9/20/90

Joint Hearing Senate Resources & Senate Special Committee on Oil & Gas

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SENATE RESOURCES COMMITTEE
AND
SENATE SPECIAL COMMITTEE ON OIL AND GAS

JOINT HEARING

SEPTEMBER 20, 1990
9AM TO 4PM

NOEL WIEN LIBRARY, FAIRBANKS

FACT SHEET

PART I

THE STATE OF ALASKA BY TEMPORARY SUSPENSION ORDERS OF THE PIPELINE COORDINATOR MAY AT ANYTIME ORDER THE TEMPORARY SHUT DOWN OF ANY OF THE TRANS ALASKA PIPELINE FACILITIES IF SUCH A SUSPENSION IS NECESSARY TO PROTECT THE PUBLIC HEALTH OR ENVIRONMENT (SEE SECTION 24, RIGHT-OF-WAY LEASE FOR THE TRANS-ALASKA PIPELINE, TEMPORARY SUSPENSION ORDERS OF THE PIPELINE COORDINATOR).

ALYESKA PIPELINE SERVICE COMPANY COULD FEEL COMPELLED TO SUSPEND OPERATIONS OF THE PIPELINE IN ORDER TO AVOID FINDING ITSELF IN NON-COMPLIANCE OF STATE OR FEDERAL REGULATIONS.

ON AT LEAST THREE OCCASIONS SINCE THE GROUNDING OF THE EXXON VALDEZ, THERE HAS BEEN THE THREAT OF A NON-SCHEDULED SHUT DOWN.

WHAT WOULD BE THE POTENTIAL ECONOMIC EFFECT OF A TEMPORARY SHUTDOWN OF THE TRANS ALASKA PIPELINE?

PART II

OVER THE PAST DECADE THERE HAS BEEN $131,430,000 APPROPRIATED TO THE ALASKA DEPARTMENT OF LAW TO LITIGATE REVENUE DISPUTES BETWEEN THE STATE AND VARIOUS OIL COMPANIES. $44,289,000 OF THIS WAS USED JUST TO LITIGATE ROYALTY SUITS.

CAN THE PRESENT SYSTEM OF CRUDE OIL VOLUME MEASURMENT FROM WELL-HEAD TO TANKER BE SUBSTANTIALLY IMPROVED?

SENATE RESOURCES COMMITTEE
AND
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PART I

SUBJECT: "ALASKA'S ECONOMY AND THE POTENTIAL EFFECTS OF A SHUTDOWN OF THE PIPELINE."

WITNESSES SCHEDULED:

KEITH BURKE, MANAGER, ALYESKA FAIRBANKS OPERATIONS

LARRY DIETRICK, DIRECTOR, ENVIRONMENTAL QUALITY, ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

JAMES EASON, DIRECTOR, DIVISION OF OIL AND GAS, ALASKA DEPARTMENT OF NATURAL RESOURCES

BUKI WRIGHT, VICE PRESIDENT, MAPCO ALASKA PETROLEUM

MARK NECESSARY, VICE PRESIDENT, REFINING, TESORO ALASKA PETROLEUM

JAMES BOLTZ, VICE PRESIDENT, REFINING, PETRO STAR INC.

ROYCE WELLER, ASSISTANT COMMISSIONER, ALASKA DEPARTMENT OF REVENUE

BRUCE BOTHELLO, ASSISTANT ATTORNEY GENERAL, ALASKA DEPARTMENT OF LAW

STATEMENT OF
KEITH D. BURKE
MANAGER, FAIRBANKS OPERATIONS
ALYESKA PIPELINE SERVICE COMPANY
BEFORE THE
SENATE RESOURCES COMMITTEE
SEPTEMBER 20, 1990

My name is Keith Burke. I have worked for Alyeska Pipeline Service Company since 1975 in various accounting and logistics management positions. In 1980 I became Manager of the Operations and Pipeline Logistics Support Department. My responsibilities in that position extended to a number of the contractors that provided support services to the pipeline, such as Earthmovers of Fairbanks, the equipment maintenance contractor, and Helilift, the aviation support contractor. In the recent Alyeska reorganization chartered by our new president, Jim Hermiller, I was assigned as Manager of Fairbanks Operations, and am pleased to be making my home in Fairbanks now. This is a new position that recognizes Alyeska's increasing presence here and the importance of Fairbanks to the operation and maintenance of the trans Alaska pipeline system.

Alyeska welcomes this occasion to testify for several reasons. First and foremost, Alyeska considers itself a good citizen that is responsive to public concerns and the need for information. Yet too often all one hears or reads about are the unusual or out-of-the ordinary events that make news because they deviate from the norm. We are proud of our accomplishments day in and day out in operating and maintaining the trans Alaska pipeline. Our record is superb and second to none worldwide as an oil transportation system.

In addition, we recognize in particular the importance of Fairbanks to Alyeska as the communications, transportation, education, and business center of interior Alaska. Fairbanks has been a key

contributor to the success of Alyeska before, during and since construction. We use Fairbanks today as a railhead and transshipment hub for our facilities along the pipeline route. We also operate a pipe fabrication and welding facility here as well as maintaining our Northern District Security Office and substantial warehousing facilities in Fairbanks. Of course, Pump Stations 7 and 8 are operated by personnel residing in Fairbanks and its surrounding communities.

Another way Fairbanks has served Alyeska is through the tremendous resources available at the University of Alaska on subjects ranging from arctic engineering and permafrost to marine sciences. Use of these resources did not stop with the completion of construction. The expertise available through the University is an important component of Alyeska's ongoing activities.

The specific topic you have asked Alyeska to address today is the impact of a shutdown of the trans Alaska pipeline on the Alaskan economy. By far the greatest impact would be the stopping of oil production with resulting loss of revenue to the State of Alaska. That is not a subject which Alyeska will be addressing, and we note from the list of proposed witnesses today that there are others who will cover the impacts that relate to lost production.

Before attempting to demonstrate the financial impact of a pipeline shutdown from Alyeska's perspective, let me emphasize as strongly as I possibly can that we believe a shutdown of the trans Alaska pipeline for any period other than of short duration is highly unlikely. Alyeska is doing everything in its power through vigorous management and attention to preventive maintenance to minimize the need for pipeline shutdown for routine repairs. Alyeska has developed plans for any number of contingencies that could occur

affecting pipeline or terminal facilities, and we are ready to respond to these contingencies, including catastrophic events, which could threaten the safe and continuous flow of North Slope oil from Pump Station 1 to the Valdez Marine Terminal.

In the Fairbanks area, Alyeska has a pipeline contingency repair operation, an equipment/light vehicle maintenance center, pipeline fabrication facility, engineered materials storage yard, and a pipeline control system maintenance and repair center, employing over 500 contractor and Alyeska employees with an annual payroll exceeding $40 million.

The impact of a pipeline shutdown hinges on the length of the event. The pipeline has been shut down for limited periods of time ranging from a few hours to a day or two. These shutdowns are necessary for planned maintenance and are coordinated with the producing fields. No immediate impact on Alyeska's direct expenditures results from these interruptions.

If a shutdown extends beyond several days, the first impact will be a reduction of purchases necessary for the operation of the mainline turbines, such as fuel and DRA expenditures, and the ancillary costs of transportation for those commodities. I have attached to this testimony a summary of impacts that might flow from a shut down lasting several weeks. As you can see, the estimate of an average reduction in expenditures would be approximately $1 million per week.

