[ ] Permit for new facility
[X] New Permit for existing facility

Existing Permit Number (if applicable) N/A

NOTICE TO APPLICANT: Alaska Statutes, sections 40.03.110(a) and (c) require that "application for permit shall be made at least sixty (60) days before commencement of a proposed discharge..", and that the department place the application on public notice in two (2) editions of a locally distributed newspaper with thirty (30) days after last publication date being allowed for written responses.

Additional information may be required to properly evaluate the proposed facility before permit issuance. Notification of additional information requirements will be issued within 15 days of receipt of this application. Please submit two copies of all application material.

Application Requirements:

1. Attach a topographic map or aerial photograph, clearly marking the site boundaries, and pertinent features such as existing and proposed surface contours, buildings, fixed equipment, surface waters, surface runoff diversions, fences, highways, access roads, wells within 1/4 mile of the site, area zoning, and adjacent land ownership. Maps or plans of site should have contour interval of 5 feet or less, and they should show present and proposed conditions, proposed working face or trench locations, and facilities for special wastes such as junked automobiles or sewage sludge.

2. Attach data on groundwater depth and direction of movement relative to populated areas and wells, and a description of the soil profile and characteristics including permafrost and ice-rich permafrost in the site. Include average annual precipitation and prevailing wind information, if available.

3. Attach a narrative report describing site operation information including estimate of area and population served, specific waste types to be disposed of, waste quantities received, steps taken to abate and control nuisances such as blowing paper and other litter, odor, dust, vectors and visual aesthetics, and data for specific facilities as follows:

a. Transfer station — hours open for public use, duty schedule of site attendents, equipment listing including that available for emergency use, and facility to which refuse is transported for processing or disposal.

b. Disposal Facility -- hours open to public, duty schedule of site attendents, equipment used at facility, disposal method including compaction techniques, size of operating face, depth of cells, means and frequency of cover application, winter operation considerations, incinceration equipment, etc.

c. Processing and/or Resource Recovery Facility -- hours open to public, duty schedule of site attendents, engineered plans and equipment specifications, process description, product description materials recovered and estimated quantities, storage facilities for recovered materials or refuse derived fuel, and storage and disposal facilities for all materials not recovered.

d. Hazardous waste facility -- hours open to public, manpower and equipment available, hazardous wastes to be accepted, methods of waste treatment or neutralization, disposal techniques, and employee safety precautions.

4. Attach a narrative plan with map or drawing to show the proposed form of the completed disposal site including contours, surface restoration, and any other planned facilities.

5. Attach a letter from the local government certifying compliance with local ordinances and zoning requirements. If the permit holder is not the owner, include a statement from the property owner detailing the arrangement by which applicant has control of the facility.

6. If the facility is not in compliance with the State regulations 18 AAC 60 "Solid Waste Management", attach a proposed plan and time schedule for attaining compliance. Include reasons to justify non-compliance operation, and the compliance plan and time schedule.

ADDENDUM TO
"APPLICATION FOR WASTE DISPOSAL -
SOLID WASTE MANAGEMENT PERMIT"

Requirements

Paragraph #1

An aerial photo and a topographic map showing the site are attached to illustrate the existing facilities, surface runoff and the nearby water bodies, including the shore of a portion of Harrison Bay.

Paragraph #2

There is no ground water movement, per se, in this area of the Arctic coastal plain. The area is within the zone of continuous permafrost; the overlying active layer ranges in thickness from 12 to 18 inches. The major runoff, melting snow varying from 6 to 10 inches of water content, occurs during the first two to three weeks of June. This runoff occurs over the surface of the still-frozen active layer. An additional 2 to 3 inches of precipitation, in the form of light to misty rain, occurs during the summer months. This runoff occurs through the 3 to 4 inches of tundra/dead organic matter that overlies the silty/fine sand that comprises the mineral soils of the active layer in this area. The prevailing wind is from the east-northeasterly; thus the landfill is on the leeward side of the camp/storage pad.

There are no wells in the area. The only other habitation within about 100 miles is the nearby DEWLine site, about one mile east, which has an average population of about 12 personnel. Drainage from the landfill area is to the westward.

Paragraph #3

The 100-person Lonely camp serves as a headquarters for the exploration of the National Petroleum Reserve in Alaska, an area of approximately 37,000 square miles. From this base camp six to nine drilling sites are operated for varying periods of time during the year, usually three to four months each although, in the case of deep wells, occasionally for as long as 14 months. Except for the deep wells, the drilling camps are operated only during the winter months. The operations are confined to those of Government Contractors including those at the nearby DEWLine Site. The landfill is not open to public use.

The solid wastes are handled in the following manner:

At camp Lonely, all combustible wastes are burned in an oil fired incinerator of the following manufacture:

CONSUMAT, Richmond, Va.
Model C-75TL, S/N 2742
Capacity 175 #/hr. Type IV Waste

This incinerates all domestic waste and garbage, as well as the sludge from the biological sewage treatment plant. Ash from the incinerator, as well as all non-combustible small-size metal wastes, glass and other non-putrescible wastes are buried in compacted layers, covered with sand/pea gravel, and used to extend the storage area of the pad. All large-size metal scrap, damaged drilling pipe and casing, and worn-out and surveyed vehicles are retrograded to Seattle on the once-yearly barge.

At each of the wellsites, the construction and drilling contractors operate in a similar manner. All combustible waste is incinerated. These incinerators are rated at 100-175 pounds per hour Type IV Waste. All non-combustible waste, including ash from the incinerator is backhauled to Lonely and consolidated with other waste for burial in the landfill or for retrograde to Seattle, via barge, as appropriate. Open burning is not permitted except for paper products and these are burned in covered burn baskets constructed of expanded metal.

Since the sanitary landfill at Lonely is being used to extend the size of the storage pad and since this constructed area must be capable of supporting heavy loads, such as drilling pipe and casing, care must be used in its construction. The outer portion of the "cell" to contain the solid waste has been eliminated since this would turn the "cell" into a wind-blown snow catchment basin during the nine winter months (the busiest period), reducing the effectiveness of the "cell", the effectiveness of the compaction effort, and would seriously undermine the load-carrying capacity of the resulting storage pad area. Since the disposal area is not used for garbage or other putrescible items, or for papers or litter, this outer wall of the cell is not needed for protection of the environment or for protection from the disease or visual aesthetics vectors often associated with a sanitary landfill type operation.

3(a). Transfer station. N/A.

3(b). Disposal facility. Hours, etc. N/A.
Compaction will be by D-7 or D-8 Cat, in 2-foot lifts. The operating face desired is 100 feet; the width of the cell 25 feet. The depth of the cell will vary from 4.5 to 6 feet in order to bring the top of the fill to the same level as the existing camp/storage pad. The top two feet of material will be beach sand/pea gravel with a surface layer of silt binder.

3(c). All large-size metal scrap, damaged drilling pipe and casing, and worn-out and surveyed vehicles and equipment will be retrograded to Seattle on the once-yearly barge.

3(d). Not applicable. The sanitary landfill is not to be used for the deposit of hazardous wastes.

Paragraph #4

Not applicable. The landfill is to be used as an extension of the existing working/storage pad.

Paragraph #5

Not applicable. The North Slope Borough solid waste collection and disposal service has not yet been initiated, even in the organized and established communities.

Paragraph #6

Not applicable.

H2 #9

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
POUCH O
JUNEAU, ALASKA 99811

WASTE DISPOSAL PERMIT
(SOLID WASTE MANAGEMENT PERMIT)

Permit No. NR-32-77 (amended) Date of Issuance: 8-25-78

This Waste Disposal Permit is issued to the U.S. Geological Survey, 2525 'C' Street, Suite 400, Anchorage, AK 99503 for the operation and maintenance of a solid waste disposal activity located at the NPRA Camp Lonely, in SE 1/4, Sec. 18, T18N, R5W, Umiat Meridian, Alaska

and is subject to the conditions and stipulations in sections A.1 through C.9, of this permit and the applicable State laws and regulations.

This permit is issued under provisions of Alaska Statutes, AS 46.03.100-110, Water, Air, and Environmental Conservation, Alaska Administrative Code as amended or revised, and other applicable State laws and regulations.

This permit is effective upon issuance and expires December 31, 1981; it may be terminated or modified in accordance with AS 46.03.120 and 18 AAC 15.

This permit is not valid until signed by the Deputy Commissioner of the Department of Environmental Conservation.

Deputy Commissioner
Department of Environmental Conservation

NRU

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

JAY S. HAMMOND, GOVERNOR

NR-32-77
amended

POUCH O — JUNEAU 99811

CERTIFIED MAIL
RETURN RECEIPT
REQUESTED

August 25, 1978

RECEIVED
AUG 31 1978
DEPT. OF ENVIRONMENTAL CONSERVATION
NRO

Dr. Max C. Brewer
Chief, Operations NPRA
2525 'C' Street - Suite 400
Anchorage, Alaska 99503

Dear Dr. Brewer:

The Department of Environmental Conservation has completed its evaluation of your Solid Waste Permit application for your NPRA Camp Lonely facility and is issuing the enclosed permit in accordance with AS 46.03.100-110 and 18 AAC 60. Please review the permit's conditions and stipulations and insure they are all understood.

If you disagree with any portion of this permit, you may request an adjudicatory hearing by filing a statement of issues under AS 44.62.370 within thirty (30) days of receipt of this letter. The statement of issues should be mailed to the Alaska Department of Environmental Conservation, Pouch O, Juneau, Alaska 99811, or delivered to their offices at 3220 Hospital Drive, Juneau. The filing of a statement of issues entitles you to an adjudicatory hearing to contest the permit. Failure to file a statement of issues within thirty (30) days of receipt of this letter shall constitute a waiver of your right to judicial review of this permit.

Sincerely,

Jerry Rainwand
Deputy Commissioner

Enclosure

PERMIT CONDITIONS AND STIPULATIONS

A. OPERATION--The permittee shall:

1. Store all kitchen wastes and other putrescible wastes in a safe and sanitary manner prior to incineration. The wastes will at no time be stored where they may attract or be accessible to wildlife.

2. Incinerate all putrescible and combustible wastes and sewage sludges generated by camp operations prior to land disposal.

3. Operate the incinerator(s) in compliance with the Alaska Air Quality Control Regulations, 18 AAC 50.

4. Cleanup and control all littered and windblown material in and around the facility through the use of regular policing or other means as required.

5. Prohibit the landfilling of all liquid wastes including sewage sludge, oil wastes, greases, paints, drilling muds and hazardous or toxic substances.

6. Restrict disposal at the facility to incinerator residue and ash, small metal wastes, glass and other inert and non-hazardous materials.

7. Deposit solid wastes in cells located along the side of the existing pad at locations approved by the department. The cells shall not exceed twenty five feet by fifty feet in width before final cover is applied.

8. Spread the wastes deposited in the cells in layers not exceeding two feet in depth and compact with a heavy tractor or other approved equipment.

9. Limit the total depth of the compacted layer of solid waste to no more than four feet, and cover with two feet of compacted earth upon completion of solid waste filling.

10. Operate only one disposal cell at a time and shall not begin filling a new cell until the previously operated one is completely filled and covered.

11. Limit the height of the finished fill to that of the adjacent pad area.

12. Grade the completed landfill area to promote surface water runoff without erosion. Surface restoration and erosion control work such as revegetation will be required if the department determines that significant erosion has occurred within two years of facility closure.

13. Be allowed to provide final cover and grading the following spring if landfill operation is terminated during the winter.

14. All "disposal prohibited" or salvageable items shall be segregated and stored in an approved location and/or transferred to an approved final disposition location. Maximum storage period shall be one year.

B. MONITORING AND REPORTING--The permittee shall:

1. Notify the Department of Environmental Conservation ten days prior to removal of earthmoving equipment from the completed landfill.

2. Submit two (2) sets of "as-built" or record drawings of the completed facility within ninety (90) days of facility completion and closure. The drawings shall accurately show the limits of all solid waste deposition, both horizontally and vertically, including the limits of each trench. The drawings may be referenced to the State Plane Coordinate System, or other recognized system, or to a monumented, well referenced local system described on the drawings.

C. GENERAL

1. The permittee shall allow the Commissioner of Environmental Conservation or his authorized representative, upon presentation of credentials,

   a. to enter upon the permittee's premises where waste collection or disposal works are located at such times and upon such terms as the Department may reasonably require, and
   b. at reasonable times, to have access to and to be allowed to copy any records required to be kept under the terms and conditions of this permit and to inspect any monitoring equipment or monitoring method required in this permit.

2. Availability of Records

   Except for information relating to secret processes or methods of manufacture, all records and reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Alaska Department of Environmental Conservation.

3. Civil and Criminal Liability

   Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond his control, including but not limited to accidents, equipment breakdowns, or labor disputes.

4. Property Rights

   The issuance of this permit does not convey any property rights in either real or personal property, or any other privileges; nor does it authorize any injury to private property or any invasion or personal rights, nor any infringements of federal, State or local laws and regulations.

5. Severability

The provisions of this permit are severable and, if any provision of this permit or the application of any provision of this permit to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby. Notwithstanding the above, in the event that such invalidation materially alters the scope or conditions of this permit, the Department shall have the right, at its sole option, to terminate the permit.

6. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.

7. Posting of Permit

The permittee shall post conspicuously and maintain a copy of this permit at the disposal facility.

8. Transfers

This permit is not transferable and is the property of the State of Alaska, Department of Environmental Conservation. Should operation of the facility be contracted or a change in contractors be made, the new contractor shall be notified in writing of the existence of the permit and its conditions. A copy of the written notification shall be forwarded to the Commissioner of the Department of Environmental Conservation.

9. This permit shall be amended to provide for the upgrading or closure of the site, if the facility is classified as an "open dump" in accordance with the inventory and definitions being developed by the Environmental Protection Agency under the Resource Conservation and Recovery Act of 1976, P.L. 94-580.

DRILL MUD INVENTORY
CAMP LONELY

October 13, 1981

ITEM	SACKS		WT/SACK	
ALUMINUM STEARATE	62		25#	[illegible]
BARITE	4,520		100#	452,000
BENEX	2,250		2#	4,500
BIT LUBE	22	(drums)	55 gals.	
BLACK MAGIC	98		50#	4900
CALCIUM CHLORIDE	1,620		100#	16,200
CAUSTIC SODA	1,350		50#	67,500
CELLO SEAL	480		25#	12,000
CELLULOSE GUM	20		50#	1,000
CMC	945		50#	47,250
COAT 45	650		50#	32,500
CONSENTRATE III	10	(drums)	55 gals.	
CONTONE	900		100#	90,000
CO-POLYMER	80		50#	4,000
DEFOAMER	22	(cans)	5 gals.	
DETERGENT	401	(cans)	5 gals.	
DEXTRID	0		50#	
DIACELL D	93		50#	4,650
DRISPAC	80		50#	4,000
E Z MUL	264	(drums)	55 gals.	
"	20	(cans)	25 gals.	
FIBER	3,925		40#	157,000
FREE PIPE	44	(drums)	55 gals.	
" "	12	(cans)	25 gals	
GEL	33,110		100#	3,311,000
GELTON	1,650		50#	82,500
GELTONE	6,650		50#	332,500
GEL QUICK	2,030		50#	101,500
IMCO THIN	15		40#	600
KWIK SEAL FINE	2,766		40#	[illegible]
KWIK SEAL MED	3,795		40#	[illegible]
KWIK SEAL COURSE	2,168		50#	[illegible]
LIME	2,205		50#	110,250
MD	48	(drums)	55 gals.	
"	176	(cans)	5 gals.	
MICA FINE	2,595		50#	[illegible]
MICA MED	2,376		50#	[illegible]
MICA COURSE	2,691		50#	[illegible]
MIL GEL	42		100#	[illegible]
MIL FREE	12	(drums)	55 gals.	
NUT PLUG FINE	1,890		50#	94,500
NUT PLUG MED	7,760		50#	388,000
POLY RX	75		50#	[illegible]
POTASH	1,120		100#	112,000
POTASSIUM CHLORIDE	0		100#	
PROTECTO MAGIC	86		50#	[illegible]
Q-BROXIN	11,196		50#	559,800
RESENEX	4,140		50#	[illegible]
SAFE GUARD 5000	8	(drums)	55 gals.	
SALT	210		100#	[illegible]
SALT GEL	0		50#	

Page 2
Drill Mud Inventory

ITEM	SACKS	WT/SACK	
SAPP	420	100#	42,000
SILVA SEAL	52	50#	2,600
SODA ASH	2,160	100#	216,000
SODIUM BICARBONATE	590	100#	59,000
SODIUM ACID	20	50#	1,000
SODIUM BICHROMATE	4	100#	400
SOLTEX	4,860	50#	243,000
SULFEX II	420	50#	21,000
SUPER COL	124	50#	6,200
TORQUE TRIM	73 (drums)	55 gals.	
XC POLYMER	240	50#	12,000
XP-20	2,460	50#	123,000
ZINC CARBONATE	2,560	50#	128,000

7,433,200
406,800
7,840,000

CAMP LONELY
CASING AND TUBING INVENTORY

October 13, 1981

Casing, 20", 133#, K-55, 8 Rd.	167 Jts.
Casing, 13-3/8", 72#, S-95, Buttress, Range #3	405 Jts.
Casing, 9-3/4", 59.2#, Buttress	1,324 Jts.
Casing, 9-5/8", 53.5#, Buttress	970 Jts.
Casing, 7-5/8", 38.5#, S-95, ABC-FL4S, Range #3	231 Jts.
Casing, 7", 38#, Buttress	663 Jts.
Casing, 7", 38#, P110, 8 Rd.	394 Jts.
Casing, 5-1/2", 22.5#, S-95, FL4S	69 Jts.
Casing, 5-1/2", 22.5#, Hydril	365 Jts.
~~Tubing, 3-1/2", 9.3#, N-80, 8 Rd., Range #2~~	~~881 Jts.~~
Tubing, 3-1/2", 12.95#, P-105, Hydril PH-6	446 Jts.
Tubing, 2-7/8", 6.5#, ABC Upset Buttress	363 Jts.
Tubing, 2-7/8", 7.5#, 8 Rd.	24 Jts.

2, 3 000027

GEOPHYSICAL SERVICE INC.
5801 SILVERADO WAY • ANCHORAGE, ALASKA 99502
907•274-0563•TELEX 25-256

September 21, 1981

RECEIVED
SEP 23 1981
U.S.G.S.-ONPRA

Dr. Max Brewer
U.S.G.S.
Husky Bldg
2525 C Street
Anchorage, Alaska 99503

Dear Dr. Brewer:

As you are doubtless aware, GSI has two seismic crews parked at camp Lonely waiting next year's seismic season. Remobilization of these crews will be greatly facilitated if GSI can obtain heated shop space, particularly for the re-installation of instruments in the recording vehicles.

Chris DeSpain of Husky Oil has advised us that control of the various non-military facilities at Camp Lonely has reverted to you, and that GSI should petition you for rental of one or two shop bays. We would like to rent two shop bays, 20' x 60' with heat, light and electricity for the period November 15, 1981 through January 5, 1982. This is a best-case request and we can obviously make do with less; the minimum being space somewhere to get one Chieftain 5 vehicle (10' x 32') out of the wind.

Please consider this letter a solicitation for your proposal for any assistance you may be able to extend to us. We are certainly willing to discuss any minumum rental or lease period necessary to get the support we need.