Also attached is a second scenario which assumes the pipeline is shut down for a period of one year or more. We cannot even imagine a set of facts that might lead to such an occurrence, and we caution the

committee and all others who have access to this testimony that the likelihood of such an event is next to zero. But for the purposes of responding to this committee's inquiry, we have included the scenario.

Under this long term shutdown scenario, facilities are mothballed, contracts reduced and employees furloughed. The impact on Alaska business in terms of moneys not spent on goods and services would be significant and not localized. Based on the 1991 projected expenditures, Fairbanks alone would lose about $93 million in direct payments to area businesses. Alyeska payroll statewide exceeds $103 million with employees living as residents in all communities along the pipeline as well as in the Kenai-Soldotna, Anchorage and Matanuska-Susitna Boroughs. Although the loss of public oil revenue would still dwarf the loss of direct expenditures, those expenditures alone well exceed one half billion dollars--an amount many Alaskans, including members of the Alyeska family, would find difficult to replace.

I hope this testimony has been helpful to the committee. In concluding I would like to state again that I am pleased to be here and intend to become an active member of the Fairbanks community. I lived here before and worked on the original pipeline construction project from 1975-77. Alyeska has become part of Fairbanks and the Interior. We at Alyeska are here for the long haul, as your neighbors. I hope that when you have questions about us or just want to visit, you'll give me a call or drop by. That's what neighbors do, and that's what I will be doing too. Thank you.

/jbm

ALYESKA PIPELINE SERVICE COMPANY
ALASKA SPENDING ASSUMPTIONS
SCENARIO 1

ASSUMPTIONS

- PIPELINE BROUGHT BACK TO FULL OPERATION WITHIN SEVERAL WEEKS
- NO LAYOFFS OF ALYESKA PERSONNEL - UNSCHEDULED OVERTIME ELIMINATED
- NO TANKER LOADINGS DURING THE ENTIRE PERIOD
- NO CONTRACT CANCELLATIONS
- NO PROJECT CANCELLATIONS
- FULL OIL SPILL RESPONSE CAPABILITIES RETAINED
- AIR EMISSIONS OBSERVERS NOT REQUIRED DURING AFFECTED PERIOD
- ANALYTICAL LABORATORY SERVICES NOT REQUIRED DURING AFFECTED PERIOD
- DRA TRANSPORTATION AND FUEL PURCHASES NOT REQUIRED DURING AFFECTED PERIOD

IMPACT

- PROJECTED AVERAGE WEEKLY EXPENDITURE REDUCTION EXCEEDS ONE MILLION DOLLARS

OTHER IMPACTS TO CONSIDER

- MULTIPLIER EFFECT
- ROYALTY PAYMENTS
- OIL FIELD PRODUCTION SLOWDOWN
- EFFECTS ON FUTURE SPENDING

ALYESKA PIPELINE SERVICE COMPANY
ALASKA SPENDING ASSUMPTIONS
SCENARIO 2

ASSUMPTIONS

- PIPELINE BROUGHT BACK TO FULL OPERATION IN ONE YEAR
- OPERATIONS WORK FORCE REDUCED BY AN AVERAGE OF 85% OVER THE AFFECTED PERIOD
- ADMINISTRATIVE WORKFORCE REDUCED BY AN AVERAGE OF 45% OVER THE AFFECTED PERIOD
- OPERATIONS, MAINTENANCE AND ADMINISTRATIVE SPENDING LEVELS REDUCED BY 90% WITH THE FOLLOWING EXCEPTIONS:
  - -- ALL LEASED VESSELS, MACHINERY, EQUIPMENT AND FACILITIES RETAINED
  - -- NO DISPOSAL OF VEHICLES AND EQUIPMENT
  - -- OIL SPILL RESPONSE TEAMS NOT REQUIRED
  - -- NO CANCELLATIONS OF MAJOR CONTRACTS
  - -- NO CHANGE IN SECURITY REQUIREMENTS
  - -- ANALYTICAL LABORATORY SERVICES NOT REQUIRED
- ALL PROJECTS NOT IN PROGRESS CANCELLED

IMPACT

- PROJECTED EXPENDITURE REDUCTION EXCEEDS $650 MILLION

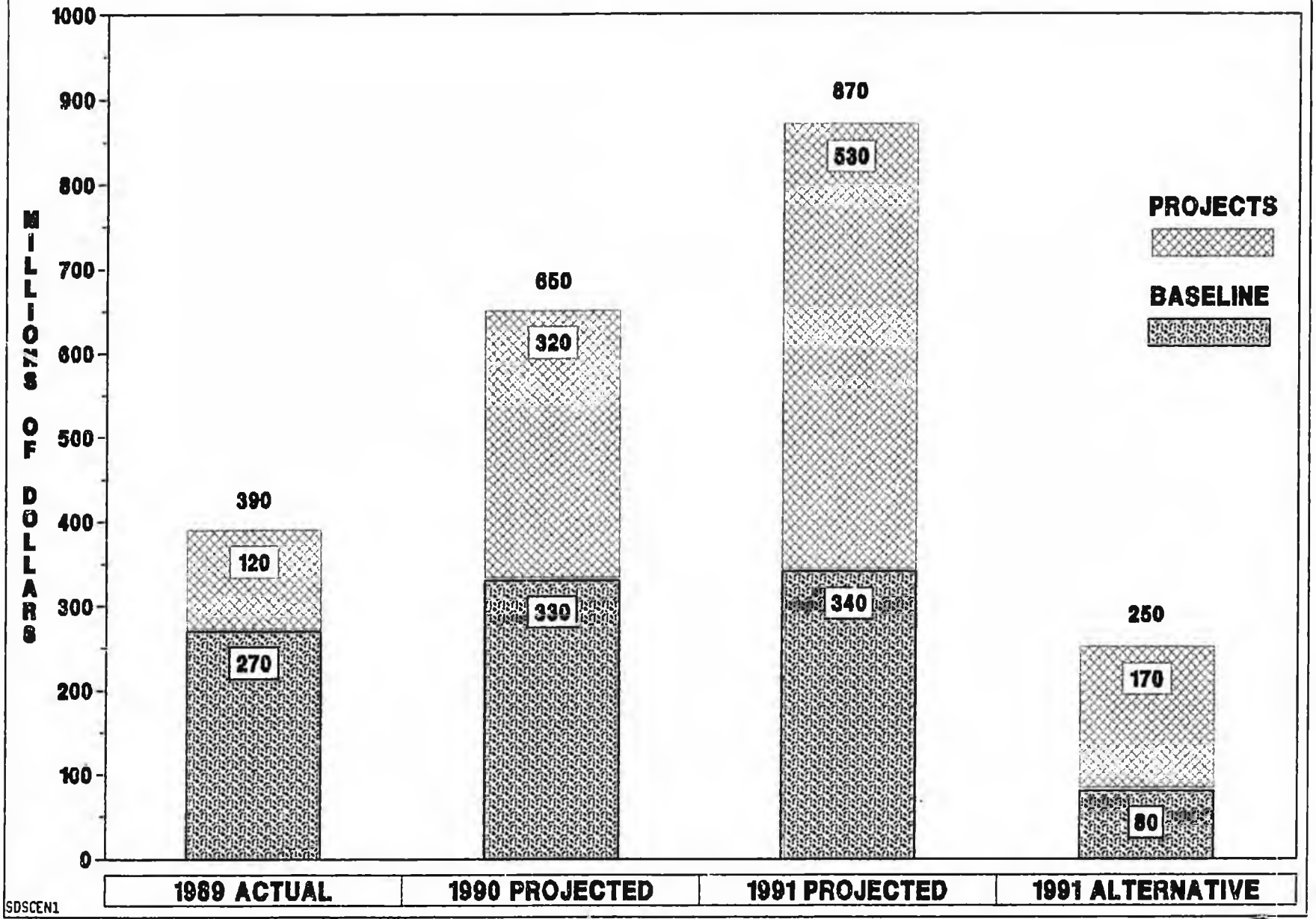
OTHER IMPACTS TO CONSIDER

- MULTIPLIER EFFECT
- ROYALTY PAYMENTS
- OIL FIELD PRODUCTION SHUTDOWN
- EFFECTS ON FUTURE SPENDING

ALYESKA PIPELINE SERVICE COMPANY

OPERATING EXPENDITURES

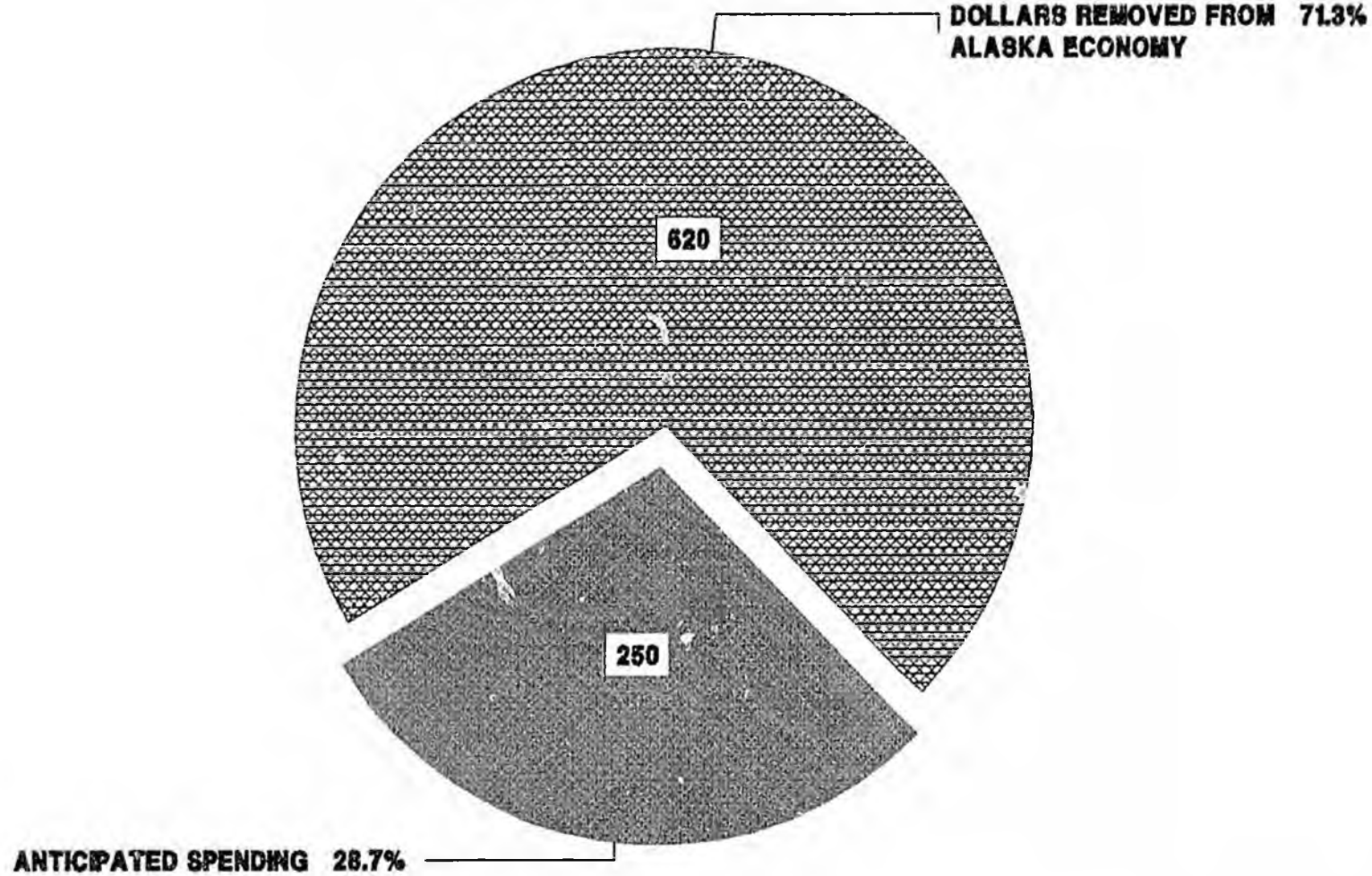
ALASKA SPENDING



SDSCEN1

ALYESKA PIPELINE SERVICE COMPANY

1991 OPERATING EXPENDITURES
ALASKA SPENDING
MILLIONS OF DOLLARS



$870 MILLION

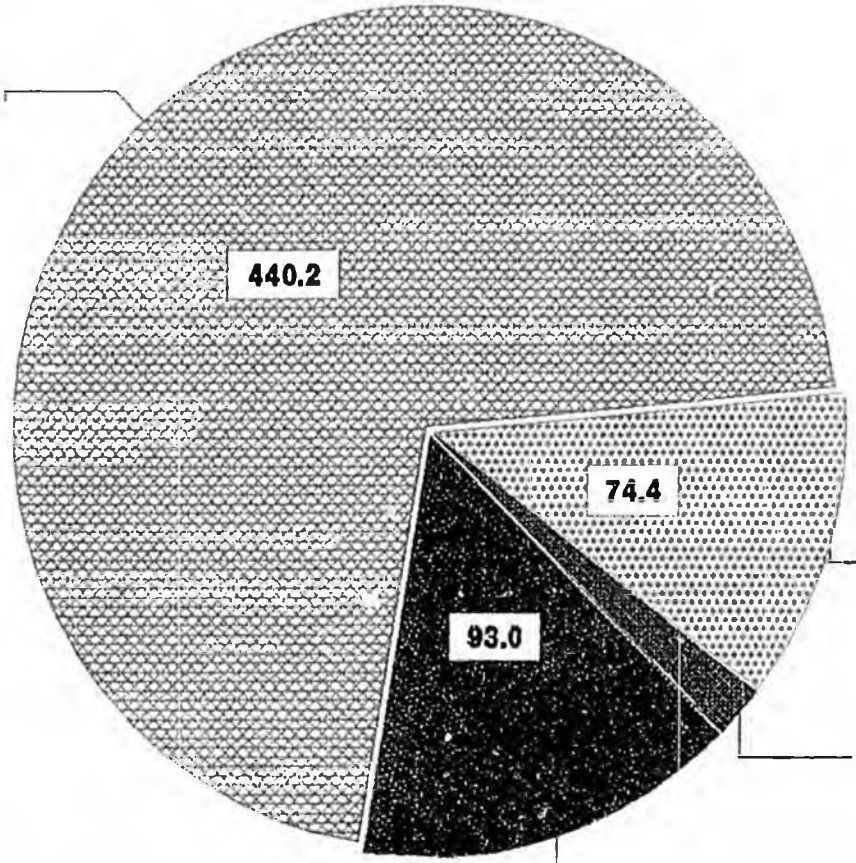
SD3CEN1A

ALYESKA PIPELINE SERVICE COMPANY

DISTRIBUTION OF DOLLARS REMOVED FROM ALASKA ECONOMY

ALASKA SPENDING

MILLIONS OF DOLLARS



$620 MILLION

SDSCEN1B

STEVE COWPER, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL QUALITY
P.O. BOX O, JUNEAU, ALASKA 99811-1800

Telephone:
(907) 465-2640

September 17, 1990

The Honorable Bettye Fahrenkamp, Chairman
Senate Resources Committee
P.O. Box V
Juneau, AK 99811