I look forward to your reply.

Sincerely,

GEOPHYSICAL SERVICE INC.

Robert G. Mood III
Logistics Manager

RGM/cb

000028

GEOPHYSICAL SERVICE INC.
5801 SILVERADO WAY • ANCHORAGE, ALASKA 99502
907•274-0563•TELEX 25-256

September 21, 1981

Dr. Max Brewer
U.S.G.S.
Husky Bldg
2525 C Street
Anchorage, Alaska 99503

Dear Dr. Brewer;

We are investigating the possibilities for staging fuel at locations on the North Slope to support next winter's seism A very attractive possibility is to lease one or two for yc BBL tanks at Lonely.

GSI requests that you entertain our request to lease one or 10,000 BBL tanks, and that, if possible you propose a month annual rental rate. The period of primary interest is of c December 15, 1981 through May 15, 1982, but we would certai to discuss annual terms if that is most convenient for you.

I look forward to your reply.

Sincerely,

GEOPHYSICAL SERVICE INC.

Robert G. Mood III
Logistics Manager

RGM/cb

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : James Devine-Asst. Dir, Geologic Engineering
USGS/ONPRA, Reston

DATE: 8 Oct 81

FROM : Chief of Operations, USGS/ONPRA

B&G/FAC/g
MCB:kw

SUBJECT: GSI Request to Lease Fuel Tanks and Shop Space at Lonely.

Attached please find copies of two letters from Geophysical Service, Inc. requesting to lease two each 10,000-barrel fuel tanks and one or two shop bays, with heat and power (i.e. operation of the camp generators), at Lonely this winter. Also attached is a copy of my non-commital response.

This appears to be a policy question and thus it is being bumped directly to you. It probably should not be considered to be an isolated instance since, as GSI knows and as other companies are finding out, one cannot effectively run seismic surveys in the near or offshore Western Beaufort Sea, or in the northeastern portion of the NPRA, without the use of Camp Lonely or its clone. The pressures for such utilization are expected to build up rapidly with the Beaufort Sea leasing planned for early 1983, requiring an extensive seismic program this winter, and with the NPRA leasing pressures.

Several possible alternatives come to mind:

1. Negotiations with GSI for them to, in effect, become the Camp Lonely operator, but with the proviso that they also must provide accommodations to other companies and to governmental agencies at reasonable prices;

2. Advertisement for a camp operator, under USGS or GSA sponsorship and Air Force concurrence since the airstrip must be considered even though not mentioned in the GSI letters, to operate, in effect, a public facility;

3. The USGS to provide a minimally operational camp for companies operating in the area;

4. Advertising Camp Lonely for sale; or

5. A flatout denial to GSI's requests.

This office does not recommend alternative No. 3. Alternative No. 4 would doubtlessly subject the Department to lawsuits from both

5010-108

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

Native organizations and environmental groups as part of the on-going implementation of land claims settlement acts, as well as impact the Department's leasing schedules in the area, already advertised or in the planning process. Alternative No. 5 would be expected only to introduce politics and to escalate the request to the Secretarial level, similar in vein to the Conservation Division's denial of the request to extend the seismic operating "window" last spring. In that case, the final negotiated decision, perhaps No. 3, might not be the most desirable from the Survey's viewpoint.

Due to the time crunch, the fact that the Government is not yet out of Lonely (either operationally or from the property disposal aspects), and the Department's obvious desire not to further compromise leasing schedules in Alaska, Alternative No. 1 could present a possible solution during the next year. It also would offer an opportunity to assure reasonable protection for Government property, a subject of considerable recent interest to GAO, especially in remote areas.

In spite of its cooler, more amiable climate, the Alaskan environment is very conducive to the production of "hot" potatoes, sometimes even bumper crops.

Max C. Brewer

Max C. Brewer

Attachments (3)

cc: George Gryc - w/attach.
Robert Lantz - w/attach.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
National Petroleum Reserve in Alaska
2525 'C' Street - Suite 400
Anchorage, Alaska 99503

B&G/FAC/g
MCB:kw
8 Oct 81

Geophysical Service, Inc.
5801 Silverado Way
Anchorage, Alaska 99502

Attention: Robert G. Mood III
Logistics Manager

Dear Mr. Mood:

This office has referred your two letters, dated 21 September 1981 and discussing GSI's interest in using certain facilities at Camp Lonely, to the Office of the Director, U.S. Geological Survey, Reston, Virginia, for response.

Sincerely,

Max C. Brewer

Max C. Brewer
Chief of Operations

36

000032

GEOPHYSICAL SERVICE INC.
5801 SILVERADO WAY • ANCHORAGE, ALASKA 99502
907•274-0563•TELEX 25-256

November 17, 1981

Mr. Edmund J. Grant
Assistant Director for Administration
United States Department of the Interior
Geological Survey
Reston, Virginia

Dear Mr. Grant:

In review of your letter of October 30, 1981, and our subsequent telephone conversations, it has occurred to me that there is one avenue left for us to explore in the effort to keep Camp Lonely warm and supervised during the coming winter. GSA regulation constrains you from lease or disposal of the camp until completion of a lengthy process of offerings to other governmental agencies and entities. The USGS does not have funding available to operate Camp Lonely as it has been operated in the past for the duration of this process. It appears to me that a way out lies between these two problems.

GSI proposes to form group of concerned organizations to operate Camp Lonely, at greatly reduced capacity but at a level sufficient to prevent damage to the installation, at nominal cost to the USGS. Placing ourselves in the position of offering a service rather than requesting a service may allow you to take steps to preserve this resource and prevent the loss of or damage to the considerable amount of government property involved.

GSI proposes to operate one of the three 250 KW generators on a rotating basis, to provide power sufficient to keep the bulk of the camp at a temperature not less than 35°F, and to maintain the runway to full 5,000 foot length for the period 6 December 1981 through 6 June 1982 for the sum of $100.00 per month. During this period lodging and meals, as available, will be tendered to any transient party on a cost reimbursement basis.

I hope this proposal will allow you to rule in the interests of all concerned, not the least being yourselves and all of us as taxpayers.

Sincerely,

GEOPHYSICAL SERVICE, INC.

Robert G. Mood, III
Logistics Manager

RGM/kc
cc: Dr. M. Brewer

GESSYE AHG
000002CZC020 COLO SPRINGS CO 19 NOV 81
TLX 09035256 GESSYE AHG
GEOPHYSICAL SVCS, INC., 5801 SILVERADO WAY, ANCHORAGE, AK 99502
ATTN: R.G. MOOD
BT
THE 4700 ADS/DO RECEIVED YOUR MESSAGE AND HAS CONSULTED ALL
CONCERNED OFFICES; CONCLUDE THAT SEVERAL PROBLEMS REMAIN TO BE
SOLVED. FIRST, THE USGS HAS NOT OFFICIALLY NOTIFIED THIS
ORGANIZATION AS REQUIRED IN THE JOINT INTER-SERVICE SUPPORT
AGREEMENT CONCERNING THE CAMP LONELY OPERATION. THEREFORE, WE
CAN NOT PROMISE SUPPORT THROUGH A FACILITY WHICH IS NOT OURS.
SECONDLY, IF THE USGS DOES TURN THE AIRSTRIP OVER TO THE USAF
AS VERBALLY INDICATED ON OR ABOUT 5 DECEMBER 1981, LANDING
AUTHORIZATIONS VALID FOR THE USGS AIRSTRIP OPERATION MAY NOT BE
VALID FOR DEWLINE AIRSTRIP LANDING. HQ USAF/PRPJ MUST BE
CONTACTED ASAP BY YOUR PROPOSED CARRIERS IF THIS PROBLEM IS TO
BE ADDRESSED IN TIME FOR YOUR OPERATION.
FINALLY, IF THE OPERATION OF THE AIRSTRIP IS TRANSFERRED TO THE
AIR FORCE AND LANDINGS ARE AUTHORIZED, WE CANNOT GUARANTEE THAT
THE AIRSTRIP WILL BE CLEAR FOR EVERY LANDING YOU WISH TO MAKE.
THE OPERATIONAL REQUIREMENTS OF THE RADAR SITE WILL BE MET
FIRST. IF ANY RUNWAY/APRON MAINTENANCE OR CLEARING IS
NECESSARY ABOVE WHAT IS REQUIRED FOR OUR SUPPORT FLIGHTS, YOUR
COMPANY WILL BE BILLED FOR LABOR AND EQUIPMENT. ALSO, LANDING
FEES WILL BE ASSESSED ON EACH LANDING IAW AF REG 55-20, RATE IS
20 CENTS PER 1,000 POUNDS MGTWO. FUEL TANK LEASING MAY BE
POSSIBLE DEPENDING ON INVENTORY OF FUEL AND IF TANKS ARE INDEED
TRANSFERRED TO THE USAF. THIS MESSAGE IS BEING SENT TO
USGS/ONPRA RESTON VA FOR THEIR ACTION AND INFO ALSO. SORRY
THAT WE COULD NOT BE OF MORE ASSISTANCE AT THIS TIME; AFTER
ABOVE PROBLEMS ARE RESOLVED, WE CAN BEGIN ACTION.
REGARDS, CAPT JIM ALLEN, 4700 ADS/DO
FELEC SVCS INC/OC
TELEX 45-2447
NNNNEND

GESSYE AHG

2361 (290)
AK-029-SP2-018

29 APR 1982

Western Geophysical
Attn: Marc S. Jones
659 North 34th Street
Seattle, WA 98103

Dear Mr. Jones:

This is in response to your letter of April 19, 1982, for an amendment to your BLM permit AK-029-SP2-018. The following VABM locations are authorized for the use of a 50'x50' tract of land necessary for the navigation beacons:

Lake	Lonely
Rocket	Abraham
Ikpik	Harrison
Frigid	

Since you will be operating out of Camp Lonely you will also have to observe the stipulations involving the Teshekpuk Lake Special Area as shown on the attached map. The previous stipulations given will also apply.

It has been determined that a rental fee of $25 per site be charged. Therefore, it will be necessary for you to submit a rental payment for the actual number of sites used by June 1, 1982.

You are also authorized to establish a base camp at Lonely in the area as shown on the attached map. We understand that the camp will consist of two temporary structures, five people and a helicopter. You are advised to contact ITT at the DEW Line station, as they are contracted to safeguard the Lonely facilities.

Please keep us informed of any change in operations. We appreciate your cooperation.

Sincerely yours,

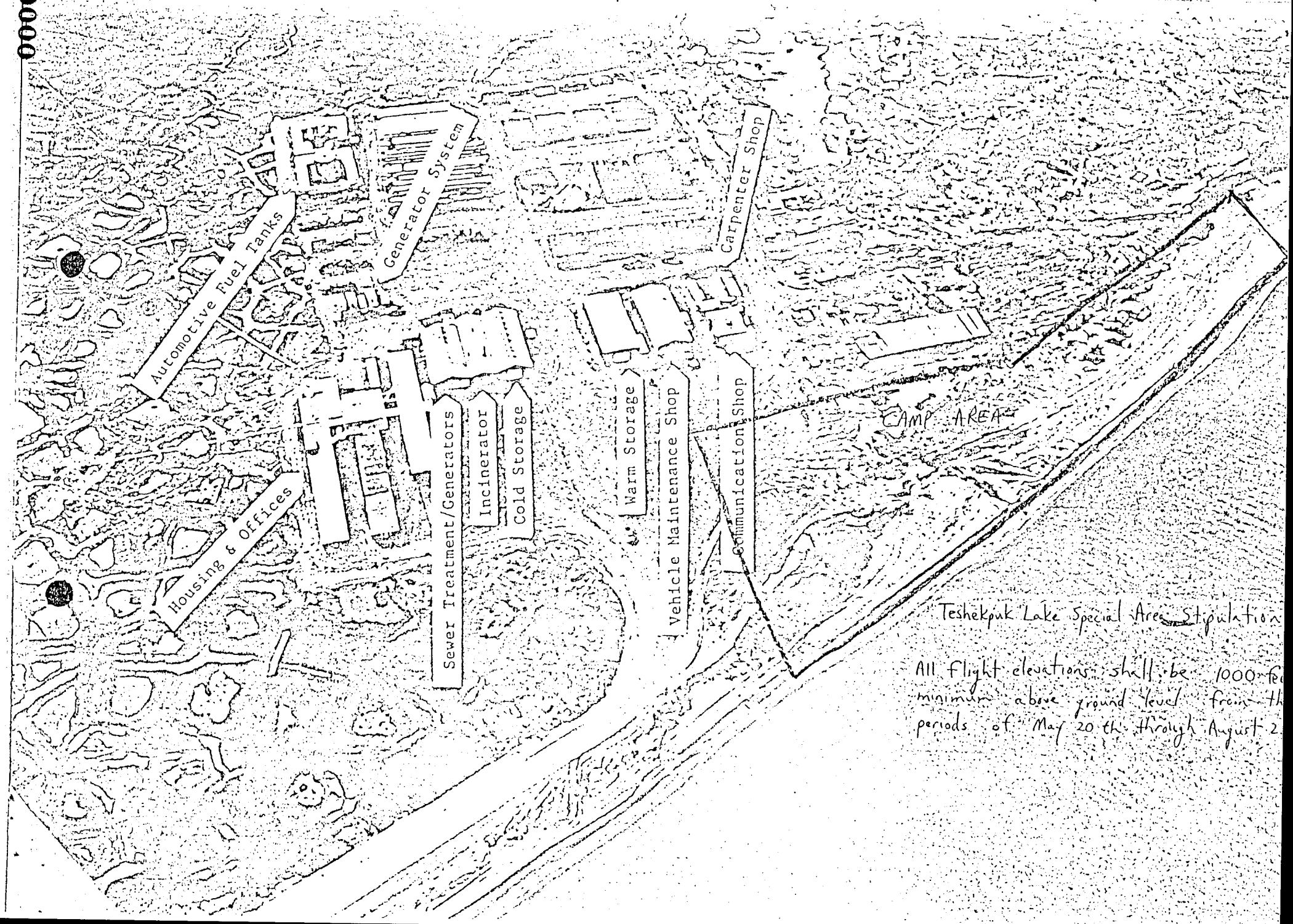
Robert Gal
Robert Gal
Acting Area Manager

Enclosures

290:J~~Silva~~ ELDRIDGE:bb:4/29/82:x148

000035

LONELY



Teshekpuk Lake Special Area Stipulation

All flight elevations shall be 1000 fe
minimum above ground level from th
periods of May 20th through August 2

2, 9 000036

IN REPLY REFER TO

3045 (290)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Fairbanks District Office
P.O. Box 1150
Fairbanks, Alaska 99707

RECEIVED

JUN 30 1982

U.S.G.S.-ONPRA

24 JUN 1982

Memorandum

To: Max C. Brewer, Chief, of Operations, USGS/ONPRA

From: William Clithero, Acting NPR-A Project Manager, BLM

Subject: Western Geophysical, Inc. Permit at Lonely

This is in response to your memorandum dated June 18, 1982, requesting a copy of the temporary use permit issued to Western Geophysical, Inc. Attached is a copy of the subject permit. You will note that part of the gravel pad was authorized to provide an adequate surface for helicopter operations.

We intend to fully enforce our stipulations should Western Geophysical create any problems. If you have have further questions, please do not hesitate to call.

Bill

Enclosure

ALYESKA BEGINS A MAJOR PIPELINE REPAIR JOB IN THE DIETRICH RIVER Contd

excavating the pipe and suspending it in cable slings supported by the piling. The pipe will then be re-covered and the diversion dike removed. Work is scheduled to be completed by mid-April, well in advance of spring breakup. The operation is not expected to interrupt the current 1.6 million barrel per day throughput. A corrosion/deformation detection pig revealed the problem.

KOREAN TRADE GROUP ATTENDS INTERNATIONAL MINERALS CONFERENCE IN ANCHORAGE

A 20-member trade delegation from the Republic of Korea was in Alaska last week at the invitation of the Alaska-Korea Business Council. While in Anchorage the group attended an "International Conference on Coal, Mining and Petroleum" held Feb. 16-17 in the Hotel Captain Cook by the Resource Development Council. They heard several speakers note that development of costly transportation facilities will be required for any major hard mineral exploitation projects in Alaska, with some suggesting that some form of participation by government and foreign purchasers of the minerals will be necessary.

Particularly notable was a suggestion by Daniel Fine of the Mining and Mineral Research Institute at Massachussets Institute of Technology. Fine proposed that Alaska crude oil be sold in the Orient but with Alaska imposing a three per cent surtax to be used for construction of the needed "infrastructure" facilities. In a luncheon speech Feb. 17, Gov. Bill Sheffield pledged state cooperation for mineral development an announced officially the first competitive coal lease sale in over a decade. It will be held May 17 in conjunction with oil Lease Sale No. 39 and will offer 1,677 acres of the Beluga River fields in one or two units. It will be a pilot sale for a series of state coal offerings similar to the state's five year oil leasing program, Sheffield added. The state will call for industry nominations this spring.

Fine and program chairman R. Daniel McMichael called for creation of a national policy on development of the arctic region which would incorporate the concept of an arctic research center such as that proposed in a congressional bill sponsored by Sen. Frank Murkowski. The conference ended with the adoption of a consensus statement, on behalf of the more than 400 persons attending the meeting, to be presented to administration and congressional officials in Washington calling for action on such policy development.

BLM PUBLISHES NOTICE OF INTENT TO LEASE CAMP LONELY LAND TO CIRI

The Bureau of Land Management in Fairbanks has published a notice of intent to negotiate a 20-year lease with Cook Inlet Region, Incorporated for 16 acres at Camp Lonely in the National Petroleum Reserve-Alaska. The land underlies the facilities which CIRI recently purchased from the General Service Administration. A CIRI spokesman said the regional Native corporation is proceeding with acquisition of necessary operating permits to reduce the lead time for accomodating any future tenant at the site. But no agreements have been reached for use of the camp as an industry service center, he said.

CONGRESSIONAL HEARINGS PLANNED ON MATTERS CONCERNING ALASKA OIL INDUSTRY

A House Merchant Marine subcommittee is planning hearings on whether to extend the Marine Sanctuaries Act and the House Energy Committee's oversight group was scheduled to consider this week how the windfall profits tax is affecting marketing techniques for North Slope crude oil. Rep. Don Young is working for termination of the act authorizing creation of marine sanctuaries. But the oil industry is expected to support a Louisiana Congressman's amendment to require approval prior to creation of a sanctuary, rather than the present provision giving Congress the power to veto presidential authorization.

000038

(200)
N215c

National Petroleum Reserve-Alaska

J.K. Lee

CAMP LONELY

SUPPORT SERVICES 1975-1981

Husky Oil NPR Operations Inc.
2525 "C" Street, Suite 400, Anchorage, Alaska 99503

000039

NATIONAL PETROLEUM RESERVE IN ALASKA

(200)
N215lc

CAMP LONELY

SUPPORT SERVICES 1975-1981

HUSKY OIL NPR OPERATIONS, INC.
Prepared by: C. K. Lee
Edited by: J. F. Schindler

For the

U. S. GEOLOGICAL SURVEY
Office of the National Petroleum Reserve in Alaska
Department of the Interior
JANUARY 1983

U.S. GEOLOGICAL SURVEY
MENLO PARK
OCT 5 - 1983
LIBRARY

This report was produced in compliance with Contract No. 14-08-0001-16474 without government review and comment.