Dear Senator Fahrenkamp:

I would like to confirm that I will be able to attend the September 20, 1990 hearing of the Senate Special Committee on Oil and Gas in Fairbanks. I have discussed our testimony with Dan Austin of your staff and it is my understanding that you would specifically like us to address our statutory authority for shutting down the pipeline. The Department does not have a role in the other issues on the agenda for the hearing ie; measuring throughput of the pipeline or evaluating consequences to revenue flow as a result of a shutdown of the Trans Alaska Pipeline.

With regard to shutting down the pipeline, the Department has no express statutory authority to shut down the operations of any business, including the Trans Alaska Pipeline system.

Virtually all of DEC's programs for regulating environmental pollution are structured by statute and regulation such that before a person or company can start operations the person or company must first secure a permit or approval under the relevant regulations. Once the permit or approval is obtained, the operator must comply with the permit or approval's conditions. If a condition of a permit or approval is violated during the business' operations, DEC in conjunction with the Department of Law may seek appropriate administrative or judicial orders to halt the violation. In that context the relief sought would not be framed in terms of a request for the issuance of an order to completely shut down the business. Instead, the relief requested would be for an order requiring the business to come back into compliance with the condition of the permit or approval currently being violated.

By way of example, Alyeska Pipeline Service Company's Valdez Marine Terminal needs an approved oil spill contingency plan before Alyeska may load crude oil onto a tanker. Having received an approved plan, if the company were to violate one of its conditions, the state could seek an order requiring that the company come back into compliance. Once the order has been issued, Alyeska would need to correct the deficiencies identified in the order. They may choose to shut down operations, if allowed by other state law, in lieu of correcting deficiencies.

This is the testimony that will be presented at the hearing in Fairbanks.

We appreciate the opportunity to participate in a discussion of these most important issues.

Please contact me if you have any questions or need additional information.

Sincerely

Larry Dietrick

Larry Dietrick
Director

Discussion Notes of

James E. Eason, Director
Division of Oil and Gas
Alaska Department of Natural Resources

Before the
Senate Resources Committee
and
Senate Special Committee on Oil and Gas

September 20, 1990

What Are the Economic Consequences of a Shutdown of the Trans Alaska Pipeline?

(Morning Session)

1. First, the obvious--if the pipeline is shut down, North Slope oil production ceases. Once production is stopped, royalty payments attributable to that production also stop. In addition, refiners that rely on Alaska North Slope (ANS) production must find alternative sources for their refinery feedstock. Refineries that can not secure alternative feedstocks will cease to operate during the shutdown.

2. Oil and gas royalties are production based payments. No production, no payment. Royalty payments are due to the state at the end of the month following the month of production. As a result, the immediate financial effect of a shutdown would not be felt at the state's bank until the end of the month following the shutdown. There also would be a corresponding lag of 30 days in the resumption of royalty payments once production resumed. Unlike the royalty in value payments, the actual royalty in kind oil taken by the state's purchasers (Mapco, GVEA, Petro Star, Chevron and Tesoro) would cease flowing the moment the pipeline is shut down. Some inventory at the Valdez terminal may or may not be available to those purchasers who use the terminal depending on the purchaser's current lifting status. Unfortunately, there is not similar storage capability at the GVEA connection.

3. Cook Inlet production only accounts for two percent of the statewide daily oil output. In addition, there is no cheap and easy way to move Cook Inlet crude oil to the North Pole refineries.

4. July production from the North Slope was 52,655,633 barrels for an average of 1,698,569 barrels per day. Royalty revenue reported for that month was $53.5 million dollars. Year-to-date production from the North Slope is 379,481,099 barrels as of July 31. Year-to-date royalty revenue from that North Slope production is $484.5 million.

5. A shutdown and restart of TAPS has its own operational and mechanical problems. The Alyeska representative can more fully address those concerns. Although at a much smaller scale, similar concerns apply to the Milne Point, Kuparuk and Endicott pipelines.

6. Apart from the pipeline issues, a shutdown and restart of the five North Slope oil fields will have its own unique problems and concerns. While shutting down or restarting TAPS is a major job in itself, shutting down or restarting an oil field the size of Prudhoe Bay is a monumental task--especially if it has to be done on short notice. Contingency plans exist to implement such an action, but it is still no easy job to accomplish. Conoco went through this exercise when it shut in Milne Point field in 1986. Conoco had the advantage of having no immediate deadlines or dictum to satisfy. It set the timeline it had to follow. Conoco, BP and ARCO should be consulted concerning the unique problems that are faced in an immediate shutdown situation. For example, well bores need to be protected against freeze back, and pipelines and vessels need to be purged to protect against freezing or corrosion. A large amount of gas will undoubtedly be flared during any shutdown or start-up operation, and it may be necessary to flare hydrocarbon liquids or discharge them into pits. In an emergency situation, safety will take precedent over the environment.

7. Long-term impacts to the oil reservoirs from a long-term shutdown are largely unknown at this time. The return to production for the Cook Inlet fields shut down by the volcano has been encouraging.

8. There is very limited oil storage capacity on the North Slope. There are two surge tanks at Pump Station #1, and both the Kuparuk and Milne Point fields have a limited amount of on-site storage. Prudhoe Bay field really has no on-site storage capacity. If TAPS shuts down, the North Slope producers have to begin to take immediate action to shut down.

9. The refineries in Fairbanks have no alternative crude oil supply or method to dispose of the return oil. The Cook Inlet refineries at least have potential alternative supplies of crude oil available to them in the event of an extended shutdown of TAPS.

10. The Division of Oil and Gas has no authority to order a shutdown of TAPS, nor do we have any authority to order Alyeska to continue to operate in the event it planned a shutdown of TAPS.

11. In the event of an extended shutdown of TAPS there would be a few collateral issues that the Division would have to address. These include requests for suspension of operations and suspension of production for the affected leases and requests for lease extensions and unit agreement extensions. The exact circumstances at issue would have to be considered prior to issuing any rulings. For instance, suspensions were granted when operations were disrupted in Cook Inlet by the Mt. Redoubt eruption.

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Testimony of

A.L. BUKI WRIGHT, JR.

VICE PRESIDENT

MAPCO ALASKA PETROLEUM Inc.

before

THE SENATE RESOURCES COMMITTEE

and

THE SENATE SPECIAL COMMITTEE ON OIL AND GAS

September 20, 1990

Thank you for the opportunity to testify before you on the subject at hand. And, at the outset, I'd like to express my appreciation to you for deciding to hold this hearing, in the first place.

The possibility of a complete shutdown of the Alyeska Pipeline has surfaced twice in the last eighteen months.

In both instances, the potential impact was described in terms of financial impact on the State of Alaska and on the producers of the oil flowing through the line. So, it is especially gratifying that your two committees are looking into the impact of a potential shutdown on the "People" of Alaska, and not just on the "State" of Alaska.

The direct and immediate impact, of course, would be felt by the refiners in the state, and their ability to continue to operate. Virtually all of Alaska's fuel supply comes from in-state refineries, all of which run on ANS crude, or a combination of Cook Inlet and ANS crude. Although impact and timing of impact would vary by refinery, the burden on individual Alaskans and on the Alaskan economy would be severe.

Obviously, some information about our specific operating capabilities, specific production information, and the like are proprietary. But, with that in mind, let me tell you a little bit about our business in the state.

MAPCO is a major supplier of refined petroleum products in Alaska. In addition to thirteen (13) company-owned retail gasoline units in the Anchorage area, and three (3) in Fairbanks, MAPCO markets a wide variety of fuels on a wholesale basis in the Interior and in Anchorage. We operate retail heating fuel businesses in Fairbanks, Nenana, Healy and Galena.

We are the jet fuel supplier at the Fairbanks International Airport and supply a significant portion of the jet fuel at the Anchorage Airport.

MAPCO supplies, under contract, jet fuel to all four military bases in the Anchorage and Fairbanks areas.

On a direct or indirect basis, MAPCO supplies considerable fuel to the villages along the Yukon River system and out into Western Alaska.

Now with that as a background, let me address the question of a potential pipeline closure.

In particular, our refinery in the Interior would be immediately crippled by a shutdown of the pipeline. MAPCO's North Pole Refinery is directly on the Trans Alaska Pipeline, and a pipeline shutdown results in the almost immediate shutdown of this 115,000 barrel per day refinery. Also, because of our location far from tidewater, we have access to not other crude supply other than ANS crude through the pipeline.

The impact on individual product availability would vary, depending on product, and on time of year. For example, heating fuel and diesel are consumed faster in the winter months, gasoline in the summer. But, in any case, even if all our tanks at the refinery and in Anchorage were full at the shutdown, we would begin running out of fuel in a matter of days, and short of some form of rationing, would be totally out within a couple of weeks.

The Fairbanks Airport would have fuel for less than two weeks with controlled liftings. The Anchorage Airport would probably run out

in a matter of days. Alaska's reputation for reliability as an international refueling base is already on delicate ground because of the recent eruptions of Mt. Redoubt. What message would a disruption of airport service caused by a fuel shortage send to the aviation community about Alaska's desire to be a major international refueling stop?

If a shutdown were to happen during the summer months, depending on timing, the impact on the Bush could be incalculable. Most of the Interior River communities and Northern and Western Alaska are ice-locked during the winter. The delivery of their fuel supplies for the entire winter begins generally in July and August. In many villages, fuel barges arrive only one or two times each summer. If the fuel isn't delivered on the Fall barge, there just isn't a second chance.

In summary, if the pipeline shuts down, the entire state of Alaska - except possibly Southeast - would be completely out of gasoline, and other fuels for transportation, heat, and electrical generation possibly within a matter of days and certainly within weeks. We would not be able to resupply from the West Coast, as they would be suffering shortages of their own caused by the shutdown.

The point I'd like to leave you with is this...Shutting down the Trans Alaska Pipeline will impact more than just the oil companies and the "State" of Alaska. It will have a very direct, immediate

and personal effect on every Alaskan.

So, the bottom line is...when there are disputes, and certainly there will be, from time to time...causing the pipeline to be shut down should not be an option. That's just going too far.

TESTIMONY OF MARK NECESSARY
Tesoro Alaska Petroleum Company

Before the
Senate Resource Committee
and
Senate Special Committee on Oil & Gas

September 20, 1990
Fairbanks, Alaska

"Economic Consequences of a Shut Down of the Trans Alaska Pipeline"

BACKGROUND

Tesoro Alaska employs two hundred Alaskans and operates a 80,000 BPD refinery north of Kenai, Alaska producing motor fuels, jet fuels, heating oils, propane and other petroleum products that are distributed throughout the state of Alaska. Tesoro also produces residual fuel oil which is exported to the Far East. Approximately 85% of Tesoro's crude oil feedstock is Alaska North Slope (ANS) [45,000 BPD ANS is obtained from the State of Alaska under the current royalty oil contract].

Tesoro's crude oil storage capacity is approximately 900,000 barrels which represents approximately 10 days of operation. The typical inventory provides five days of operation which coincides with the frequency of oil tanker deliveries from Valdez.

EFFECTS OF ALYESKA PIPELINE SHUTDOWN

A. Planned Shutdowns

In the event adequate notice is provided (at least sixty days notice) it is possible to replace the ANS with other crude oils; however there are considerable limitations on the types of crude oil that can be processed at Tesoro's refinery which was expanded and modernized in the mid 1980's to specifically handle ANS.

B. Unplanned Shut Downs [Any shutdown occurring with less than sixty days notice].

The total economic impact to Tesoro Alaska and the State of Alaska would increase as the duration of the shutdown increases as well as the time of year of the shutdown. I have provided three scenario's that illustrate potential economic impacts of a shutdown.

No. 1: A shutdown of five (5) days in June.

Expected Effects:

1. Shortage of at least 350,000 bbls to Tesoro necessitating reduction in refinery throughput from 80,000 bbls/day to 50,000 bbls/day with all downstream units reduced to minimum thruputs causing a shortage of refined products that would potentially prevent meeting contractual commitments for all products.

2. There is a real possibility of a shutdown within 10 days depending on vessel availability and congestion at Valdez. (Tesoro actually ran out of ANS crude after the Exxon Valdez accident and had to substitute ANS with one cargo of Cook Inlet crude.)

3. The refinery would also be subject to costs associated with delays incurred by vessels already scheduled to lift refined products (Tanker costs approximately $20,000 per day).

No. 2: A shutdown of fifteen (15) days in April.

Expected Effects:

1. Shortage of at least 1,050,000 bbls necessitating reduction of throughputs from 80,000 to 50,000 for 5 to 8 days and shutdown of the refinery on the 8th day following termination.

2. A shutdown of TAPS for 15 days would cause major supply problems on the west coast as well as Alaska. It is expected that these supply problems could cause the duration of shutdown to be as much as 30 days as the earliest foreign crude could be obtained would be in the 30-45 day range.

3. Weekly operating costs during a shut down would be in the range of $500,000.

4. Reduction of jet fuel product availability to the Anchorage Airport from the current levels of 12-15,000 bbls/day which would have potentially permanent impact for some air freight operations.

5. There would be even more costly interruptions in the marine vessel schedules which would cause demurrage claims as referenced in the first scenario.

6. Significant cost exposure for freeze protection at the refinery with potential equipment damage related to cold weather shutdowns.

7. Real potential for state wide gasoline shortages for all grades of gas.

No. 3: A shutdown of thirty (30) days at any time.