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SUPPORT SERVICES

INTRODUCTION

Camp Lonely was established by the Navy on the shores of the Beaufort Sea at Pitt Point during the late summer of 1974. The camp was located adjacent to the U. S. Air Force Distant Early Warning (DEW Line) site POW 1 which is approximately 90 miles southeast of Barrow, Alaska. The camp was conceived as a semi-permanent logistics supply base for the exploration activities of the Naval Petroleum Reserve No. 4 (later National Petroleum Reserve in Alaska) on the Arctic Slope of Alaska. Husky Oil NPR Operations, Inc. was employed as the management contractor for the government in late 1975. Husky's Support Services personnel arrived at Camp Lonely in early January 1976 and opened the existing camp. During the following months, new camp units were brought in and set on pilings. In addition, Husky erected new warehouses, shops and a building to house the new sewage treatment plant and the power generation plant. Camp Lonely was transformed into a completely self-contained logistics supply base for the construction and exploration activities which were to take place over the next 65 months on near and distant parts of the 37,000 square mile Reserve.

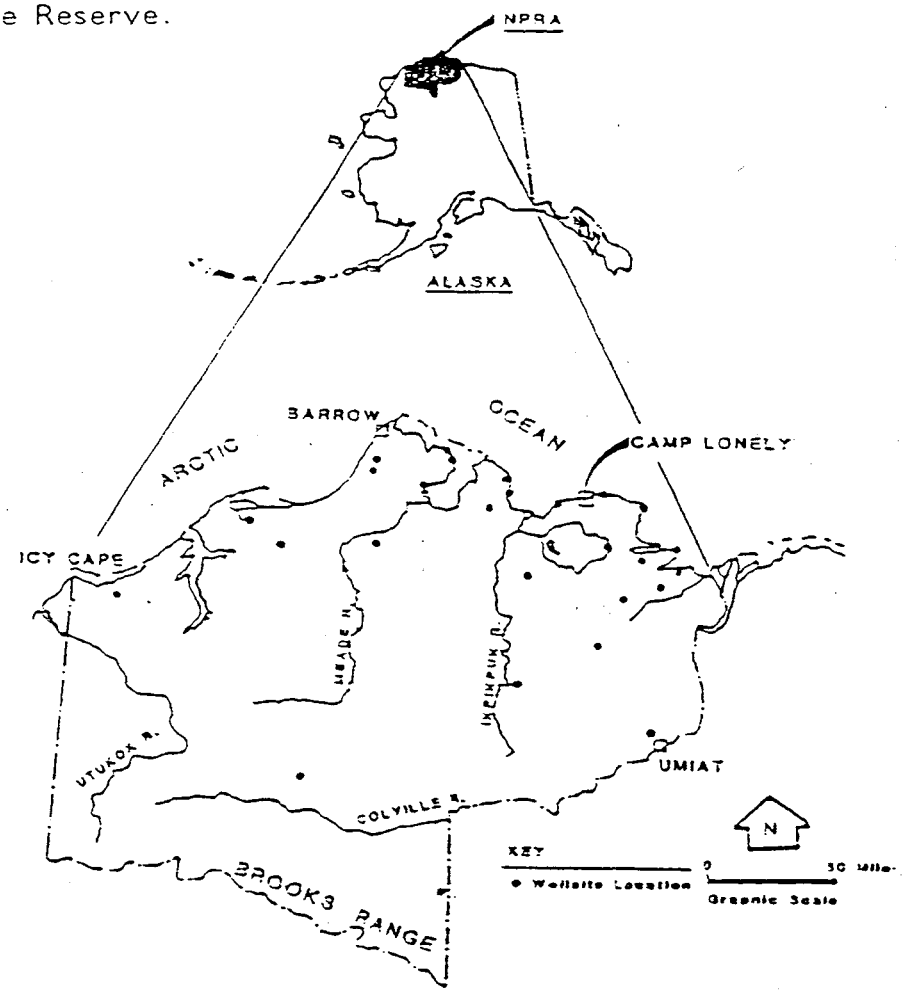

FIGURE NO. 1. LOCATION OF CAMP LONELY

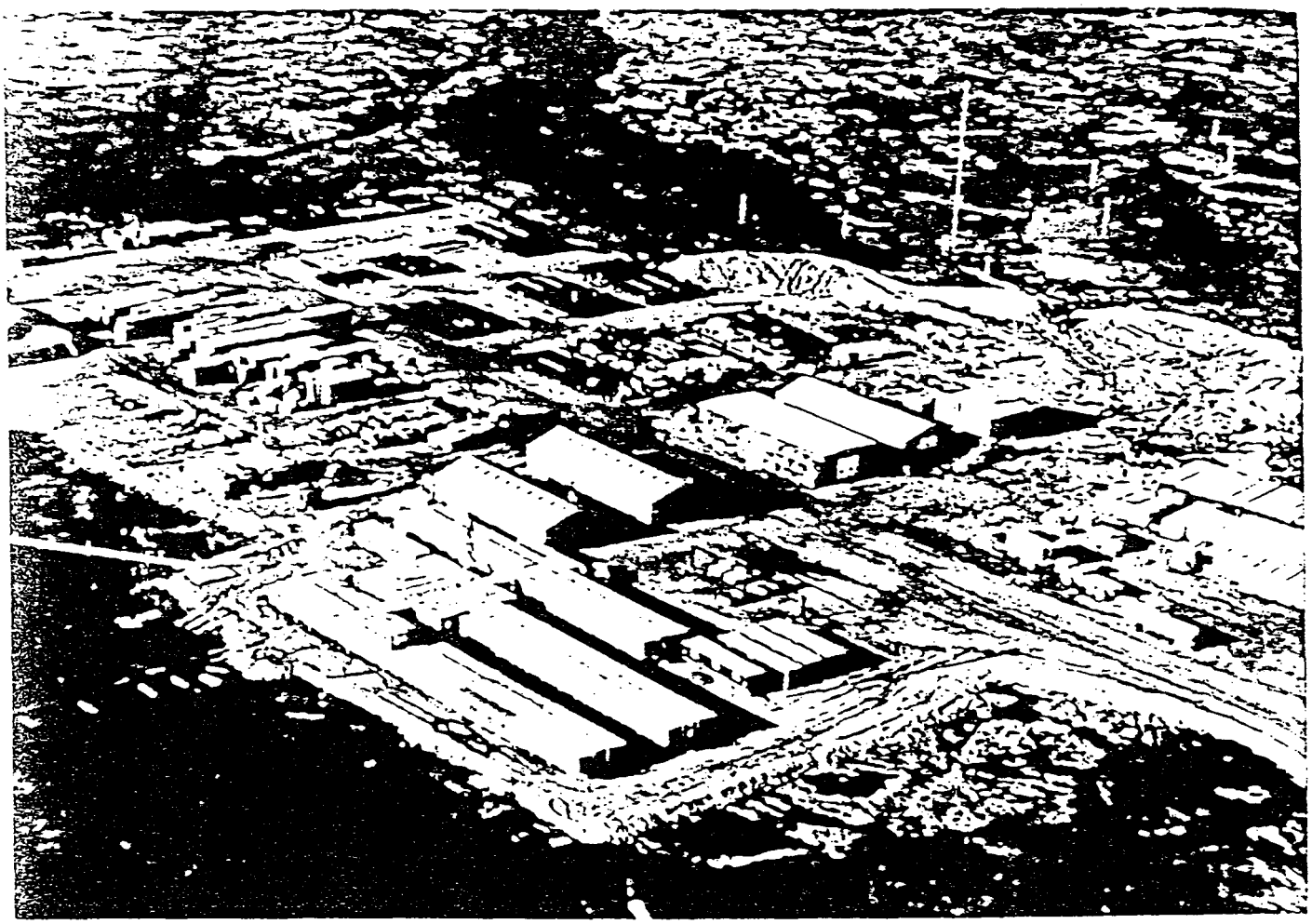

FIGURE NO. 2. CAMP LONELY

Being a self contained remote facility, Camp Lonely was essentially a small city. It included housing and feeding accommodations for approximately 100 personnel with the ability to expand to accommodate 125 personnel by the use of temporary sleeping units. The camp facilities ultimately included a potable water treatment plant, a sewage treatment plant, incinerator, warehousing, mechanical shop, communications shop, 5,200' runway (enlarged from the DEW Line facility), airport terminal, aircraft hangar, storage for drilling pipe and mud products, and all the necessary equipment for maintenance of pads, roads, and airstrips, material handling, unloading and loading of aircraft, water hauling and fueling services.

Camp Lonely, in addition to being the main logistic base for supplies and materials for Husky's operations on the Reserve, was the main arrival and departure point for personnel. It housed and fed those personnel providing the support to the resident crews plus the transient personnel who remained one or more days. The following depicts the combined transient and resident population of the Camp during the years of operations:

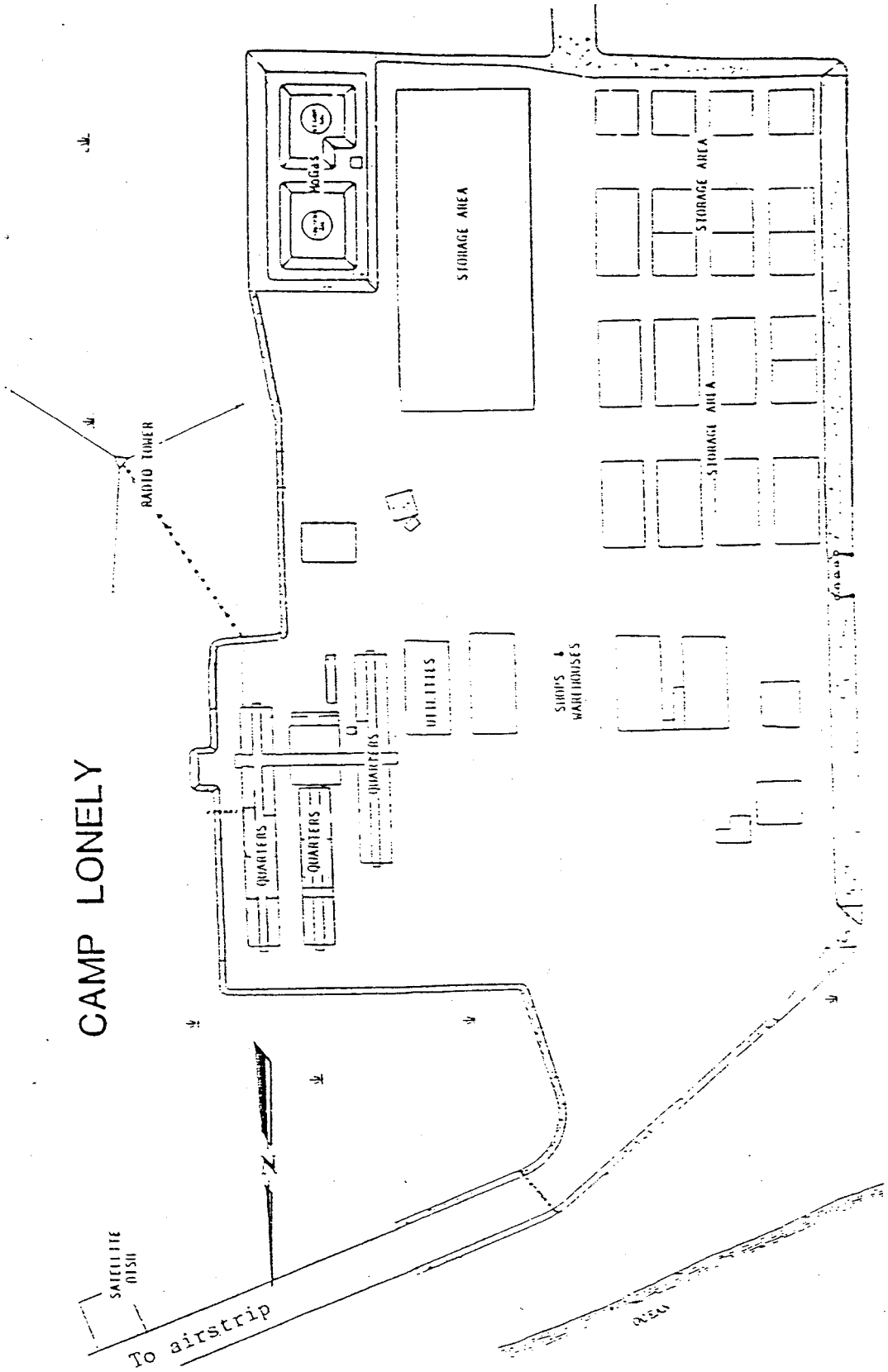

FIGURE NO. 3. PLAN OF CAMP LONELY

TABLE 1. POPULATION OF CAMP LONELY

	1976	1977	1978	1979	1980	1981
January	415	2,250	3,627	3,588	3,282	3,158
February	802	1,910	2,573	3,353	3,085	2,482
March	843	1,795	2,659	3,374	3,022	2,377
April	487	2,640	2,589	3,436	2,348	3,063
May	475	2,064	2,058	3,552	2,071	1,653
June	860	2,421	1,866	3,304	2,299	1,812
July	1,877	2,208	2,006	3,726	2,194	2,066
August	1,953	2,129	2,811	3,797	2,390	2,431
September	1,388	1,806	2,974	2,603	1,835	1,353
October	2,199	1,951	3,271	1,848	1,779	836
November	1,696	2,346	3,798	2,124	1,583	840
December	2,095	2,879	3,680	2,863	2,288	37
TOTAL	15,090	26,399	33,912	37,568	28,176	22,158
Daily Average	41	72	93	103	77	61

PERSONNEL SERVICES

As the hub of operations for all activities within the Reserve, Camp Lonely became the center for personnel support. Running a transient camp-hotel for often over one hundred personnel, the staff at Lonely provided such housekeeping services as assigning rooms, keeping records, billings, general administrative services, handling mail, laundry, general cleaning, maintenance, recreation, movies, television, as well as a 24-hour duty medic for routine colds and emergencies. Office space and sleeping rooms (often combined) were provided for the transportation, construction and drilling departments as well as numerous subcontractors.

AIRPORT OPERATIONS

The Support Services Department at Camp Lonely operated and maintained the 5,200 foot all weather airstrip and the associated airport facilities. The airport operations went through some growing pains during the early years of the project. Some of the problems that were encountered were the original pad was too small, there were insufficient fueling points for aircraft, there was no place to unload and segregate freight for transshipment and the forklifts originally used were inadequate primarily because of poor visibility and lack of control when loading and unloading aircraft. These problems were recognized early in the program and necessary steps taken to correct them. The airport work pad was expanded to the present configuration (Figure No. 4); a warehouse was erected at the airport; two additional multipoint fueling stations were established; an aircraft hangar was erected; and bids with appropriate specifications were sent to vendors for new forklifts and the forklifts were purchased. The airport pad covers approximately 575,000 square feet and includes a 125' x 135' aircraft hangar, a shipping and receiving warehouse, aircraft control tower, three aircraft fueling locations and a passenger terminal.

The Camp Lonely airport operation was the hub of activity for receiving and shipping food, supplies, materials, fuel and passengers to and from Anchorage and various construction sites and drilling locations. The personnel who operated the airport terminal and airport receiving warehouse were members of the Lonely staff under the Support Services Department. In this capacity they met all planes, and unloaded or loaded all cargo, moved the supplies to and from the warehouse as necessary and provided transportation between the camp and the terminal for incoming and outgoing passengers. They were responsible for checking manifests and providing the Lonely Control Center with accurate documentation. The Lonely Control Center (Transportation Department personnel) were responsible for assigning aircraft cargo and passengers and arranging for medical evacuations. During the six years of operation, the Camp Lonely Airport handled shipment of approximately 212,000,000 pounds of freight, 122,000 passengers and 69,000 aircraft landings and takeoffs. The airport operations are summarized in Table 2.

CAMP LONELY AIRPORT OPERATIONS

	1976*	1977	1978	1979	1980	1981	Tota
Freight (Pounds)							
Inbound	--	--	18,446,156	30,965,412	13,669,640	9,449,501	
Outbound	--	--	24,387,546	50,012,293	22,096,380	19,862,582	
TOTAL	10,000,000	13,611,800	42,833,702	80,977,705	35,766,020	29,312,183	212,501 [illegible]
Average	833,333	1,134,317	3,569,475	6,748,142	2,980,502	2,442,682	35,416,9[illegible]
Passengers							
Inbound	--	--	14,954	13,280	7,621	6,423	
Outbound	--	--	14,625	14,874	9,714	[illegible],017	
TOTAL	15,000	18,864	29,579	28,154	17,335	13,440	122,[illegible]
Average	1,250	1,572	2,465	2,346	1,445	1,120	20,3[illegible]
Aircraft							
Inbound	--	--	--	8,138	6,010	5,194	
Outbound	--	--	--	7,975	5,974	5,266	
TOTAL	6,500	7,800	16,056	16,113	11,984	10,460	68,9[illegible]
Average	542	650	1,338	1,343	999	872	11,4[illegible]