Expected Effects:

1. A shortage of at least 2,100,000 bbls resulting in a reduction of thruputs to 50,000 bpd for 8 days and a total refinery shutdown thereafter

2. The shutdown would be expected to continue for 30 - 45 days with a minimum cost in the range of 1.8 to 2.7 million dollars at the refinery alone.

3. A 30 day shutdown of the pipeline would have permanent effects on our crude supply and transportation system. A loss of 1.8 mbd for any length of time would cause major supply problems on the entire U.S. West Coast. There would be a resultant scramble for crude oil and products in the Pacific Rim. Tesoro's ability to compete for the remaining available supplies would be affected by the increasingly difficulties in getting shippers to operate in Alaska. The ultimate effect expected is that we would have to pay higher than market prices to cover our needs.

4. There would be a reduction of gasoline in excess of 400,000 bbls; 500,000 bbls of jet fuel; 200,000 bbls of diesel and two complete cargos of fuel oil exports to the Far East.

5. If the interruption occurred in the winter there could be high costs associated with freeze protection as well as increased hazards in starting the refinery after supplies are reestablished.

CONCLUSION

The statewide petroleum product shortages would have a major negative impact on Alaska's economy in general and would especially hit the air transportation market hard. Tesoro would be faced with the potential of a vast increase in operating costs that would in no way be offset by revenues. It should be noted that Tesoro's interruption could also impact the retail availability of gasoline thruout the state at Tesoro, 7-11, and several of the other major retailers in Alaska.

STATE OF ALASKA

DEPARTMENT OF REVENUE

OFFICE OF THE COMMISSIONER

STEVE COWPER, GOVERNOR

P.O. BOX S
JUNEAU, ALASKA 99811-0400
PHONE: (907) 465-2300
TELEFAX: (907) 465-2389

September 13, 1990

The Honorable Bettye Fahrenkamp
Alaska State Senate
119 N. Cushman St., Suite 201
Fairbanks, Alaska 99702

Dear Senator Fahrenkamp:

The enclosed narrative was prepared for your hearing scheduled September 20th. Chuck Logsdon, senior petroleum economist, will also be available to address any technical questions you, other committee members or staff may have.

Sincerely,

Royce Weller
Assistant Commissioner

RW/sp

Enclosure

90-120

DEPARTMENT OF REVENUE COMMENTS CONCERNING OIL PRODUCTION—REVENUE CONSEQUENCES OF DISRUPTION AND MONITORING ADEQUACY

Disruption

From time to time there have been disruptions in production flow through the pipeline. The causes are varied; scheduled or unscheduled maintenance, the grounding of the EXXON VALDEZ, regulatory disputes over air quality and the invasion of Panama. Because oil production from the North Slope is in decline due to the decline in the mammoth Prudhoe Bay field, these disruptions cannot be made up quickly. As a result, any disruption in the flow of oil down the pipeline has negative impacts on the amount of ANS moved to market and therefore reduces State revenues. Assuming production of 1.8 million bbl/day and $15/bbl wellhead value, total disruptions in pipeline throughput would cost the State $6.75 million per day, $47.25 million per week, or $205.9 million per month.

This negative impact does not include the indirect impact of production disruption on the TAPS pipeline tariff. The fewer the number of barrels that flow through the pipeline, the larger the cost per barrel to ship the oil from the North Slope to Valdez. Because the taxpayer can deduct the cost of pipeline transportation to arrive at the wellhead value, this reduces the production tax and the State's royalty value. It is estimated that the 1989 disruption in output caused by the EXXON VALDEZ accident plus unexpected adverse summer operating conditions added nearly $.20/bbl to the cost of shipping oil off the North Slope in 1990 since Alyeska is allowed to capture the increased cost against barrels shipped in the following year.

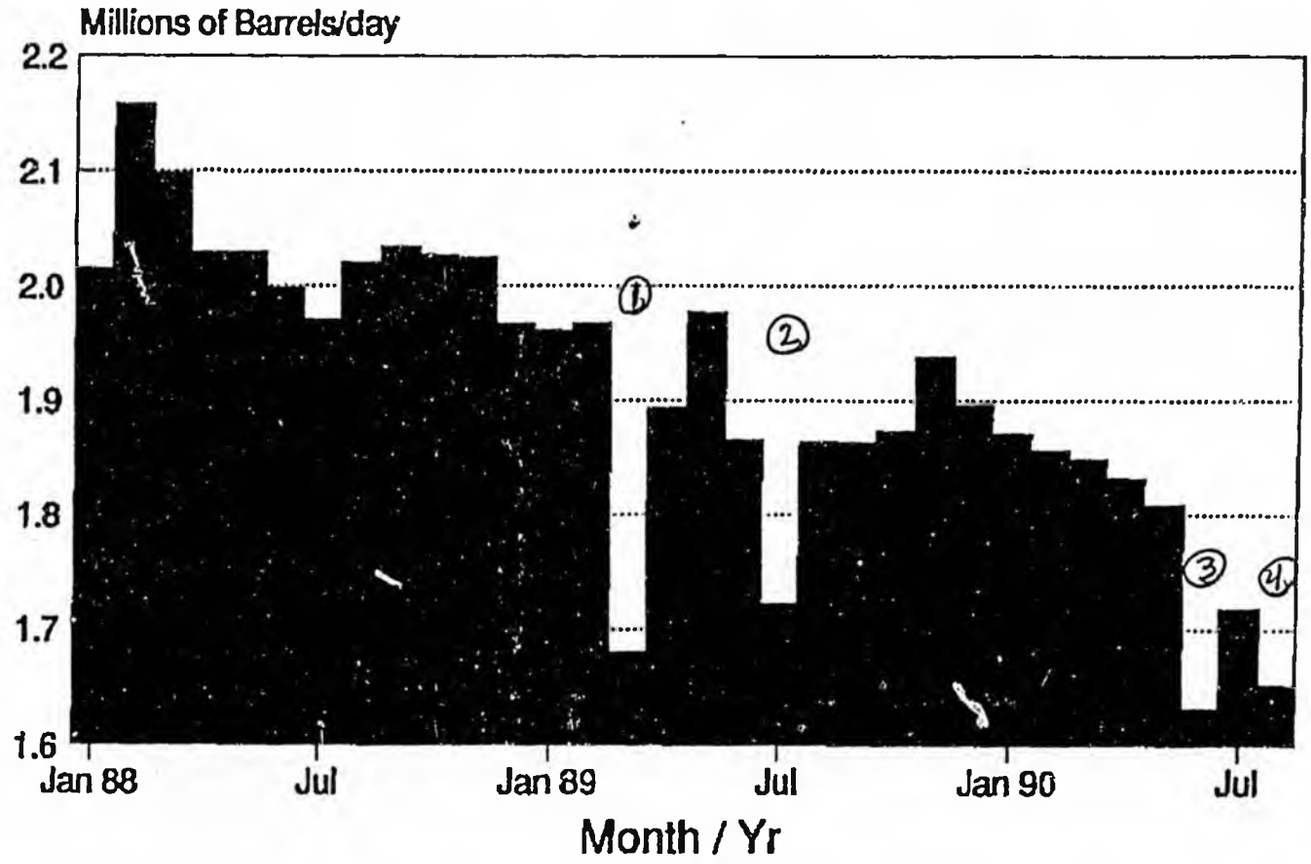
Monitoring

The Department of Revenue reconciles the reported amount of taxable oil production with the production allocation reports used by the oil field operators to allocate production among working interest owners. These production amounts are also compared with the production reported by the oil field operators to the Alaska Oil and Gas Conservation Commission (Form 10-405). This reconciliation occurs as the production tax is received on a monthly basis. The tax is due one month after the month in which the oil is produced so the Department has current information on oil production on a one month lagged basis.