* - Incomplete Data - Estimated

TABLE 2

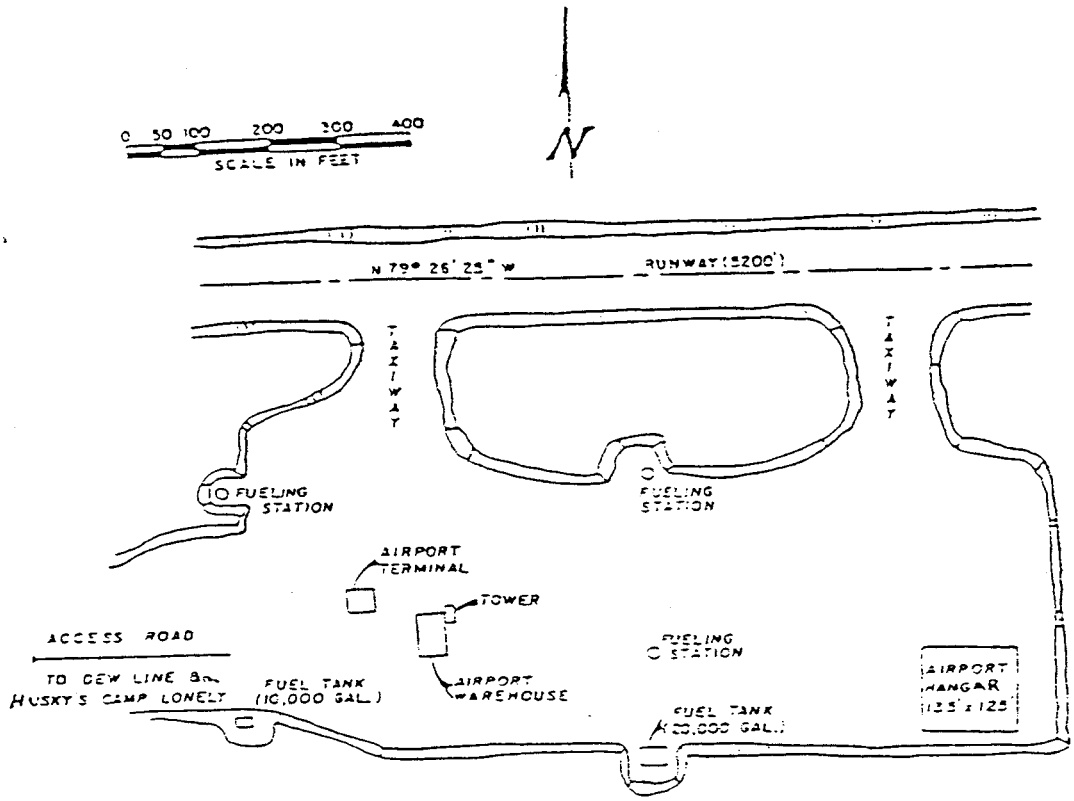

FIGURE NO. 4. CAMP LONELY - AIRPORT AREA

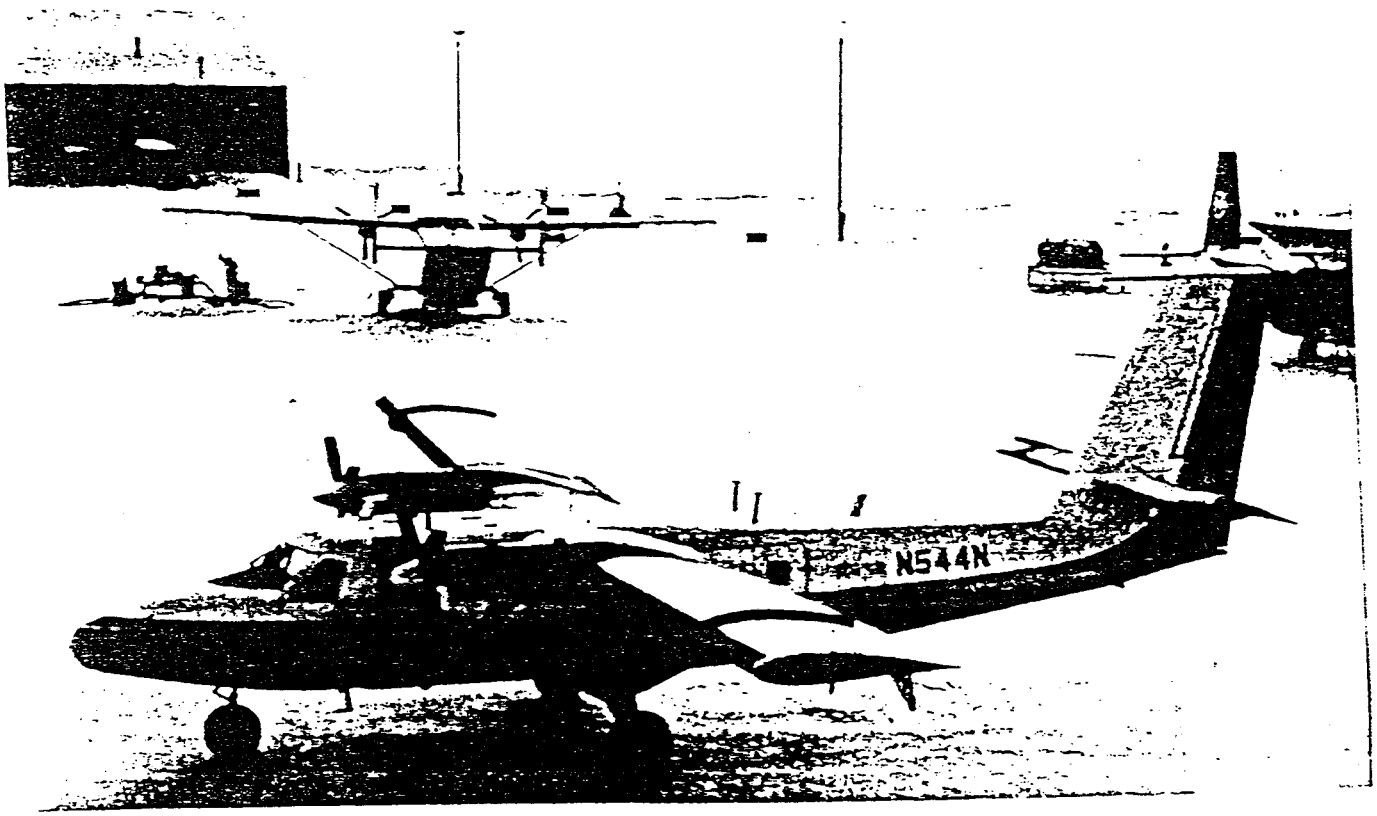

FIGURE NO. 5. AIRPORT AREA WITH TWIN OTTER

CATERING SERVICES

General Discussion

Husky, as the management contractor, utilized subcontractors to provide catering and housekeeping services to Camp Lonely. During the early months of the project the catering subcontractor furnished the food and housekeeping supplies. After operating for those first months it was decided that substantial savings could be effected if Husky, as a Navy contractor, procured the food stuffs and supplies from the Commissary at Elmendorf Air Force Base through an Interservice Support Agreement. Under this arrangement, food would be purchased for Camp Lonely and all construction and drilling camps. However, since the military uses special forms, a specialized and regimented ordering system, and a somewhat unique unit of issue, we found the various construction camps, drilling camps, and Camp Lonely were submitting and receiving confusing food orders. Orders were consistently over or short of the camp's requirements. In order to establish coordination between the camps, the subcontractors and the Commissary, a Catering Coordinator was hired. This position was established to oversee the entire catering function including menu preparation and the proper ordering and delivery of food and subsistence supplies to all camps of the exploration operation.

The first priority was to insure that orders from the field locations were properly submitted to the Air Force and that all orders were completely filled. We established local accounts at suppliers to fill any shortages from the Commissary. All typed orders had to be submitted to Husky for screening before they were submitted for processing to the Air Force. Frequent meetings for training were arranged with the subcontractor's clerical personnel who typed these orders. It was recognized that proper catering procedures had to be established to ensure a continuous, smooth flow of supplies to the camps.

A standardized list of quality products was established which specified the size of individual units and case lots. A forecast was made for the forthcoming fiscal year of the quantities of supplies involved and this forecast was submitted to our suppliers to ensure adequate supplies were on hand for Husky. The head cooks in the camps were required to order according to our product's list. A standardized three week menu cycle was developed and served in all camps as well as a standardized breakfast menu, salad menu and special holiday menus for all major holidays. Weekly inventories were accomplished concurrent with all orders from the field. Procedures were initiated for the receipt and accountability of supplies. Head cooks were briefed by Husky with these procedures before they were sent to the field camps. Transfer forms and procedures were instituted to control all intercamp transfers. Delivery and shipping days were established and all shipments were coordinated by the Anchorage office.

In January of 1978, Husky opened its Anchorage Receiving Facility (ARF) and at that time, we began using insulated food containers for food shipments to the camps. These reusable knockdown containers were

labeled with identification stickers in regard to contents, Contractor's name, camp name, and location. Frozen food containers were marked as "Freeze", produce and milk containers were marked as "Chilled" and dry goods containers were marked with "Do Not Freeze".

During the summer months, all chill and freeze containers were filled with dry ice to keep food supplies frozen or chilled during transport. All food stuffs were inventoried by Husky when received at ARF and quality and quantity checks were made at each delivery. A standard start up supply order was established for a 50-man camp which coincided with the three week menu cycle. All remaining supplies were inventoried after closure of a camp and forwarded to Camp Lonely for further utilization. An emergency supply of high use items like coffee, paper cups, fruit juices, paper towels and toilet paper were stocked at the Camp Lonely warehouse for emergency situations. All transfers from emergency supplies were initiated by Anchorage.

A Catering Procedure Book was prepared and forwarded to all camps together with transfer forms, preaddressed envelopes for mailing orders and inventories, exemption reports to describe the condition of supplies when received and pre-printed food order forms. A dietician was hired to assist in establishing the caloric value of Husky's menus. All sodas and chocolates were barred from the project because of the tendency of camp workers to consume too much sugar-saturated foods which made them lose their appetites for the regular scheduled meal times. Fruit juices were substituted for sodas.

Frequent trips were made to the camps to ensure compliance of Husky's catering procedures and to inspect the camps in regard to cleanliness and proper food handling practices. A Husky sanitation report was established for this purpose. We also made certain that subsistence supply containers were not destroyed or contaminated and were promptly returned to Anchorage for further utilization.

During the program, Husky provided subsistence supplies to 100 locations in the Reserve. Weekly shipments ranged from 51,230 pounds in September of 1979 to 201,667 pounds in January of 1980. We calculated approximately 10 pounds of supplies for each man per day.

We found that smaller camps up to 25 men had a higher man-day cost than the larger camps. We also found that individual crews had different eating habits. For example, younger crews consumed much more milk and other crews consumed more fruit juices.

Our procurement of subsistence supplies from the Air Force was discontinued in July 1978 and local vendors were used exclusively from then on. During that time, the control of the Reserve was turned over to the U. S. Geological Survey from the Navy. Total food shipments to the Reserve by our receiving facility since January 30, 1978 to August 17, 1981 (end of the program) amounted to approximately 4,562,796 pounds.

The decision for Husky to procure all subsistence supplies instead of contracting to the catering companies was made primarily to ensure that a wholesome uniform menu was served, to develop a uniform meal service for all the camps on the Reserve, and to have the flexibility to move needed supplies from one location to another without accountability to different catering contractors. It also gave Husky complete control of the quality and costs of supplies purchased.

Husky's control over its food procurement also ensured proper coordination of shipments to the camps with the Transportation Department, flexibility in scheduling shipment days and dates, and complete control and accountability over all supplies until they were consumed in the camps.

The procedures, guidelines, and menus that were ultimately established are included in the Appendix. These provided uniformity and ensured a smooth and continuous flow of subsistence supplies to the field locations and were cost effective. These procedures were developed from experience gained over past drilling and construction seasons and include recommendations from the field location. It was essential that every camp follow these procedures and closely monitor the activities of all catering personnel to ensure compliance.

A general wholesaler provided all subsistence supplies except dairy products which were provided by a local dairy company, and meat cuts which were exclusively provided by a local meat vendor. This ensured that only fresh products with the best quality available were shipped to the camps. A back-up supplier provided any shortages which may occur from the general wholesale supplier.

CAMP START UP AND CLOSING PROCEDURES

These guidelines were developed to provide uniform procedures for the initial start up and final closure of camps.

Each Camp Manager/Head Cook was briefed on all ordering and inventory procedures before going to the camp. Each camp received a three week supply of subsistence supplies for the initial start up, together with ordering and inventory procedures, transfer forms, exemption reports and preaddressed envelopes for mailing. The Head Cook submitted his first order immediately after the completion of his first menu cycle, for the following week's delivery. His regular weekly order was submitted each Sunday to ensure it was received in Anchorage no later than the following Tuesday.

Each camp was responsible for having the least amount of supplies on hand at the time of closure. The Manager/Head Cook was responsible for taking a complete and accurate final inventory of all supplies. All supplies were packaged, crated or palletized for shipment for utilization at another location.

WEEKLY ORDERING PROCEDURE

The purpose of this procedure was to establish a smooth and continuous flow of subsistence supplies to the camps, to eliminate overstocking and shortages, and to minimize transfers between camps.

Each Head Cook was provided with inventory and requisition forms. In addition, each camp was assigned a specific day for receiving their supplies.

The Head Cook submitted his first order immediately after completing his first menu cycle for the following week's delivery, using the estimated weekly usage factor as provided, as a guideline for ordering.

The Head Cook was responsible for taking an accurate inventory of all supplies on hand, using the inventory/requisition form to record this information. He planned and ordered supplies for the following week according to the applicable menu cycle, the inventory on hand, and the present and projected level of camp population. Items which were not listed on the order forms but which the Head Cook felt were needed, were ordered as a write in and were shipped when quality and availability had been established.

The orders and inventory report were sent in the Company mail pouch. In an emergency situation the order and inventory were called in by phone. The camp retained a copy of the orders to ensure knowledge of what was ordered and what quantities were expected for the following week's delivery. Retaining a copy of these orders also assisted in planning for the next order and provided the relief Head Cook with information of what quantities of supplies were on hand and what had been ordered. This procedure also reduced overstocking, duplications, and shortages.

Correct inventory information and the requisitioning of supplies was critical to the overall food service operation. All personnel recognized that subsistence supplies were delivered to the field location only once a week and that orders placed one week would not be received until the following week.

SHIPPING PROCEDURES

The purpose of these procedures was to ensure the timely delivery, inventory and crating of all subsistence supplies.

All subsistence supplies were delivered palletized and labeled by camp, from all suppliers. After receipt of these supplies, the quality and quantities were verified before these supplies were crated in insulated Arctic food containers by category as to freeze, chill and dry goods. A copy of the whole shipment order was forwarded together with the subsistence supply shipment. All ice cream shipments were dry iced before shipping during the summer months.

Insulated food containers were especially designed and were broken down and banded for back haul to Anchorage to be used for future subsistence supply shipments. No foreign substances were placed in food containers to avoid contamination.

RECEIPT AND INVENTORY PROCEDURES

The purpose of these procedures was to provide a uniform method of controlling the receipt, inventory, and accountability of subsistence supplies shipped to the field locations. After receipt of the subsistence supply order, the Manager/Head Cook verified all received items against the shipping documents. When shortages or other discrepancies were noted, a short exemption report was attached to the shipping documents, signed by the receiving person and forwarded together with the next subsistence order to the Anchorage office.

In the event no discrepancies were noted, the exemption report was marked as to the shipment's condition, signed and forwarded together with the next supply order.

All approved intercamp transfers (if applicable) were treated in the same manner. All received supplies were checked against the transfer form which accompanied every transfer. Again, these forms were signed by the receiving person and forwarded to the Anchorage office to ensure that proper credits were given to the shipping camp. The catering and subsistence costs are shown in Table 1.

TABLE 3
CATERING & SUBSISTENCE COSTS BY FISCAL YEAR

		Costs				Man-day Rates			
	Man-days	Catering	Subsistence	Laundry & Miscellaneous	Total	Catering	Subsistence	Laundry & Misc.	Total
1981									
Camp Lonely	27,808	$524,820	$293,957	$20,859	$839,636	$18.87	$10.57	$.75	$30.19
Drill Sites	25,976		309,029				11.90		
1980									
Camp Lonely	29,361	491,846	292,983	29,341	814,170	16.75	9.98	1.00	27.73
Drill Sites	50,885		552,204				10.86		
1979									
Camp Lonely	41,482	608,354	306,301	22,608	937,263	14.66	7.38	.55	22.59
Drill Sites	72,255		757,443				10.48		
1978									
Camp Lonely	30,339	514,468	317,704	42,028	874,200	16.96	10.47	1.38	28.81
Drill Sites	36,154		287,701				7.96		
1977									
Camp Lonely	25,213	481,769	186,913	18,011	686,693	19.11	7.41	71	27.24
Drill Sites	25,457		196,691				7.73		
1976									
Camp Lonely	9,100	219,708	28,092	14,402	262,202	24.14	3.08	1.58	28.81
Total Program									
Camp Lonely	163,303	$2,840,965	$1,425,950	$147,249	$4,414,164	$17.40	$8.73	$.90	$27.03
Drill Sites	210,727		$2,103,068				$9.98		

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SUPPLIES AND WAREHOUSING

Each department had the responsibility for ordering their own supplies but once the materials arrived at Camp Lonely, the storage and warehousing of these items became the responsibility of the Lonely staff. These supplies included drill pipe, muds and chemicals, drill bits and special tools, piling, construction timbers and materials, bulk fuel and almost any other commodity imaginable. The general supplies such as vehicle parts, plumbing and electrical fittings, rags, saw blades, light bulbs, small tools and a myriad of other miscellaneous items were ordered and warehoused by the support staff.

Large stocks of supplies were ordered annually for delivery on the summer Cool Barge, the only economical form of transport to the Slope. This meant that the arrival of the barges and their tons of supplies prompted a flurry of activity to sort and store all commodities so they were properly inventoried and readily accessible at any time of the year. The gravel pad at Lonely provided an estimated 4.5 acres of outside storage space and the tank farm provided four million gallons (100,000 barrels) bulk storage for JP-5 fuel in addition to the 191,000 gallons of Mogas storage on the southeastern corner of the camp pad.

VEHICLE AND OUTSIDE MAINTENANCE

The Lonely support staff accomplished routine servicing and vehicle and equipment maintenance of their own rolling stock and, on occasion, the Tucker Sno-Cats of the Construction Department. All subcontractors were responsible for the maintenance of their own rolling stock.

In winter, crews cleared all roads of snow, maintained the runway, and cleared the snow from around the stored materials and buildings on the Camp pad. Snow clearance is important for accessibility and fire safety. In summer all roads and gravel pads were dragged or otherwise repaired to keep their surfaces in good condition.

A major responsibility of the Outside Maintenance crew was the water haul. During periods of peak population, three and four trips per day were made to Okalik Lake, six miles southwest of the Camp.

POWER GENERATION

Initially, the Camp's electrical power was provided by temporary diesel powered generators. In April 1976, installation of the Camp's semi-permanent electrical generation and distribution system was completed. Three 240 kw diesel-electric generators were installed in the camp utility building and fitted with a waste heat recovery system. The heat recovery system provided space heating for the utility, shop and warehouse buildings.

During the first three months of 1978, a major upgrading of the camp electric generation and distribution system was completed. This was

necessary to support expanded camp capacity and services. The upgrade included installation of three additional 240 kw diesel-electric generators, new switching and synchronization equipment, upgrading of the power distribution system to the Camp and installation of a new 2.4 kv power line to the airport. The new power line to the airport was needed to support expanded airport operations.

Finally, during September 1979, one of the three original 240 kw generators was removed and replaced by a 300 kw generator. No further additions or major modifications were made to the camp electrical generation system subsequent to this replacement.

WATER TREATMENT SYSTEM

Camp Lonely acquired its water from two surface water sources. From roughly November to June the camp drew its water from Okalik Lake, a larger fresh water lake about 6 miles from Lonely. An ice road was constructed each winter for the water trucks to reach the lake. A small heated shack was set up over the hole bored through the ice to draw out raw water for transport to the camp. Water was transported on an all-terrain vehicle equipped with an insulated tank and pump assembly, or by another similar unit mounted on a flat bed truck The "summer lake" was a shallow pond of small dimensions located near the camp and DEW Line station. This lake was accessibly by means of a gravel road year round. During the later years of the project a gasoline driven pump and an overland pipeline were used to draw water during the brief summer season. The lake froze completely to bottom each winter permitting only brief seasonal use. The two raw water supply lakes were of substantially different chemical characteristics that each required different treatment techniques.

The water treatment system consisted of raw and potable water storage tanks separated by cartridge and pressure sand filtration and chlorination. The system was preassembled and mounted in a single ATCO structure trailer unit. Roughly one day's potable water storage capacity was available. The water treatment system proved effective in removing larger suspended particulates and coliform bacteria, but depending on a quality of the raw water, was at times quite ineffective at removing soluble iron and manganese, turbidity, and color.

A retrofit recommendation was made on May 4, 1978 by Environmental Services, Ltd. to upgrade the treatment system by replacing the sand filter media with manganese greensand. This, along with the addition of a potassium permanganate feed ahead of the greensand would improve the iron and manganese removal performance of the water plant.

Another modification was made to the system by adding a second prefilter housing ahead of the permanganate feed and greensand filters. This allowed a coarse (20 micron) prefiltration followed by a 5 micron activated carbon cartridge filter for color reduction.

On at least one occasion early in 1978, a temporary water shortage was resolved by use of a snowmelter. The melted water was of poor quality, however, and had a bad taste. The raw winter lake water proved to be the best available supply as long as access was possible.

The Alaska Department of Environmental Conservation (ADEC) classified Camp Lonely as a Class B Surface Water Supply in 1978 with the enactment of the new Alaska Drinking Water Regulations. Monitoring for total coliform and color are required for Class B surface supplies every two months as a minimum frequency. Due to the variability of the lake water quality and a desire by Husky Oil to maintain as high quality a level of treatment as possible, a more comprehensive monitoring schedule was adopted than required by ADEC.

The program began as turbidity and hardness monitoring in 1977, and after enactment of the ADEC Drinking Water Regulations in 1978, total coliform monitoring was added weekly, and color analyses every other month. Later in the Summer of 1978, after the water filters were retrofitted with greensand media, iron and manganese testing was added to the weekly monitoring schedule. Weekly TDS analyses were added in October 1980.

The operators monitored residual chlorine and turbidity on site daily with field instrumentation. The remaining analyses were performed by the contract laboratory in Fairbanks on samples shipped each week with the wastewater sample kit.

The results of the weekly testing varied considerably with the season and source of the water. TABLE 4 outlines minimum, maximum and average values for the four weekly monitoring parameters and color for the summer lake and winter lake, respectively, during the period from November 18, 1980 to November 25, 1981. The compliance record with ADEC Maximum Contaminant Concentration (MCC) is also shown.

In the Spring of 1981, a waiver of the ADEC for iron, manganese, and color was obtained by Northern Testing Laboratories, Inc. on behalf of Husky. This waiver allowed the standards for these three "aesthetic" parameters to be exceeded up to the values shown on TABLE 4. Corresponding improvements in the compliance record as a result of the waiver are also listed in TABLE 4.

The quality of the product water improved, but still did not meet ADEC maximum contaminant concentration criteria at certain times of the year. The summer lake was particularly troublesome with regard to high iron, color, and turbidity. Problems with the winter lake were with high manganese and total dissolved solids (TDS), particularly late in the winter when much of the fresh water was lost to ice formation. None of the treatment components were capable of TDS reduction (salt removal).

The quality of the raw water varied according to how carefully bottom sediments were left undisturbed as the water was drawn from the lakes. Heavy wind was often sufficient during summer to stir up precipitated iron and manganese, and organic sediments from the bottom of the smaller summer lake. Potable water quality would often drop at such time, and the frequency of prefilter changeouts vastly accelerated. As little as 2,000-3,000 gallons of raw water would foul the 20 micron filters under the worst conditions.

Considerable discussion occurred during the operation of the camp about improving the raw water quality by a number of means. Some of these were:

1. Deepening the summer lake to allow greater water storage, longer use and, perhaps, improved clarification. The possibility of tapping into brine deposits under the sediment was one deterent to this idea. It was never tried.

2. Build a pipeline to Okalik Lake. The winter lake water was excellent in clarity, color, and low in iron, and was not high in TDS for the summer and about half the winter. The use of a pipeline would permit year round use of the lake. This idea was reviewed several times, and developed up to the stage of preliminary design at one point. It was never performed due largely to reasons of cost and the amount of time remaining for the camp to be in service.

3. Accumulate extra snow around the summer lake to improve the water quality through dilution with clean melted snow water. This was tried with some success particularly in the Winter of 1980/81. The raw water was better and the lake level somewhat higher than in previous years.

The transition from winter to summer was often a difficult time to acquire raw water. Access to the winter lake was restricted because of melting of the ice road. At the same time, the summer lake may not have thawed sufficiently to produce much water from that source.

In order to overcome such shortages and to provide additional fire protection storage capacity, a second potable water tank of 20,000 gallons capacity was installed in the utility building.

TABLE 4
CAMP LONELY
SUMMARY OF POTABLE WATER TEST RESULTS

	Iron mg/l	Manganese mg/l	Color C.U.	TDS mg/l	Total Coliform Colonies/100ml
Winter Lake (11-18-80 to 6-2-82)					
Minimum	.059	.009	10	459	0
Maximum	.260	.387	20	1450	0
Average	.126	.095	15	879	0
No. of Samples	28	28	3	28	27
% Compliance					
- w/ADEC Standards	100	54	100	14	100
- w/variance allowed Husky	100	86	100	N/A	N/A
Summer Lake					
Minimum	.238	.010	40	116	0
Maximum	1.736	.547	80	1730	2
Average	.893	.131	55	548	0
No. of Samples	23	23	3	24	24
% Compliance					
- w/ADEC Standards	4	61	0	67	96
- w/variance allowed Husky	87	74	67	N/A	N/A
Note:					
ADEC standards are:	.3	.05	30	500	1
Husky's allowed variance was:	1.2	.20	60	N/A	N/A

As part of the waiver package, ADEC required a Total Trihalomethane (TTHM) analysis be run on the camp water supply to verify the color level was not promoting the development of chlorinated organic compounds. A single TTHM value taken September 21, 1981 at the peak of the high color level of the summer lake showed 120 ppb TTHM as compared to a standard of 100 ppb promulgated by the EPA. No current ADEC standard exists for TTHM as of this time. The analysis did suggest the possible presence of trace chlorinated organic substances in the water, at least during times of maximum color level. Several raw water analyses indicated subtoxic trace levels of the cyanide negative ion was occasionally present. Both the TTHM and CN negative ion compounds are products of incomplete organic biodegradation in the shallow, cold, arctic lakes.

In general, the raw water quality in the camp was quite acceptable for most uses including drinking and food preparation. High salt levels in late winter and high iron in the late summer were the most notable and persistent of the water quality problems.

TABLE 5 shows the average water usage at Camp Lonely during the project. The average gallons per day by month are shown as is the average daily usage per man.

TABLE 5

HUSKY OIL

CAMP LONELY WATER USE DATA

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
1976													
Water Used GPD	1980	1380	1220	700	720	1310	2850	3750	2510	3150	3330	3130	2169
Man-days AV/Day	26	29	27	16	15	29	61	63	46	71	57	68	42
Water Use GPCD	76	48	45	44	48	45	47	60	55	44	58	46	51
1977													
Water Used GPD	4010	3410	3360	3620	3250	3340	3980	4620	4030	4440	5890	5920	4156
Man-days AV/Day	73	68	58	88	67	81	71	67	60	63	78	93	72
Water Use GPCD	55	50	58	41	49	41	56	69	67	70	76	64	58
1978													
Water Used GPD	7210	4060	4280	4440	4100	4100	3680	4800	4650	5200	5500	4900	4743
Man-days AV/Day	117	92	86	86	66	62	65	91	99	106	127	119	93
Water Use GPCD	62	44	50	52	62	66	57	53	47	49	43	41	52
1979													
Water Used GPD	5310	5260	4590	5090	5530	5290	5440	5440	4840	3040	3250	4420	4792
Man-days AV/Day	116	120	109	115	115	110	120	122	87	60	71	92	103
Water Use GPCD	46	44	42	44	48	48	45	45	56	51	46	48	47
1980													
Water Used GPD	4780	4780	5370	3850	3790	4510	4250	4420	3660	3350	3010	3720	4124
Man-days AV/Day	106	106	97	78	67	77	71	77	61	57	53	74	77
Water Use GPCD	45	45	55	49	57	59	60	57	60	59	57	50	54
1981													
Water Used GPD	4830	4300	4120	5240	3540	3380	3690	4260	2980	2080	1860	End	3662
Man-days AV/Day	102	89	77	102	53	60	67	78	45	27	28	19	62
Water Use GPCD	47	48	54	51	67	56	55	55	66	77	66	0	54

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CAMP LONELY WASTEWATER TREATMENT SYSTEM

The Rotating Biological Contactor (RBC) Plant

The first wastewater treatment system used at Camp Lonely was a 3250 gpd Rotating Biological Contactor (RBC) package plant manufactured by Petwa Canada, Ltd. of Calgary, Alberta. The plant included a preaeration tank, aerobic sludge digester, an Autorol Corporation "Biosurf" disc in a semicircular tank fed by bucket dippers, a semicircular clarifier with sludge removal pumps, and a baffled chlorine contact chamber.

The original plant specifications included design considerations for an influent with 500 mg/1 BOD at 20°C with a flow of 65 gpmd for 50 men, or 3250 gpd. Total design influent BOD loading was 13.55 lbs./day, or approximately 1.0 lb. of BOD/240 sq. ft. of media surface area. Hydraulic rating was 1 gpd/sq. ft.

The plant was preconstructed and mounted on a skid for C130 Hercules transport capability. The unit was positioned in a prefabricated warehouse type building immediately adjacent to the camp housing. Raw wastewater from the camp was received in a small dual grinder pump lift station and sent directly to the preaeration tank. Final effluent from the chlorine contact chamber was discharged directly to the tundra through an insulated heat traced outfall line.

Monitoring of the RBC plant performance began on June 26, 1976, by a Fairbanks based laboratory. A single effluent suspended solids value of 186 mg/1 was reported for June 28, and a value of 333 mg/1 on July 26. On August 2, 1976, the monitoring program was expanded to include BOD and suspended solids tests on influent and effluent samples. Fecal coliform monitoring was added on September 2, 1976 and chemical oxygen demand (COD) tests on September 29.

Samples were run weekly, with effluent suspended solids only on alternating weeks. The test results are collated chronologically with monthly averages in the "Wastewater Treatment Plant Test Data Summary", Appendix II of this report.

The initial test results indicated the plant was performing poorly. The average effluent BOD and suspended solids results for August 1976 were 320 and 238 mg/1, respectively. Husky then requested a field visit by Dames & Moore to investigate the plant operation and determine if the plant performance could be improved. The following observations and recommendations were obtained from the field report and follow up memos from that visit:

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1. The plant was in a visibly stressed condition as indicated by the near septic and extensive sloughing condition of the microbial film on the discs.

2. The effluent was turbid and contained large solids.

3. The preaeration tank did not function as a surge tank. Lift station surges moved rapidly and directly through the biological reactor, resulting in alternating overload/starvation cycles. A recommendation was made to convert the preaeration tank to a flow control or surge tank using a variable speed drive Moyno pump.

4. Overuse of bleach and other chlorinated cleaning compounds was suspected. Samples of various cleaning compounds were collected and transported to the laboratory for bioassay analysis.

5. Sludge withdrawal and scum skimmer operation recommendations were made to improve the clarifier performance. Operational recommendations for the chlorination and sludge digestion and decanting operations were also made.

6. The test (both field and lab) programs were reviewed and discussed with the plant operator.

7. A recommendation was made to construct an improved sludge injection nozzle for the sludge incinerator to improve its performance.

Following the field visit and implementation of the recommendations, the plant performance improved from negative to positive BOD and suspended solids removal. However, the effluent quality and overall plant performance remained poor.

A second field visit was made on October 21-22, 1976. It was determined that the plant was now being operated properly according to the manufacturer's instructions. The plant performance was poor but consistent in removal (around 50%), suggesting that the biological reactor may have been sized too small. Also, by this time, the camp population was often exceeding the 50 man sizing, although the actual hydraulic and organic loading values (flow & BOD) were within the 3250 gpd at 50 mg/l BOD design levels most of the time.

Following the October visit, several RBC experts were contacted to assess the problem and to attempt to resolve the poor performance condition. The following individuals were contacted and their responses outlined:

1. Mr. William Reilly of the Wm. H. Reilly Co., Portland, Oregon, West Coast distributor of Autotrol products, concluded that the disc area should be doubled to affect proper BOD removal. He also recommended contacting Ron Antonie, Autotrol design engineer to determine if the plant was properly sized.

2. Mr. Ron Antonie, Autotrol Corp., Milwaukee, Wisconsin, designer of the Biosurf process, determined that the Camp Lonely RBC was sized to 1.0 gpd/sq. ft. of disc area, and should have been sized to 0.6 gpd/sq. ft. Mr. Antonie recommended primary treatment or screening to reduce the load on the unit.

Petwa Canada, Ltd., Calgary, Alberta, manufacturer of the plant said the camp population was too high, but that the plant should perform to specifications with the design loading. Petwa also agreed to provide both an influent screen and effluent filter to help improve the plant performance.

Following the discussions with Petwa representative, a plan was developed and approved by Husky to have Petwa attempt to improve the plant performance by field modification. Influent screening and effluent filtration were discussed as possible retrofit improvements to the plant.

During October, 1976, Dames & Moore acquired an effluent sample from the plant and ran a series of tests to determine if filtration alone could possibly bring the plant into compliance. The results of these tests indicated filtration 20-25 microns would result in about 15% less BOD and about 75% less suspended solids in the effluent, while 1.2 micron filtration would eliminate the suspended solids and reduce the remaining BOD by over 50%. Unfortunately, the tests indicated that the effluent BOD would still be over the Alaska Department of Environmental Control (ADEC) limits (30 mg/1) even under the best conditions.

On December 2, 1976, the Alaska Department of Environmental Conservation (ADEC) field officers met with Dames & Moore (D&M) on behalf of Husky. The ADEC representatives informed D&M of their intent to issue a compliance order to Husky if the plant could not be brought into compliance.

Petwa began a field effort which lasted for several months, trying influent screening, effluent filtration, alum addition to the clarifier, and finally, addition of a "filler" disc between the two sets of discs on the existing shaft to increase the available disc surface area by approximately 30%.

The influent screening did reduce the entry of larger food and paper solids into the plant, but did little to improve the BOD removal. The effluent filtration and alum addition did reduce the suspended solids but failed to bring the BOD removal into compliance. The mechanical operation of the filter proved to be limited by short filter runs due to rapid plugging.

The most dramatic improvement came as a result of the addition of more disc surface. The 30% increase in surface area directly resulted in an approximate improvement of 15% in overall BOD removal. This improvement was precisely as predicted by Mr. Reilly and Mr. Antonie of the Autotrol corporation.

During the entire monitoring period of the RBC plant, both before and after the field modifications, the plant never achieved a 30/30 effluent. A total of 42 weekly samples were analyzed during this time; the very best effluent BOD was achieved April 28, 1977 (greater than 1 mg/1), and the best effluent suspended solids (44 mg/1) on March 16, 1977. Average effluent quality as a monthly average ranged from 86 to 320 mg/1 for BOD

and from 77 to 333 mg/1 for suspended solids. During this period the effluent loading to the RBC plant was within the organic and hydraulic limits specified by the manufacturer 57% of the time.

Overall performance of the RBC plant was very poor. It is significant to note that the BOD percent removal was very consistent, and did improve linearly with a commensurate increase in the disc surface area. This suggests that an RBC design of 0.5-0.6 gpd/sq. ft. of disc area will have a reasonable chance of achieving the proper effluent quality under Arctic workcamp conditions.

On May 16, 1977, the RBC plant was finally shut down and removed from the utility building. An extended aeration plant was acquired and installed in its place.

THE EXTENDED AERATION PLANT

Following an economic comparison of physical/chemical and extended aeration treatment technologies, Husky purchased an extended aeration plant for Camp Lonely. The extended aeration process is a biological system as was the RBC plant, but is of the suspended growth type plant rather than fixed film such as RBC or the older trickle filter system.

A suspended growth biological plant utilizes a large aeration tank designed to contain the biological reaction. The raw waste water enters the aeration tank and is contacted by the biological floc (bacterial and other microorganisms) which utilize the BOD and solids as a food source. The loading on the system can be adjusted by varying the flow rate and the bacteria level (MLSS for Mixed Liquor Suspended Solids).

The fundamental difference between the biological and physical/chemical process is in the use of bacterial floc or chemical floc respectively to remove the undesirable pollutants from the sewage. The biological floc is "grown" from naturally occurring microorganisms universally present in domestic wastewater. Furthermore, the floc is in a constant state of mass reduction, resulting in a decreasing amount of sludge. This is the principle applied to the aerobic digestion process used to further reduce the volume of sludge wasted from the mixed liquor.

The physical/chemical (P/C) process simulates the biological floc, but has the following differences and limitations:

1. The P/C system uses a number of chemicals to build and maintain the floc. These include aluminum sulphate, sodium carbonate, and organic polymers. Each chemical must be purchased, transported, stored, mixed, fed and maintained. This vastly increases the cost and complexity of the P/C process.

2. The P/C system creates a very large amount of sludge. The pollutants in the sewage are removed in mass rather than in reduced or digested form. The mass of solids removed consists of the original

pollutant and a large bulk of extensively hydrated (water-logged) chemicals. Sludge production from P/C systems is as much as 10 times greater than from extended aeration systems.

3. The soluble or dissolved fraction of the BOD is very high in arctic camp wastewater, around 40-60% of the total BOD. This fraction is the portion most easily removed by biological systems, and conversely the most difficult to remove by P/C. Activated carbon is usually added as a slurry to the chemical reaction in a P/C plant to remove soluble BOD. The majority of P/C plants operated in arctic camp conditions were ultimately retrofitted with oversized aerated "surge" tanks. These tanks could support a biological reaction prior to the chemical reaction and convert the soluble BOD to bacterial cells which are then removed with alum (Alumin sulphate).

The net result of these differences is a substantially higher cost for P/C treatment over the extended aeration.

Specification for a complete extended aeration plant were released for vendor quotations by Husky NPR early in 1977. A plant manufactured by Steel Fabricators of Anchorage, Alaska, was selected for purchase. Plant specifications are listed in TABLE 6. Figure 6 is a schematic of the treatment plant.

The extended aeration plant was installed and began discharging effluent on May 19, 1977. The first effluent test taken on this plant was on May 20, wherein the effluent suspended solids were 25 mg/l and the BOD was 140 mg/l. The MLSS was allowed to build and the effluent quality improved correspondingly. A minimum operational MLSS level of 2000 mg/l was reached in approximately 4 weeks. The monthly average effluent results for June, 1977 were:

BOD	29 mg/l	(86% removal)
Suspended Solids	22 mg/l	(94% removal)
Fecal Coliform	16 col/100ml	

TABLE 6
STEEL FABRICATORS 7500 GPD EXTENDED AERATION PLANT SPECIFICATIONS

Plant: Capacity:	7500 gpd
Tank Sizes (Approximately):	
Surge	2870 gallons
Aeration	7500 gallons
Clarifier	6 hr. detention at full flow
Aerobic Digestor	30 day waste sludge capacity
Clarifier:	
Weir Loading Rate	950 gpd/ft.
Surface Loading Rate	99 gpd/sq. ft.
Sludge Return	4" Air Lift
Surface Skimmer	Air Lift
Chlorine Contact:	1 hr. at 7500 gpd
Effluent Filter:	"Roltray" paper filter
Influent Pumps (2 ea.)	Mouno WA150 Grinders
Effluent Pumps:	Submersible, float actuated with batch counter for flow volume estimate.
Manufacturer:	Steel Fabricators, Anchorage, Alaska.