In contrast, the oil and gas corporate income tax (extraction factor) is reconciled to production statistics on an annual basis. The production source data, however, is the same.

Both audit divisions can, and often do supplement the above data with current oil production information held by the Department of Natural Resources Division of Oil and Gas.

Alaska North Slope
Oil Production



Source: Alaska Department of Revenue

Note: August 1990 is preliminary data

ANS Production

Month	Millions of Barrels per Day
Jan 88	2.015
Feb	2.158
Mar	2.099
Apr	2.030
May	2.030
Jun	1.998
Jul	1.971
Aug	2.021
Sep	2.035
Oct	2.027
Nov	2.025
Dec	1.967
Jan 89	1.952
Feb	1.968
Mar	1.680
Apr	1.894
May	1.977
Jun	1.866
Jul	1.722
Aug	1.864
Sep	1.864
Oct	1.874
Nov	1.939
Dec	1.896
Jan 90	1.871
Feb	1.857
Mar	1.849
Apr	1.832
May	1.809
Jun	1.632
Jul	1.718
Aug	1.652

Note: August 1990 is preliminary data

9/6/90 11:45am
FAX TRANSMITTAL MEMO
TO: Royce Weller
DEPT: FAX #: 465-2389
FROM: Chuck / Phyll PHONE: 272-5627
CO: FAX #: 278-5026
Post-it brand fax transmittal memo 7671
NO. OF PAGES 2

Expected and Historical Crude Oil Prices
For Alaska North Slope Crude and OPEC Marker
In 1989 constant $/barrel

	Low Scenario		Mid Scenario		High Scenario	
Fiscal Year	Saudi Lt Ras Tanura	ANS at Wellhead	Saudi Lt Ras Tanura	ANS at Wellhead	Saudi Lt Ras Tanura	ANS at Wellhead
1990	16.18	11.80	16.33	12.15	16.37	12.46
1991	15.35	10.90	16.95	12.83	17.95	14.54
1992	14.91	11.26	17.08	13.78	17.93	15.24
1993	14.49	11.04	17.19	13.95	18.26	16.05
1994	14.37	11.13	17.34	14.29	18.48	16.61
1995	14.26	11.06	17.49	14.41	18.69	17.03
1996	14.18	11.21	17.68	14.75	18.98	17.68
1997	14.10	11.41	17.85	15.17	19.28	18.37
1998	14.03	11.44	18.02	15.44	19.57	18.84
1999	13.96	11.35	18.20	15.63	19.88	19.27
2000	13.87	11.07	18.38	15.46	20.19	19.33
2001	13.83	10.83	18.53	15.45	20.50	19.49
2002	13.72	10.51	18.58	15.42	20.81	19.78
2003	13.61	10.16	18.63	15.42	21.12	20.07
2004	13.50	9.71	18.68	15.44	21.45	20.39
2005	13.38	9.11	18.73	15.50	21.77	20.80
2006	13.27	8.15	18.78	15.55	22.10	21.15
2007	13.16	6.40	18.83	15.53	22.44	21.51
2008	13.06	3.61	18.88	15.51	22.78	21.85
2009	12.95	4.19	18.93	15.47	23.13	22.25
2010	12.84	4.50	18.97	15.38	23.48	22.61

Simulated Oil Production
(Millions of barrels/day)

Low Scenario

	Prudhoe	NGL's	Kuparuk	Milne Point	Endicott	Lisburne	West Sak	North Star	Ninkuk	Pt McIntrye	Total ANS	Cook Inlet	Total Alaska
1989	1.48	0.06	0.30	0.00	0.10	0.04	0.00	0.00	0.00	0.00	1.97	0.00	1.97
1990	1.32	0.04	0.29	0.02	0.10	0.04	0.00	0.00	0.00	0.00	1.80	0.00	1.80
1991	1.17	0.04	0.26	0.03	0.10	0.04	0.00	0.00	0.00	0.00	1.63	0.00	1.63
1992	1.07	0.04	0.24	0.03	0.09	0.04	0.00	0.00	0.00	0.00	1.49	0.00	1.49
1993	0.98	0.03	0.22	0.03	0.07	0.04	0.00	0.00	0.00	0.00	1.36	0.00	1.36
1994	0.95	0.03	0.18	0.02	0.06	0.03	0.00	0.00	0.02	0.05	1.34	0.00	1.34
1995	0.85	0.03	0.15	0.02	0.06	0.03	0.00	0.00	0.02	0.05	1.20	0.00	1.20
1996	0.76	0.03	0.13	0.02	0.05	0.03	0.00	0.00	0.02	0.05	1.07	0.00	1.07
1997	0.64	0.03	0.11	0.01	0.05	0.03	0.00	0.00	0.02	0.05	0.93	0.00	0.93
1998	0.54	0.02	0.10	0.01	0.04	0.02	0.00	0.00	0.02	0.04	0.79	0.00	0.79
1999	0.46	0.01	0.08	0.01	0.04	0.02	0.00	0.00	0.02	0.04	0.67	0.00	0.67
2000	0.38	0.01	0.07	0.00	0.04	0.02	0.00	0.00	0.02	0.04	0.56	0.00	0.56
2001	0.32	0.01	0.06	0.00	0.03	0.02	0.00	0.00	0.01	0.04	0.48	0.00	0.48
2002	0.28	0.01	0.05	0.00	0.03	0.01	0.00	0.00	0.01	0.03	0.42	0.00	0.42
2003	0.24	0.01	0.04	0.00	0.03	0.01	0.00	0.00	0.01	0.03	0.36	0.00	0.36
2004	0.20	0.01	0.04	0.00	0.02	0.01	0.00	0.00	0.01	0.03	0.31	0.00	0.31
2005	0.16	0.01	0.03	0.00	0.02	0.01	0.00	0.00	0.01	0.03	0.26	0.00	0.26
2006	0.12	0.00	0.03	0.00	0.02	0.01	0.00	0.00	0.01	0.02	0.20	0.00	0.20
2007	0.08	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.15
2008	0.04	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.10
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.02
2010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.02

Simulated Oil Production
(Millions of barrels/day)