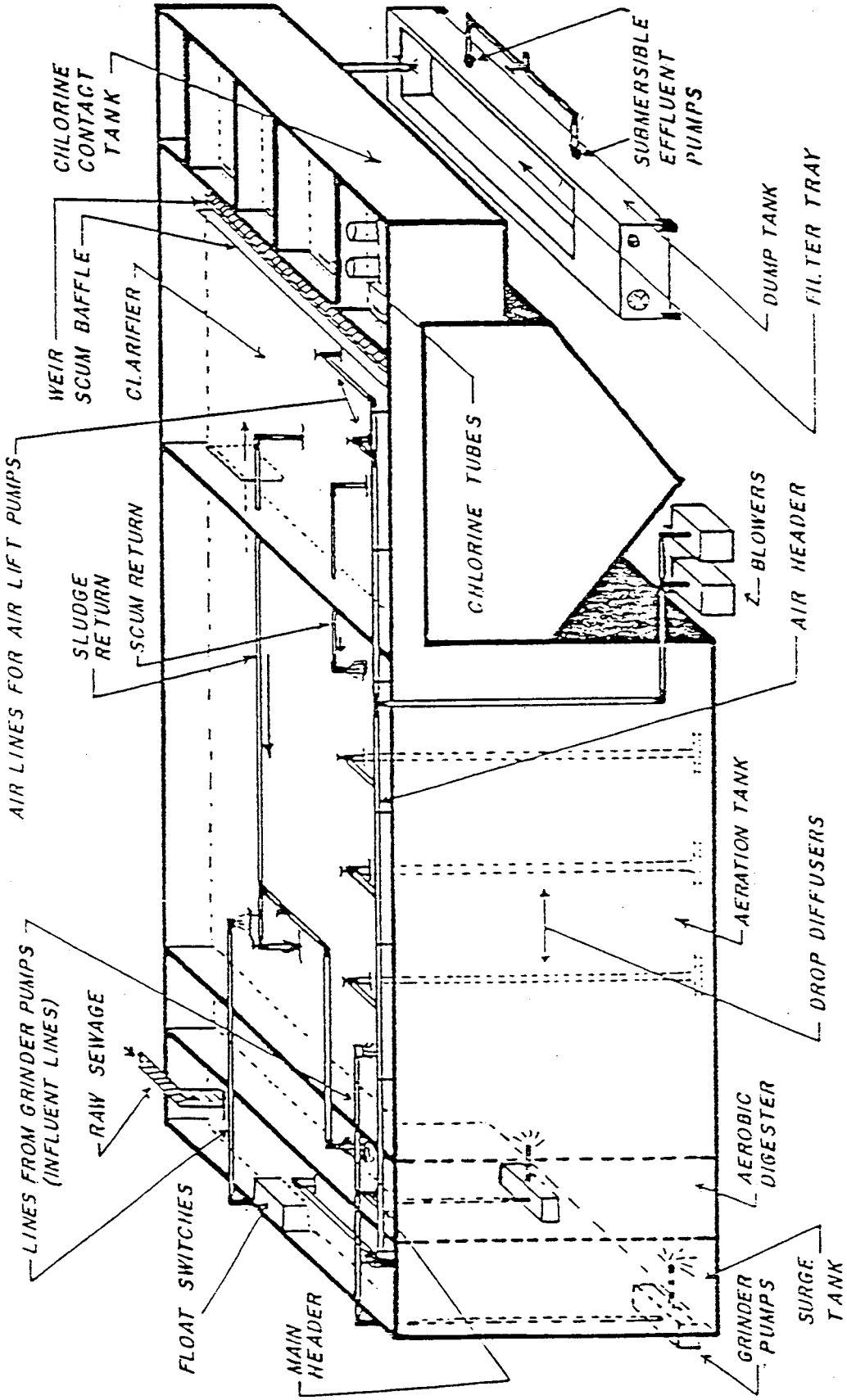

FIGURE NO. 6. CAMP LONELY SEWAGE PLANT

The extended aeration system had achieved full compliance with ADEC and USEPA secondary treatment criteria:

Secondary Effluent Criteria *:

BOD	30 mg/1	(85% removal)
Suspended Solids	30 mg/1	(85% removal)
Fecal Coliform	200 col/100 ml	

*As a monthly average; individual values can be higher.

The plant was monitored on a weekly basis for influent and effluent BOD and suspended solids, and effluent fecal coliform bacteria. Additionally mixed liquor samples were analyzed for suspended solids (MLSS) to monitor the status of the microbiological treatment process.

The monitoring program was performed by Dames & Moore through October 4, 1977, then by Environmental Services, Ltd. (ESL) Fairbanks Laboratory from October 12, 1977 to February 27, 1980. On February 29, 1980, the ESL laboratory operation was acquired by Northern Testing Laboratories of Fairbanks and the monitoring program continued uninterrupted through the end of operation of the plant on November 25, 1981. A monthly summary collation of laboratory data generated on this plant is included in Appendix II "Wastewater Treatment Plant Test Data Summary".

Along with the weekly monitoring program, Husky NPR contracted with the laboratory to provide a once per month site visit to work with the operators, provide training and troubleshooting services, and to perform regular equipment and process inspections. A written field report was prepared following each visit. An on-site monitoring program was instituted at the start-up of the plant. This analytical schedule is outlined as follows:

ON-SITE TESTING

	Influent	Mixed Liquor	Effluent
pH	X	X	X
Dissolved Oxygen	X	X	X
30 Minute Settleability			X
60 Minute Settleability	X		X
Chlorine Residual			X

The on-site monitoring program was performed twice daily for most of the plant's operational history, and was reduced to daily near the end of the project.

The monitoring laboratory was assigned the task of preparing the detailed Operations and Maintenance (O&M) manual for the plant as part of the 1978 fiscal year contract. This document along with the manufacturer's

equipment service instructions provided a complete written guide to the theoretical basis and the specific operations and maintenance procedures for the plant.

The extended aeration plant was operated continuously for a 55 month period from May 1977 to November 1981. During that time a total of 234 weekly laboratory analyses were performed. TABLE 7 outlines the number of compliance test results as a percentage of the total number of analyses run. The compliance is based on effluent discharge limitations in Waste Disposal Permit WPC 78-11 issued to the USGS by the ADEC on July 12, 1978.

For evaluation, the operational history of the plant can be divided into two periods from May 1977 to May 1978 and from May 1978 to the end of the project, November 1981. This second period was the time during which the plant was being operated and maintained primarily by two operators, Ed Grant and Don Robinson.

TABLE 7 divides the compliance performance of the plant into the periods outlined above. The plant compliance record for individual tests and monthly averages during the first year was from fair to poor when compared against a better than 90% average for 66% analyses in the second period.

TABLE 7

CAMP LONELY EXTENDED AERATION PLANT COMPLIANCE RECORD
NUMBER OF SAMPLES (N), AND PERCENT IN COMPLIANCE

PARAMETER	PERMIT LIMIT	YEAR 1		YRS 2-5		TOTALS	
		N	PCNT	N	PCNT	N	PCNT
BOD	Monthly Av. 30 mgl.	13	38	43	90	55	78
BOD	Maximum Val. 60 mgl.	53	74	179	97	232	92
S. Solids	Monthly Av. 30 mgl.	13	46	42	93	55	82
S. Solids	Maximum Val. 60 mgl.	53	79	181	98	234	94
Fecal Coli.	Monthly Av. 200Col/100ml.	13	69	42	98	55	91
Fecal Coli.	Maximum Val. 400/Col/100ml.	49	69	180	95	229	90

The table graphically demonstrates the fact that with any wastewater treatment system the performance is to a large extent dependent on the skill, knowledge and ambition of the operators. This was the case with the Camp Lonely treatment plant. Other operators worked on the plant previously, and some worked at various times during this period, but two men were largely responsible for the excellent performance during the latter three and a half years of its operation. A good operational routine was developed which maintained positive aerobic conditions and proper sludge levels in the plant. Extensive interfacing with the contract laboratory by the two operators provided the operational support and data necessary to keep the plant running smoothly.

A major logistical problem was the successful transport of the weekly samples to the laboratory within the 24 hour time requirements for BOD and coliform analyses. Over 80% of the samples arrived at the laboratory within this time constraint. This greatly enhanced the validity and utility of the test results by the operators and the lab.

The effluent quality from the extended aeration plant was generally excellent. The operators began running turbidity measurements with a nephelometer manufactured by Turner Designs, Inc. during the last several years of the plant operation. The turbidity values typically ran less than 10 NTU's (Nephelometric Turbidity Units) and occasionally ran to less than 1.0 in final effluent samples. Often, the effluent turbidity was less than that of the camp's potable water supply as measured with the same nephelometer.

Runs of over 6 months were recorded wherein neither the effluent BOD or suspended solids values exceeded 20 mg/1. The greener vegetation in the vicinity of the warm effluent discharge was well known at Camp Lonely as a favorite stopping point for water fowl and caribou during the summer. During winter months, the effluent formed mounds of clear ice mixed with drifting snow. Using snow fences and Caterpillar tractors, the ice and snow accumulation was kept clear from the end of the outfall. During spring breakup, the frozen effluent would dissipate with the rush of thawing tundra snow and ice. Impact on the tundra and the wildlife was very slight to nil.

The plant was kept in excellent mechanical condition by the operators. The blowers were moved into the generator room and the air lines insulated to decrease the noise level in the working area. The tankage was painted several times. The lift station and grinder pump maintenance proved to require a substantial amount of effort, but was performed on a regular preventive maintenance program.

The plant equipment and structures were well maintained, safe, clean, and pleasant to be around. This was entirely due to the efforts of the operators. The operation of the plant was stable enough to allow the operators to perform a number of other duties around camp. The operators ran the water treatment equipment, the incinerators for both sludge and trash disposal, performed light maintenance, and vehicle and other equipment operation as needed.

The plant operated well using either a two shift approach or a single main shift followed by a simplified night watch routine. This was true as long as the plant operational routine was performed twice per day. A short description of the operational routine follows:

Extended Aeration Plant Operations Routine

1. Check all mechanical equipment for proper operation.

2. Perform tests. Take lab samples on designated shipping day.

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3. Fill out logs. Record flow volume.

4. Clean clarifier. (This was accomplished by shutting off the surge tank pumps to stop the flow over the weir. The sidewalls of the tank were squeegeed to clear sludge deposits, the surface was cleared of scum and grease, and the side wall waterline scrubbed to remove solid buildup. The influent pumps were restarted after the clarifier contents settled and cleared).

5. Waste sludge to the digester as needed.

6. Check chlorine solution and mix as needed.

7. Remove old filter paper and advance new paper from the roll.

8. Hose down plant. Accomplish general housecleaning.

Other Routines as Needed

1. Adjust air setting & return sludge rates.

2. Clean air diffusers.

3. Pump and blower maintenance.

4. Decant aerobic digester and burn sludge.

5. Clean chlorine contact tank of solids deposits.

A number of operational problems occurred at various times. Most of these were related to control of the MLSS and dissolved oxygen levels. During the first year of operation of the plant, excessive sludge wasting drove the MLSS too low for proper BOD removal on several occasions. At other times the MLSS ran too high, creating excessive denitrification in the clarifier and solids loss to the effluent.

The stabilization of the MLSS over long periods of time, with occasional planned increases or decreases according to the load (camp population) occurred after experienced and responsible operators began operating the plant, and contributed greatly to the stable, excellent effluent produced thereafter.

Some of the various problems and solutions are discussed below:

1. MLSS level as outlined in the example above was the major parameter of process control. The MLSS was run weekly as a laboratory test, and estimated daily using the 30 minute settleability test (the SVI - Sludge Volume Intensity or Density). An operational range of MLSS from 2000 to over 7000 mg/1 was used at various flows. When there was not enough MLSS for the incoming BOD, the plant did not perform well.

2. Low dissolved oxygen was the major cause of the number of secondary problems. The biological process is very dependent on aerobic conditions to maintain a degree of efficiency. The sock type diffusers proved to be a high maintenance item, and when not cleaned regularly of scum, grease, hair and other stringy materials would plug and fail. The loss of oxygen was enough on occasion to trigger a bulking condition.

3. Bulking sludge by definition is a poor settling sludge with filamentous bacteria present in the floc. The examination of the floc by microscope for both the presence of filaments and for the general health and population distribution of protozoans, rotifers, and other microorganisms was developed into a powerful troubleshooting tool. This procedure was incorporated into both the field and laboratory test routines.

   The filaments could be observed as they formed, allowing the prediction of an onset in bulking. The low dissolved oxygen levels could be occurring in the mixed liquor or in the clarifier. The mixed liquor dissolved oxygen problem was countered by cleaning the sock diffusers regularly and was eventually solved by replacement with non-clog style diffusers provided by the manufacturer for testing.

   The clarifier dissolved oxygen problem could be solved by use of the clarifier cleaning procedure described in the operational routine above. The sludge return rate also has an influence on the dissolved oxygen level in the clarifier.

   Bulking sludge would settle poorly, resulting in a higher sludge blanket in the clarifier. The Steel Fabricators clarifier was designed with very low weir and surface loading rates. Bulking rarely resulted in loss of sludge to the effluent in this plant. Often the bulking sludge produced a clearer effluent than that produced prior to the onset of the filamentous growths.

4. Denitrification, or nitrogen gas lifting of sludge in the clarifier, was present at various time and degrees of severity. Probably the worst case of denitrification occurred during the early part of 1981. During a period of high flows and high MLSS levels, the clarifier began to undergo massive denitrification. The foam blanket on the clarifier was up to 2' thick with enough density to support a long 1" x 2" stick vertically without it falling over. Lowering the MLSS and, eventually, the camp population solved the problem. Frequent cleaning of the clarifier kept it under control to the extent that the plant remained in compliance through the entire incident.

   Most often, the denitrification foam was present as a light film which could be cleared in a few minutes with a skimmer. The clarifier was designed with a scum baffle ahead of the weir to prevent loss of the foam to the effluent. Additionally, this plant was equipped with a coarse paper filter (tray type) which collected the majority of any solids lost to the effluent.

5. Surge tank troubles which occurred included pH and level control, low dissolved oxygen and flow rate problems.

   During periods of low raw water alkalinity, the influent in the surge tank was supplemented with a few pounds per day of soda ash (sodium carbonate).

   Low dissolved oxygen levels were related to both the high oxygen demand of the raw wastewater and an inefficient diffuser. The original diffuser was simply a pipe with small holes drilled in it. It was eventually replaced by two RAMCO "MAT", or maximum air transfer, nonclog diffusers. The RAMCO diffuser used a large air orifice for nonclog design and used propeller blades driven by the air to chop the bubbles into an air/water froth with very high dissolved oxygen transfer efficiency. Mixing was also improved by the use of these diffusers.

   Flow problems were a matter of matching the raw wastewater flow to the right combination of pumps feeding to the mixed liquor. The Moyno grinder influent pumps are fixed at approximately 2, 5 or 9 gpm settings depending on the pump size. One or two 2 gpm units (WA 150's) proved to be the best combination. A variable speed Moyno sludge pump was occasionally used as a third influent pump to provide good flow dampening in order to feed the plant evenly.

6. Sludge burning was one of the more difficult tasks the operators had to perform. If the incinerator refractory came in contact with the wet sludge directly, it would cause the brick to wear rapidly. Frequent patching was then required. By burning (boiling) the sludge in 55 gallon barrels cut to fit in the incinerator, damage to the refractory was minimized.

   After several years of use, the old incinerator was replaced with a new larger unit. Rather than cause damage to the new incinerator's refractory work, the operators and other craftsmen of the camp fabricated a small sludge burner from sections of pipe and pieces of the old incinerator. The sludge was burned in barrel sections cut lengthwise from drums. The burner was very effective as a sludge disposal unit and was an exceptionally well built piece of equipment.

   The ability to readily burn sludge and the proper operation of the aerobic digester made MLSS control by sludge wasting an effective operational procedure. It added greatly to the stability of the plant performance.

7. Residual level chlorine control was improved by replacing the Sanuril tablet type chlorinator with a diaphragm type chemical feed pump feeding a calcium hypochlorite (HTH) slurry. The record of monthly fecal coliform averages from June, 1978 to the end of the project attained 98% compliance with the permit.

8. Grease accumulations were a problem in the lift station, surge tank, and clarifier. After installation of a grease trap in the lift station in February 1979 and frequent cleaning of its content, the grease problem lessened. Grease also was found to accumulate in the influent pipe and had to be periodically cleaned out.

A number of other minor problems occurred at various times. Generally, through thorough maintenance, good troubleshooting, and good inventory and other support, the problems rarely resulted in effluent quality loss. Again, the primary reason for the long term excellent operation of the plant is the work of experienced and responsible operators.

The last sample was collected from the plant November 25, 1981. The plant was dewatered, the sludges burned, and the tankage cleaned out at the end of November. At the completion of four and a half years of use, the 7500 gpd extended aeration plant remains completely fit for use. "Wastewater Treatment Plant Test Data" is included in Appendix II.

INCINERATION

In the early spring of 1976, an oil fired incinerator, rated as capable of destroying 175 pounds per hour of paper and putrescible waste, was installed at Camp Lonely. The unit was located in the utilities building near the waste-water treatment facility and operated satisfactorily for approximately three years consuming the waste sludge of the treatment plant as well as the paper and putrescible wastes of the kitchen and living quarters. In the winter of 1978-79, the exploration program was an order of magnitude larger and the amount of waste also grew. Construction and drilling camps open-burned their paper and wood debris, but all putrescibles were compacted and backhauled to Lonely for incineration. Even with 24-hour service, the facility could not handle the load and again garbage bags had to be backhauled to Fairbanks and Anchorage for disposal in municipal facilities.

In the late summer of 1979, a 500 pound per hour capacity incinerator with continuous ram-charging capability was installed. The old incinerator was used to handle the wasted sludge from the extended aeration treatment plant. The ram-charger on the new incinerator allowed continuous charging without the need to cool-down and reload. These facilities served the operation very well for the duration of the program.

SOLID WASTE DISPOSAL

A sanitary landfill was established at Camp Lonely in the summer of 1977 when it no longer became possible to backhaul material for disposal at authorized sites. The requisite permits were obtained for the Alaska Department of Environmental Conservation and the landfill operation was established along the western edge of the camp pad. Landfill disposition was limited to metal, glass and ashes and specifically excluded rubber and hydrocarbon products, chemicals, and any putrescible wastes. The location of the landfill was extremely convenient and the resulting filled area added to the pad space available for outside storage.

APPENDIX I

GENERAL FOOD SPECIFICATIONS

To provide uniform specifications for all food supplies, the following standards were maintained.

1. Meats, fish, poultry and dairy products

   A. All red meats will be USDA "Choice"
   B. All pork products will be USDA Selection No. 1
   C. All sausage products have to be prepared in accordance with USDA standards
   D. All poultry will be USDA Grade "A"
   E. All eggs and dairy products will be USDA Grade "A"
   F. All seafoods will be Grade "A"

2. Vegetables

   A. All fresh vegetables will be US No. 1
   B. All canned vegetables will be US "Choice" or better
   C. All frozen vegetables will be US Grade "A"

3. FRUITS

   A. All fresh fruits will be US Grade "Fancy" or "Extra Fancy"
   B. All canned fruits and fruit juices will be US "Choice" or better
   C. All frozen fruits and juices will be Grade "A"
   D. All dried fruits will be US "Choice" or better

MEAT PRODUCTS AND PORTION CONTROL SPECIFICATIONS

	PACK
Rib Eye Roll Roast, USDA Choice, no lip, 8-10 lb	1/30 lb.
New York Steaks, USDA Choice, 1" tail, 12 oz.	1/10 lb.
Top Sirloin Steaks, USDA Choice, Semicenter cut, 10 oz.	1/10 lb.
T-Bone Steaks, USDA Choice, no tail, 14 oz.	1/10 lb.
Tenderloin Steaks, USDA Choice, close trim, 6 oz.	1/10 lb.
Flank Steaks, USDA Choice	1/10 lb.
Beef Short Ribs, USDA Choice, 5" cut, Kosher style	1/10 lb.
Beef Top Round, USDA Choice, split & tied	1/30 lb.
Beef Cube Steaks, USDA Choice, lean, 6 oz.	1/30 lb.
Brisket of Beef, Fresh, USDA Choice, no deckle	1/30 lb.
Ground Beef, USDA Choice, 80/20 fat ratio	4/10 lb.
Corned Beef Round, precooked, USDA	1/20 lb.
Diced Beef, USDA Choice, lean, 1" cubes	1/30 lb.
Beef Patties Gound, USDA Choice, 3 x 1	4/15 lb.
Precooked Chicken, honey dipped, no neckbones, Grade A	1/15 lb.
Chicken, cut up, Breast, Thighs, Legs, Grade A	1/25 lb.
Ducklings, 6 lb., Grade A	6/4.5 lb.
Cornish Game Hen, 24 oz. Grade A	24/24 oz.
Turkey Whole, 22-24 lb, Grade A	2 ea.
Turkey Roll all White, Grade A	4/10 lb.
Pork Loins Boneless, no blade, USDA Selection No. 1	1/30 lb.

Pork Chops, Center Cut, 6 oz. USDA Selection No. 1	1/30 lb.
Leg of Lamb, 6-8 lb, bone in	1/30 lb.
Lamb Chop, double cut, 6 oz.	1/10 lb.

WEEKLY USAGE ESTIMATES

The weekly usage estimate was developed based on experience obtained from the operations of Camp Lonely and the drilling and construction camps. It was developed for a 50-man camp to provide guidance to the Head Cooks in preparing their weekly order of subsistence supplies. The Head Cook would use these estimates for ordering the correct quantities of all standard supplies until he had experienced and established his own usage factor for his camp.

All product items have been specified by quality and size as generally accepted by professional chefs and by Company quality standards.

GENERAL INFORMATION - MENUS

The menus included in Appendix I were designed to provide consistency in meal service and to assist the Head Cooks with the planning of their daily work schedules and the inventory and ordering of all subsistence supplies.

These menus are planned for two consecutive three week cycles and have been estimated to provide the maximum requirement in nutrition for personnel working under Arctic conditions. These menus represent a minimum caloric value of 5,000 calories per person per day.

The Head Cooks do not have flexibility to change these menus at will unless an emergency situation exists (additional camp population without adequate warning, etc.), and any proposed changes have been approved by the Camp Management. Any approved changes should be coordinated with the Anchorage office to ensure the proper ordering and expediting of supplies.

STANDARD BREAKFAST MENU

ENTREES:	Eggs Any Style, Poached, Soft Boiled, Scrambled, Fried
	Waffles
	Pancakes
	French Toast
	Omelettes (Cooked to Order) Spanish, Western, Ham, Cheese
	Breakfast Sausage and Patties
	Bacon, Ham, Fried Polish and Reindeer Sausage
	Hashbrown Potatoes, Home Fries
COLD CEREALS:	Assortment of Individual Dry Cereals, Granola, Wheat Germ
HOT CEREALS: Choice of Two	Grits, Oatmeal, Cream of Wheat, Roman Meal
FRESH FRUITS:	Sliced Bananas, Fresh Strawberries, Fresh Pineapple, Papayas, Ruby Red Grapefruit
STEWED FRUITS:	Prunes, Grapefruit Sections, Sliced Peaches, Sliced Pears, Figs, Apricot Halves, Mandarin Oranges
BREADS:	White, Wheat, Rye, Muffins, Biscuits
ONE DAILY:	Creamed Chipped Beef, Corned Beef Hash, Eggs Benedict, Ground Beef Gravy
BEVERAGES:	Fresh Orange Juice, Grapefruit Juice, V-8 Juice, Tomato Juice, Apple Juice, Prune Juice
	Milk, Buttermilk, Skimmed Milk, Coffee, Tea, Sanka, Hot Chocolate

STANDARD SALAD BAR

LUNCH / DINNER

An Assortment of Four (4) Luncheon Salads and Six (6) Dinner Salads daily.

Standard Daily Salads:
- Crisp Green Salad with Dressings
- Cottage Cheese
- Fruit Jello
- Assorted Relishes (Fresh and Pickled)
- Assorted Cheeses

Plus Two (2) Luncheon choices and Four (4) Dinner choices of any of the following salads:

- Waldorf Salad
- Marinated Sliced Beets
- Carrot and Raisin Salad
- Potato Salad (German Style)
- Potato Salad (Mayonnaise)
- Shrimp Salad
- King Crab Salad
- Green Pepper and Tomato Salad
- Ambrosia Salad
- Avocado Salad
- Scandinavian Salad
- Salmon Salad
- Red Cabbage Salad
- Cole Slaw
- Golden Slaw (Sauerkraut)
- Cucumber Salad (Oil and Vinegar or Sourcream)
- Fresh Fruit Salad
- Mixed Bean Salad
- Cauliflower and Pimento Salad

Sliced Cheese, Turkey, Ham, Mushrooms, Bacon, Croutons, Shrimp and Crab Meat to be provided as garnishes for the Daily Green Salads.

SWEETS / DESSERTS

DAILY REQUIREMENTS:

TWO FRUIT PIES:	Choice of Apple, Cherry, Blueberry, etc.
TWO CREAM PIES:	Choice of Banana, Chocolate, Coconut, Pumpkin, Lemon Meringue, etc.
ONE CUSTARD:	Rice Custard, Apple Custard, Plain Custard, etc.
ONE CAKE:	Choice of Black Forest Cake, Strawberry Shortcake, Cheese Cake, Devil's Food Cake, etc.
ONE PUDDING:	Bread Pudding, Rice Pudding, Tapioca Pudding, Chocolate Marshmallow Pudding, etc.
COFFEE PASTRIES:	Assorted Cookies, Sweet Rolls, Pecan Rolls, Danish, Brownies, Cake Donuts, Raised Donuts, etc.
ICE CREAM:	Ice Cream Novelties, Soft Ice Cream with Assortment of Toppings
YOGURT:	Plain and Assorted Fruit Yogurts

Special occasions call for special desserts. To be coordinated with national holidays and special events like Mexican Night, Las Vegas Night, Oktoberfest, and Outdoor BBQ's.

Petit Fours
Eclairs
Napoleons
Cream Puffs
Fruit Cake
Cherries Jubilee

WEEK NO. 1.

WEEKLY MENU - LUNCH

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
CREAM ASPARAGUS	BEEF NOODLE SOUP	SPLIT PEA SOUP	CHICKEN RICE SOUP	LOBSTER BISQUE	VEGETABLE BEEF	CORN CHOWDER
CHICKEN FRIED STEAK	MARINATED BEEF FLANK STEAK	DEEP FRIED YOUNG CHICKEN	BBQ PORK SPARE RIBS	BRAISED BEEF SHORT RIBS	FRENCH DIP SANDWICH/AU JUS	OLD FASHIONED BEEF STEW/ DUMPLINGS
TUNA FISH CASSEROLE WITH NOODLES	COMBINATION MEXICAN PLATE	HAMBURGERS CHEESE/BACON	GRILLED REUBEN SANDWICH	HOT REINDEER SAUSAGE/ SAUERKRAUT	KING CRAB SUPREME	COMBINATION PIZZA
WHIPPED SNOW-FLAKE POTATOES	WHIPPED SNOW-FLAKE POTATOES SPANISH RICE	WHIPPED SNOW-FLAKE POTATOES FF POTATOES	WHIPPED SNOW-FLAKE POTATOES FF POTATOES	WHIPPED SNOW-FLAKE POTATOES RICE PILAF	FF POTATOES FRIED RICE	WHIPPED POTATOES FF POTATOES
BUTTERED PEAS & CARROTS NAVY BEANS	CAULIFLOWER AU GRATIN BLACK EYE PEAS	FRENCH GREEN BEANS ONION RINGS	CANDIED CARROTS BAKED BEANS	MIXED VEGETABLES RED BEANS	CUT GREEN BEANS BLACK EYE PEAS	LIMA BEANS

DINNER

SOUTHERN FRIED CHICKEN BAKING POWDER BISCUITS	T-BONE STEAK SEASONED BUTTER ONION RINGS CORN MUFFINS	HUNGARIAN BEEF GOULASH	BEEF BROCHETTES VALENCIA	NEW YORK SIRLOIN STEAK SAUTEED MUSHROOMS	BEEF TERIYAKI FLANK STEAK	ROAST PRIME RIB AU JUS HORSERADISH SAUCE
YANKEE POT ROAST	DEEP FRIED FILLET OF PERCH LEMON/TARTAR SAUCE	ROAST PORK SAGE DRESSING APPLESAUCE	BAKED VIRGINIA HAM HONEY BUTTER SAUCE	POACHED ALASKA SALMON HOLLANDAISE	GRILLED PORK MEDALLIONS SAUTEED PEPPERS AND PINEAPPLE	VIENNA VEAL CUTLET
GRILLED LIVER SMOTHERED ONIONS CRISP BACON	POLISH SAUSAGE GERMAN KRAUT	SAUTEED SCALLOPS MORNAY SAUCE	ITALIAN RAVIOLI AU GRATIN	STUFFED BELL PEPPERS	MACARONI & CHEESE CASSEROLE	SHRIMP NEWBURG
WHIPPED SNOW-FLAKE POTATOES FF POTATOES*	BAKED POTATO WHIPPED SNOW-FLAKE POTATOES	BUTTER NOODLES WHIPPED SNOW-FLAKE POTATOES	RICE PILAF LYONNAISE POTATOES	BAKED POTATO BOILED NEW POTATOES	RICE ORIENTAL WHIPPED SNOW-FLAKE POTATOES	RICE PILAF BAKED POTATO
BRUSSEL SPROUTS STEWED TOMATOES	SAUTEED LEAF SPINACH CREAMED CARROTS	YELLOW CORN BROCCOLI SPEARS	BUTTERED WAX BEANS ASPARAGUS SPEARS	TOMATOES & OKRA RUTABAGAS	GREEN PEAS VICHY CARROTS	CORN ON THE COB GREEN BUTTERED BEANS

FRENCH FRIED POTATOES

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EEK NO. 2

WEEKLY MENU - LUNCH

ONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
RENCH ONION SOUP	NAVY BEAN SOUP	MINESTRONE SOUP	CREAM OF CHICKEN SOUP	BOSTON CLAM CHOWDER	TOMATO RICE SOUP	POTATO SOUP
EEF POT PIE	BRAISED BEEF CUBE STEAK	YOUNG CHICKEN MARENGO	YANKEE POT ROAST	BAKED MEATLOAF MUSHROOM SAUCE	BEEF TIPS IN BURGUNDY	BAKED HAM HONEY BUTTER SAUCE
REPES NORMANDY	BBQ PORK ON BUN	BAKED ITALIAN LASAGNA	FISH 'N' CHIPS	BREADED VEAL CUTLET	GRILLED FILLET OF PERCH	HAMBURGERS CHEESE/BACON
OME FRIED POTATO CE PILAF	WHIPPED SNOW-FLAKE POTATOES FF POTATOES	RICE PILAF WHIPPED SNOW-FLAKE POTATOES	WHIPPED SNOW-FLAKE POTATOES FF POTATOES	WHIPPED SNOW-FLAKE POTATOES RICE RISOTTO	FF POTATOES WHIPPED SNOW-FLAKE POTATOES	FF POTATOES WHIPPED SNOW-FLAKE POTATOES
REEN SWEET PEAS AKED BEANS	BROCCOLI POLONAISE RED COUNTRY BEANS	FRENCH CUT GREEN BEANS LIMA BEANS	BUTTERED BABY CARROTS	BRUSSEL SPROUTS NAVY BEANS	MIXED VEGETABLES BLACK EYE PEAS	PEAS/MUSHROOMS DEEPFRIED ONION RINGS

DINNER

ONDON BROIL ISHROOM SAUCE	TOP SIRLOIN STEAK ONION RINGS	CARVED BARON OF BEEF AU JUS	ROAST LEG OF LAMB APPLE MINT JELLY	RIB EYE STEAK SAUTEED MUSHROOMS CORN BREAD	ROAST TURKEY SAGE DRESSING GIBLET GRAVY	ROAST PRIME RIB OF BEEF AU JUS
READED PORK IOPS -APPLESAUCE ORN MUFFINS	DEEP FRIED SOLE TARTAR SAUCE	BOILED JUMBO SHRIMP IN THE SHELL	BEEF STROGANOFF	DEEP FRIED OCEAN SCALLOPS	BOILED NEW ENGLAND DINNER	POACHED HALIBUT STEAK LEMON/TARTAR SAUCE
ICKEN CHOW MEIN	SPAGHETTI ITALIAN MEAT SAUCE	MACARONI & CHEESE CASSEROLE	CHICKEN KIEV	STUFFED CABBAGE ROLLS TOMATO SAUCE	BEEF RAVIOLI AU GRATIN	CHICKEN A LA KING IN PATTY SHELL
ITTERED RICE IPPED SNOW-AKE POTATOES	BAKED POTATOES FF POTATOES	RICE PILAF WHIPPED SNOW-FLAKE POTATOES	O'BRIEN POTATOES BUTTER NOODLES	BAKED POTATOES WHIPPED SNOW-FLAKE POTATOES	SWEET POTATOES BOUILLON POTATOES	STEAMED RICE RISSOLE POTATOES
ICCOTASH CORN SQUASH	CANDIED CARROTS CAULIFLOWER AU GRATIN	BUTTERED WAX BEANS - GREEN ASPARAGUS POLONAISE	ZUCCHINI SQUASH SAUTEED LEAF SPINACH	GREEN PEAS AND ONIONS YELLOW CORN	BUTTERED GREEN BEANS - BOILED CABBAGE	CORN ON THE COB TOMATO PROVENCAL

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WEEK NO. 3

WEEKLY MENU - LUNCH

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
BEEF BARLEY SOUP	CREAM OF MUSHROOM SOUP	CHICKEN NOODLE SOUP	LENTIL SOUP	OYSTER STEW	EGG DROP SOUP	CREAM OF CELERY SOUP
BEEF SAUERBRATEN	FRENCH DIP SANDWICH	DEEP FRIED JUMBO SHRIMP	STEAK SANDWICH	BRAISED BEEF SPARE RIBS	BBQ PORK SPARE RIBS	HOT BEEF SANDWICH
HOT DOG ON THE BUN	SPAGHETTI MEAT SAUCE	OLD FASHION BEEF STEW	BAKED BEANS W/FRANKS	GRILLED HAM AND CHEESE SANDWICH	MACARONI & CHEESE CASSEROLE	VEAL PARMESAN
BUTTER NOODLES FF POTATOES	FF POTATOES WHIPPED SNOW-FLAKE POTATOES	FF POTATOES HOME FRIED POTATOES	WHIPPED SNOW-FLAKE POTATOES	AU GRATIN POTATOES FF POTATOES	WHIPPED SNOW-FLAKE POTATOES	WHIPPED SNOW-FLAKE POTATOES
BUTTERED GREEN PEAS CHILI	MIXED VEGETABLES NAVY BEANS	VICHY CARROTS LIMA BEANS	CUT BROCCOLI BLACK EYE PEAS	YELLOW CORN RED COUNTRY BEANS	GREEN CUT BEANS BAKED BEANS	CORN ON THE COB LIMA BEANS
			DINNER			
BEEF CREOLE	NEW YORK SIRLOIN STEAK W/SAUTEED MUSHROOMS	BEEF WELLINGTON	BOILED CORNED BEEF ROUND	RIB EYE STEAK ONION RINGS	MARINATED BEEF FLANK STEAK	TENDERLOIN STEAK
CHICKEN CORDON BLEU	TROUT MEUNIERE LEMON BUTTER	BAKED CORNISH GAME HENS	ROAST PORK LOIN APPLE DRESSING	DOUBLECUT LAMB CHOPS APPLE MINT JELLY	ROAST DUCKLING ORANGE SAUCE	BROILED AUSTRALIAN LOBSTER TAIL
PORK CHOW MEIN CRISP NOODLES	CHIPPED BEEF WITH NOODLES	ITALIAN LASAGNA	POLENTA WITH SAUSAGE	NEW ORLEANS SHRIMP JAMBALAYA	BAKED CREPES W/CHICKEN RAGOUT	SWEET & SOUR POR PEPPERS & PINEAP
RICE PILAF WHIPPED SNOW-FLAKE POTATOES	BAKED POTATOES FF POTATOES	RISSOLE POTATOES WHIPPED SNOW-FLAKE POTATOES	BOILED POTATOES WHIPPED SNOW-FLAKE POTATOES	BAKED POTATOES FF POTATOES	WILD RICE WHIPPED SNOW-FLAKE POTATOES	RICE PILAF BAKED POTATO
CREAMED CARROTS ASPARAGUS MILANAISE	TOMATO PROVENCAL CUT GREEN BEANS	BRUSSEL SPROUTS CALIFLOWER AU GRATIN	STEAMED CABBAGE FRENCH BEANS ALMONDINE	ACORN SQUASH STEWED TOMATOES	MIXED VEGETABLES HOT PEACH HALVES	FLORENTINE TOMA SAUTEED WHOLE MUSHROOMS

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NEW YEAR'S EVE MENU

ASSORTED HORS D'OEUVRES

HEARTS OF ROMAINE SALAD WITH ASSORTED DRESSINGS

ASSORTED CHEESE TRAY

ASSORTED TRAY OF FRESH AND PICKLED RELISHES

CRAB MEAT AND AVOCADO SALAD

FRESH FRUIT SALAD

"GAZPACHO"

TENDERLOIN STEAK AND LOBSTER
MELTED BUTTER

BAKED CORNISH GAME HENS
WILD RICE STUFFING

OYSTERS ROCKEFELLER

STUFFED BAKED POTATO

GREEN BEANS AND BACON

BROILED TOMATO WITH CHEESE

VARIETY OF FRESHLY BAKED BREADS AND ROLLS

CHOCOLATE CAKE WITH VANILLA ICE CREAM

CHERRIES JUBILEE

MIXED NUTS AND MINTS

BALLOONS, NOISEMAKERS, STREAMERS, ETC.

NEW YEAR'S DAY MENU

ASSORTED HORS D'OEUVRES

CHUNKS OF ICEBERG LETTUCE WITH ASSORTED DRESSINGS

ASSORTED CHEESES WITH FROSTED APPLES

ASSORTED TRAY OF FRESH AND PICKLED RELISHES

STUFFED TOMATOES WITH SHRIMP SALAD

MANDARIN SALAD WITH NUTS

SELECTED FRESH FRUIT BASKETS

"CREAM OF MUSHROOM SOUP"

DUCK A L'ORANGE
WILD RICE

ROAST PRIME RIB OF BEEF AU JUS
HORSERADISH SAUCE

POACHED ALASKA SALMON FILLETS

BAKED IDAHO POTATO

BROCCOLI WITH CHEESE SAUCE

GLAZED BABY CARROTS

BLACK EYE PEAS

VARIETY OF FRESHLY BAKED BREADS AND ROLLS

NAPOLEONS

CREAM PUFFS

ASSORTMENT OF PIES AND PUDDINGS

MIXED NUTS AND CANDIES

"HAPPY NEW YEAR" POSTERS IN DINING AREA

EASTER DINNER MENU

ASSORTED HORS D'OEUVRES

WEDGES OF ICEBERG LETTUCE WITH ASSORTMENT OF DRESSINGS

ASSORTED CHEESES WITH FROSTED GRAPES

ASSORTED TRAY OF FRESH AND PICKLED RELISHES

SEAFOOD COCKTAIL WITH SAUCE SUPREME

SELECTED FRESH FRUIT BASKET

BEEF CONSOMME
"CELESTINE"

BAKED WHOLE VIRGINIA HAMS
HONEY BUTTER

ROAST PRIME RIBS OF BEEF AU JUS

CHICKEN CORDON BLEU
WILD RICE

PARSLEY POTATOES

SAUTEED BROCCOLI SPEARS

WHOLE BABY CARROTS

VARIETY OF FRESHLY BAKED BREADS AND ROLLS

STRAWBERRY SHORTCAKE
WHIPPED CREAM

ASSORTMENT OF PIES AND PUDDINGS

MIXED NUTS AND CANDIES

EGGS "N" THINGS

EASTER DECORATIONS AND FRESH DAFFODIL
FLOWERS FOR DINING AREA

4TH OF JULY DINNER MENU

ASSORTED HORS D'OEUVRES

CHEFS SALAD BOWL WITH ASSORTMENT OF DRESSINGS

ASSORTED CHEESE TRAY WITH PRETZELS

ASSORTED TRAY OF FRESH AND PICKLED RELISHES

AMERICAN STYLE POTATO SALAD

ALASKA CRAB CLAWS WITH COCKTAIL SAUCE

SELECTED FRESH FRUIT BASKET

"EAST COAST LOBSTER BISQUE"

ROAST BARON OF BEEF
CARVED TO ORDER

BBQ YOUNG CHICKEN

POACHED WHOLE KING SALMON

COUNTRY STYLE CORN ON THE COB

BOSTON BAKED BEANS WITH PORK

AU GRATIN POTATOES

SNOWFLAKE POTATOES WITH GRAVY

VARIETY OF FRESHLY BAKED BREADS AND ROLLS

HOMEMADE APPLE PIE
WITH WISCONSIN CHEDDAR CHEESE

HAND DIPPED ICE CREAMS AND CONES

WATERMELON

MIXED NUTS AND CANDIES

ALL AMERICAN DECORATIONS FOR DINING AREA

THANKSGIVING MENU

ASSORTED HORS D'OEUVRES

CRISP GREENS WITH ASSORTMENT OF DRESSINGS

ASSORTED TRAY OF FRESH AND PICKLED RELISHES

CHILLED CRAB LEGS WITH SAUCE SUPREME

SELECTED FRESH FRUIT BASKET

"CREAM OF ASPARAGUS SOUP"

ROAST TOM TURKEYS
SAGE DRESSING
GIBLET GRAVY
WHOLE CRANBERRY SAUCE

ENGLISH ROAST NEW YORK STRIP
YORKSHIRE PUDDING
MUSHROOM SAUCE

POACHED HALIBUT
LEMON BUTTER

BUTTER WHIPPED SNOWFLAKE POTATOES

SWEET POTATOES

FRENCH CUT BEANS WITH ALMONDS

BUDS OF CAULIFLOWER AU GRATIN

VARIETY OF FRESHLY BAKED BREADS AND ROLLS

MINCEMEAT PIE WITH BRANDY SAUCE

PUMPKIN PIE WITH WHIPPED CREAM

BAKED APPLES WITH CINNAMON SAUCE

MIXED NUTS AND CANDIES

THANKSGIVING DECORATIONS FOR DINING AREA

CHRISTMAS MENU

ASSORTED HORS D'OEUVRES

CRISP GREEN SALAD WITH ASSORTMENT OF DRESSINGS

ASSORTED CHEESE TRAY

ASSORTED TRAY OF FRESH AND PICKLED RELISHES

WALDORF SALAD WITH CHOPPED NUTS

CHILLED JUMBO SHRIMP

SELECTED FRUIT BASKET

"BOSTON CLAM CHOWDER"

BEEF FILLET WELLINGTON
BRANDY SAUCE

BAKED WHOLE VIRGINIA HAMS
HONEY BUTTER

CHICKEN MARENGO
WILD RICE

BAKED IDAHO POTATO
SOUR CREAM, BACON, CHIVES

BUTTERED GREEN ASPARAGUS

BRAISED BAVARIAN CABBAGE

VARIETY OF FRESHLY BAKED BREADS AND ROLLS

PECAN PIES

PUMPKIN PIES WITH WHIPPED CREAM

RICE CUSTARD WITH RAISINS

FRUIT CAKE

ASSORTED CHRISTMAS COOKIES AND NUTS IN THE SHELL

CHRISTMAS DECORATIONS FOR DINING AREA

APPENDIX II

APPENDIX II

WASTEWATER TREATMENT PLANT TEST DATA SUMMARY

	Influent			Mixed Liquor			Effluent				Flow	Removal		
	COD MG/L	BOD MG/L	SS MG/L	MLSS MG/L	SS30M ML/L	SVI ML/G	COD MG/L	BOD MG/L	SS MG/L	F.COL. C/.1L	GPD AVG	COD %	BOD %	SS %
Rotating Biological Contactor Package Plant (RBC)														
1976														
June			186											
July			333											
August		240	211					320	238				-33	-37
September	710	386	368				380	164	212	3,837	1960	46	46	36
October	1,200	560	428				660	215	216	62	2,800	45	62	42
November	1,307	580	475				710	253	211	16,173	4,000	43	54	40
December	1,500	605	532				715	290	231	208	2,450	52	51	50
1976 Average	1,179	474	362				616	248	222	5,070	2,803	47	36	26
1977														
January	925	340	482				475	160	164	346	4,725	49	55	68
February	1,070	380	462				605	200	227	16	2,950	41	48	52
March	1,093	460	397				453	153	108	2,134	2,460	54	67	73
April	1,030	330	477				612	86	96	7,500	3,075	40	74	81
May (1/2 month)			312						77		2,850			80
Subtotal (5 mos.) Avg.	1,030	378	426				536	150	134	2,499	3,212	46	61	71
Total RBC Plant	1,105	426	394				576	199	178	3,785	3,008	46.5	48.5	48.5
Extended Aeration Plant														
1977														
May		525	269	675	60	45		119	84	346	2,967		79	63
June		230	369	2,095	155	74		29	22	16	3,350		86	94
July		438	416	2,760	355	123		35	40	86	4,025		92	91
August		274	448	1,978	204	120		90	99	55	4,500		60	79
September		320	542	3,363	198	59		28	11	21	3,975		92	98
October		283	478	2,970	173	60		24	20	49	4,075		91	96
November		380	475	2,016	136	72		41	53	276	6,252		90	88
December		417	578	2,770	463	150		66	27	128	7,320		84	95
Subtotal 8 mo. Average		358	447	2,328	218	88		54	44	122	4,558		84	88

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WASTEWATER TREATMENT PLANT TEST DATA SUMMARY

	Influent			Mixed Liquor			Effluent				Flow	Removal		
	COD MG/L	BOD MG/L	SS MG/L	MLSS MG/L	SS30M ML/L	SVI ML/G	COD MG/L	BOD MG/L	SS MG/L	F.COL C/.1L	GPD AVG	COD %	BOD %	SS %
1978														
January		345	474	2,405	943	396		58	50	10	7,755		86	89
February		515	603	3,173	851	272		35	22	949	4,758		93	96
March		430	607	4,580	765	170		14	10	69	4,684		96	98
April		358	605	5,000	863	173		51	40	70	4,860		86	93
May		464	669	3,806	450	118		28	41	214	4,824		94	94
June		390	524	4,063	818	201		13	15	10	4,543		95	97
July		705	529	4,418	865	196		9	7	10	4,680		98	99
August		634	702	4,390	846	193		9	9	10	5,244		99	98
September		740	675	5,538	855	155		9	4	10	6,105		98	99
October		863	832	5,468	783	143		23	11	12	6,435		96	99
November		528	558	6,280	698	111		34	47	14	6,015		92	91
December		418	615	7,963	865	109		57	52	75	6,045		86	91
1978 Average		532	616	4,757	800	187		28	26	121	5,496		93	95
1979														
January		578	677	8,632	867	100		16	16	10	5,676		97	98
February		590	536	6,628	710	108		13	17	10	6,045		97	97
March		598	534	6,075	730	122		35	24	10	5,850		94	95
April		310	408	8,440	554	66		12	6	27	6,253		96	99
May		418	435	7,892	510	65		12	7	26	6,060		97	98
June		575	615	6,225	745	124		9	4	12	6,270		99	99
July		386	419	3,203	711	228		10	8	319	5,850		97	98
August		362	382	3,022	643	213		12	8	37	6,312		96	98
September		310	471	3,038	371	121		25	45	71	5,790		92	91
October		306	508	2,915	208	71		16	24	22	3,648		95	95
November		315	457	4,635	183	40		29	5	32	4,380		90	99
December		289	481	4,580	465	103		28	16	14	5,625		91	97
1979 Average		420	494	5,440	558	113		18	15	49	5,647		95	97

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WASTEWATER TREATMENT PLANT TEST DATA SUMMARY

	Influent			Mixed Liquor			Effluent				Flow	Removal		
	COD MG/L	BOD MG/L	SS MG/L	MLSS MG/L	SS30M ML/L	SVI ML/G	COD MG/L	BOD MG/L	SS MG/L	F.COL. C/.1L	GPD AVG	COD %	BOD %	SS %
1980														
January		320	543	4,396	551	126		16	6	17	6,120		95	99
February		260	392	6,265	451	73		13	4	18	5,925		95	99
March		275	433	5,505	625	120		10	5	27	6,030		96	99
April		262	624	4,916	845	177		8	8	50	4,800		97	99
May		229	403	5,155	830	161		7	4	10	4,440		95	99
June		193	386	5,495	328	59		9	7	15	5,235		95	98
July		240	464	5,632	322	57		8	3	11	5,412		97	99
August		328	562	4,600	224	49		23	10	63	5,805		93	98
September		270	529	4,748	497	109		15	11	10	4,500		94	98
October		199	399	5,110	414	81		8	4	27	4,650		95	99
November		228	648	5,345	326	61		13	22	12	4,035		93	96
December		202	441	5,082	200	41		13	16	13	4,860		92	96
1980 Average		250	485	5,104	468	93		12	8	23	5,151		95	98
1981														
January		323	675	7,180	353	50		11	26	16	6,330		96	97
February		330	495	5,863	344	59		10	9	12	5,351		97	98
March		376	534	6,992	499	71		8	5	10	5,100		98	99
April		278	517	6,155	459	74		11	2	17	5,713		96	100
May		288	441	6,615	350	53		12	14	10	4,167		96	97
June		273	419	4,488	333	75		6	1	30	4,225		98	100
July		248	400	3,154	554	175		9	2	12	3,746		95	99
August		293	580	2,785	518	185		13	3	10	4,225		96	99
September		394	551	2,526	304	119		8	2	11	3,255		98	100
October		448	359	1,963	231	117		61	14	28	2,561		92	94
November		263	463	2,373	213	91		7	3	10	2,011		97	99
1981 Average		319	494	4,554	378	97		14	7	15	4,244		96	98

000092

Data Table Key:

BOD	Biochemical Oxygen Demand
SS	Suspended Solids
MLSS	Mixed Liquor Suspended Solids
SS30M	Mixed Liquor 30 Minute Settleability
SVI	Sludge Volume Index
F. COL	Fecal Coliform Bacteria
FLOW	Effluent Dishcarge Volume
REMOVAL	Percent of influent value removed
MG/L	Milligrams Per Liter or PPM
ML/G	Milliliters Per Gram
C/.1L	Colonies Per 1/10 Liter or 100 ML
PCNT	Percent
HRS	Hours
AV	Average

Transit time is time lapsed from sampling to receipt at Lab

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File: 17G
S.H.

POINT LONELY SRRS
ALASKA

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 04

000095

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

File: S.H. 179-35-1 04

(907) 452-1714

October 12, 1987

Northern Regional Office
1001 Noble Street, Suite 350
Fairbanks, Alaska 99701

Ho Tac/DEEV
Attn: Joe Fitzgerald
Langley Air Force Base, Virginia 23665

Re: Installation Restoration Program
Draft Phase II, Stage 2 Report, DEW Line Stations, Alaska

The department has completed review of the subject document and offers the following comments regarding the individual sites which are addressed:

Bar-M Station Kaktovik/Barter Island

Site 1, Old Dump Site

The old landfill area needs maintenance to correct erosion problems and armoring on the portion of the site facing the coast. The department agrees that additional sampling is warranted.

Site 3, Waste Petroleum Disposal and Fuel Storage Secondary Containment

An August 18, 1987, inspection revealed evidence that fuel had leaked through the east dike. Without a quantification of the extent of the spillage it is difficult for the department to agree that the site warrants no further investigation. Lining of the diking may be warranted.

Site 4, Current Dump Site

Information made available by a recently completed topographic map should be used to develop a plan to divert drainage around this facility. Extensive leachate was observed in this area. The department agrees that it is difficult to discount the existence of hazardous wastes in this site, due to its joint-use nature.

Site 8

No comment.

File: DEW
Category #: 3.40
Document Date: 10/12/87

Site 9, Old Dump Site, N.W.

No comment.

POW-3 Station Bullen Point/Flaxman Island

Site 13, Old Dump Site, East

No comment.

POW-2 Station Oliktok

Site 16, Old Dump Site, N.W.

The location of the old landfill near the shoreline could cause a problem as the coast erodes. The possibility that hazardous waste has been disposed at this location cannot be discounted.

POW-1 Station Point Lonely

Site 28, POL Storage Area

It is difficult for the department to agree that oil spill cleanup at this site is complete without quantification of the remaining fuel from old spills.

A large fuel spill appears to have occurred on the south side of the old Husky oil tanks located at the west end of the airstrip. The spill volume and any damage has not been quantified.

Site 31, Old Dump Site

Archive photographs indicate that a large number of 55 gallon drums were buried at this site. It is, therefore, difficult to endorse the site as having no hazardous waste.

Site 32, Husky Oil Dump Site

The Husky Oil Dump was operating under a permit to Cook Inlet Regional Corporation until last year, even though the U.S. Air Force was the sole user. The dump was closed by the Air Force as a condition of opening a new dump. Water quality monitoring adjacent to the old dump has indicated high Chromium levels. Numerous oil sheens were noted to be

originating from the dump during the August 1987 visit. The department disagrees with the opinion that the contaminants leaching from this site are negligible in relation to the potential receptors. The habitat is a sensitive wetland area.

A number of sink holes in the cover were visible at this site which should be addressed as per the closeout provisions of the permit.

LIZ-2 Station Point-Lay

Site 40, Current Dump Site

The "current dump site" was to be discontinued in use effective July 1987 as per a memorandum of agreement between the department and the U.S. Air Force. At the time of the August 1987 visit, this site had been covered and seeded. The site appears to have a drainage problem which causes leaching through the fill area. This is contrary to closeout provisions of the permit which stipulate controlled drainage away from the site. The site should be watched for settlement problems. Again, the joint-use nature of the landfill in prior years makes it difficult for the department to discount the possibility of hazardous wastes being deposited.

Site 43, Old Dump Site, North

No comment.

Site 44, Suspected Dump Site

No comment.

Although not included on your list of subject facilities, it is worth noting that our August 20, 1987 inspection of the LIZ-3 (Wainwright) solid waste facility revealed a deterioration of conditions over our last visit. The new dump has been extended into the drainage swale, contrary to department requirements. Leaking, discarded oil filters were observed and were suspected to be the source of sheens seen near the solid waste facility. It is not known whether the old landfill ever received hazardous waste.

If you have any questions, please contact myself or Rich Cormack at (907) 452-1714.

Sincerely,

Bradley R. Fristoe

Bradley R. Fristoe
Environmental Engineer

rc:brf:tss
cc: J. Guzmano, EPA/Anchorage
J. Mach, ADEC/Fairbanks
P. McGee, ADEC/Fairbanks
300.45.007
300.45.086
350.45.002
425.45.004

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OCT 22 1987

DEEV

Information Copy of State of Alaska Comments on Draft Phase II, Stage 2 Report, DEW Line Stations

USAF OEHL/TSS
Attn: Maj Carmichael
Brooks AFB, TX 78235-5501

1. Attached for your information are comments by the Alaskan Department of Environmental Conservation (ADEC) on the draft Phase II, Stage 2 Report, DEW Line Stations. The comments generally are logical and applicable, especially based on observations of the sites during our Aug 87 DEW Line visit.

2. Request you evaluate comments and contact us to discuss integration of ADEC's concerns into the final report. Suggest you send a copy to Dames & Moore Engineers, the report authors, for their evaluation of the comments.

3. Suggest you send a copy of ADEC's comments to Woodward-Clyde Consultants for their evaluation and possible integration into the upcoming FONSI's and remedial investigations at the DEW Line Stations.

4. Direct comments to Mr Joe FitzGerald at AUTOVON 574-4430.

FOR THE COMMANDER

SIGNED

GILBERT N. BURNET
CHIEF, ENVIRONMENTAL PLNG DIV

1 Atch
ADEC Comments

JF IFITZ/DEEV/5424V/21 OCT 87/SJM

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POINT LONELY SRRS
ALASKA

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 06

000101

File:
S.H. 17A-35-1
06

INSTALLATION RESTORATION PROGRAM

PHASE II - CONFIRMATION/QUANTIFICATION

STAGE 2

DEW LINE STATIONS ALASKA

DAMES & MOORE
1550 NORTHWEST HIGHWAY
PARK RIDGE, ILLINOIS 60068

JANUARY 29, 1988

FINAL REPORT, AUGUST 17 THROUGH AUGUST 20, 1986

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

PREPARED FOR

HEADQUARTERS TACTICAL AIR COMMAND
COMMAND SURGEON'S OFFICE (HQ TAC/SGPB)
BIOENVIRONMENTAL ENGINEERING DIVISION
LANGLEY AIR FORCE BASE, VIRGINIA 23665

UNITED STATES AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (USAFOEHL)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

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INSTALLATION RESTORATION PROGRAM
PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 2

FINAL REPORT

FOR

DEW LINE STATIONS, ALASKA

TACTICAL AIR COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA 23665

JANUARY 29, 1988

PREPARED BY

DAMES & MOORE
1550 NORTHWEST HIGHWAY
PARK RIDGE, ILLINOIS 60068

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USAFOEHL TECHNICAL PROGRAM MANAGER
Major Richard Carmichael, USAF

USAF OCCUPATIONAL & ENVIRONMENTAL HEALTH LABORATORY (USAFOEHL)
TECHNICAL SERVICES DIVISION (TS)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

NOTICE

This report has been prepared for the United States Air Force by Dames & Moore, for the purpose of aiding in the implementation of the Air Force Installation Restoration Program. It is not an endorsement of any product. The views expressed herein are those of the contractor and do not necessarily reflect the official views of the publishing agency, the United States Air Force, nor the Department of Defense.

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