Mid Scenario

	Prudhoe	NGL's	Kuparuk	Milne Point	Endicott	Lisburne	West Sak	North Star	Niakuk	Pt McIntrye	Total ANS	Cook Inlet	Total Alaska
1989	1.48	0.06	0.30	0.00	0.10	0.04	0.00	0.00	0.00	0.00	1.97	0.000	1.969
1990	1.33	0.05	0.27	0.02	0.10	0.04	0.00	0.00	0.00	0.00	1.83	0.041	1.873
1991	1.22	0.05	0.27	0.03	0.11	0.04	0.00	0.00	0.00	0.00	1.71	0.037	1.750
1992	1.11	0.04	0.25	0.03	0.11	0.04	0.00	0.00	0.00	0.00	1.57	0.034	1.607
1993	1.06	0.04	0.22	0.03	0.09	0.04	0.01	0.00	0.00	0.00	1.48	0.030	1.512
1994	0.97	0.03	0.19	0.03	0.08	0.04	0.01	0.00	0.02	0.06	1.42	0.027	1.447
1995	0.89	0.03	0.16	0.02	0.07	0.03	0.02	0.00	0.02	0.06	1.31	0.024	1.330
1996	0.82	0.02	0.14	0.02	0.07	0.03	0.02	0.00	0.02	0.06	1.20	0.022	1.221
1997	0.73	0.02	0.12	0.02	0.07	0.03	0.02	0.00	0.02	0.06	1.08	0.020	1.104
1998	0.67	0.02	0.10	0.01	0.07	0.03	0.04	0.00	0.02	0.06	1.00	0.018	1.022
1999	0.62	0.02	0.09	0.01	0.06	0.02	0.04	0.00	0.02	0.05	0.92	0.016	0.935
2000	0.56	0.01	0.07	0.01	0.05	0.02	0.06	0.05	0.02	0.05	0.90	0.014	0.911
2001	0.52	0.01	0.06	0.00	0.05	0.02	0.06	0.06	0.02	0.04	0.83	0.013	0.842
2002	0.45	0.01	0.05	0.00	0.04	0.02	0.08	0.06	0.02	0.04	0.76	0.012	0.774
2003	0.40	0.01	0.04	0.00	0.04	0.01	0.08	0.06	0.01	0.03	0.69	0.012	0.706
2004	0.36	0.01	0.04	0.00	0.03	0.01	0.11	0.05	0.01	0.03	0.65	0.009	0.663
2005	0.33	0.01	0.03	0.00	0.03	0.01	0.10	0.04	0.01	0.03	0.59	0.009	0.603
2006	0.29	0.01	0.03	0.00	0.03	0.01	0.15	0.03	0.01	0.03	0.58	0.008	0.588
2007	0.25	0.00	0.02	0.00	0.02	0.01	0.15	0.03	0.01	0.02	0.52	0.007	0.528
2008	0.21	0.00	0.02	0.00	0.02	0.01	0.15	0.03	0.01	0.02	0.47	0.006	0.478
2009	0.19	0.00	0.02	0.00	0.02	0.01	0.15	0.02	0.01	0.02	0.43	0.006	0.437
2010	0.16	0.00	0.01	0.00	0.01	0.01	0.14	0.02	0.00	0.02	0.38	0.005	0.388

Simulated Oil Production
(Millions of barrels/day)

High Scenario

	Prudhoe	NGL's	Kuparuk	Milne Point	Endicott	Lisburne	West Sak	North Star	Niakuk	Pt McIntrye	Total ANS	Cook Inlet	Total Alaska
1989	1.48	0.06	0.30	0.00	0.10	0.04	0.00	0.00	0.00	0.00	1.97	0.000	1.969
1990	1.34	0.05	0.30	0.02	0.11	0.04	0.00	0.00	0.00	0.00	1.87	0.041	1.908
1991	1.25	0.06	0.31	0.03	0.13	0.04	0.00	0.00	0.00	0.00	1.81	0.037	1.851
1992	1.15	0.06	0.30	0.04	0.12	0.04	0.00	0.00	0.00	0.00	1.70	0.034	1.732
1993	1.10	0.05	0.27	0.04	0.10	0.04	0.01	0.00	0.00	0.00	1.61	0.030	1.635
1994	1.06	0.05	0.23	0.03	0.09	0.04	0.01	0.00	0.03	0.14	1.67	0.027	1.701
1995	0.96	0.05	0.20	0.02	0.09	0.04	0.03	0.00	0.03	0.14	1.55	0.024	1.575
1996	0.89	0.04	0.17	0.02	0.08	0.04	0.04	0.00	0.03	0.14	1.45	0.022	1.474
1997	0.88	0.04	0.17	0.02	0.10	0.04	0.05	0.00	0.03	0.14	1.46	0.020	1.482
1998	0.79	0.04	0.15	0.02	0.09	0.03	0.07	0.00	0.02	0.12	1.33	0.018	1.346
1999	0.73	0.02	0.13	0.01	0.08	0.03	0.08	0.00	0.02	0.11	1.20	0.016	1.220
2000	0.66	0.02	0.11	0.01	0.07	0.03	0.09	0.08	0.02	0.10	1.19	0.014	1.199
2001	0.61	0.01	0.09	0.01	0.07	0.02	0.08	0.12	0.02	0.08	1.13	0.013	1.142
2002	0.55	0.01	0.08	0.01	0.06	0.02	0.10	0.12	0.02	0.07	1.05	0.012	1.057
2003	0.50	0.01	0.07	0.00	0.06	0.02	0.10	0.12	0.02	0.07	0.95	0.012	0.965
2004	0.44	0.01	0.06	0.00	0.05	0.02	0.12	0.11	0.01	0.06	0.88	0.009	0.892
2005	0.41	0.01	0.05	0.00	0.04	0.02	0.12	0.09	0.01	0.05	0.80	0.009	0.806
2006	0.36	0.01	0.05	0.00	0.04	0.02	0.17	0.08	0.01	0.04	0.77	0.008	0.779
2007	0.31	0.01	0.04	0.00	0.03	0.01	0.17	0.06	0.01	0.04	0.67	0.007	0.681
2008	0.26	0.01	0.04	0.00	0.03	0.01	0.17	0.05	0.00	0.03	0.61	0.006	0.614
2009	0.24	0.01	0.03	0.00	0.02	0.01	0.17	0.04	0.00	0.03	0.56	0.006	0.564
2010	0.22	0.01	0.03	0.00	0.02	0.01	0.21	0.04	0.00	0.03	0.55	0.005	0.551

SHORT TERM SHUTDOWNS

ALYESKA WANTS			D.E.C. WANTS	D.N.R. WANTS	O.P.S. WANTS
D.E.C. OPPOSES	D.N.R. OPPOSES	O.P.S. OPPOSES			
			Basis: Unlawful discharge of "oil" on lands of state	Basis: noncompliance with stipulations attached to R.O.W. lease or R.O.W. statute	Basis: same as D.N.R. and when there are harzardous safety conditions
Alyeska free to shut down on a temporary basis under state law.		Alyeska free to shut down under federal law until such time as a shutdown becomes abandonment of services	Means: --injunctive relief	Means: --hearing on revocation or suspension --suspension before hearing in an emergency	Means: --same as D.N.R. --cease and desist order for hazardous safety conditions

LONG TERM SHUTDOWNS

Alyeska may not "abandon" or permanently discontinue" use without APUC approval based upon a finding that continued service is not required by the public convenience and necessity.

May be basis to prevent under both state and federal R.O.W. leases

Means:
--injunctive relief for violation of APUC notification; ROW leases

SENATE RESOURCES COMMITTEE
AND
SENATE SPECIAL COMMITTEE ON OIL AND GAS

JOINT HEARING

SEPTEMBER 20, 1990
9AM TO 4PM

NOEL WIEN LIBRARY, FAIRBANKS

PART II

SUBJECT: "MEASURING PIPELINE THROUGHPUT FOR THE PURPOSE OF DETERMINING REVENUE."

WITNESSES SCHEDULED:

JAMES EASON, DIRECTOR, DIVISION OF OIL & GAS, ALASKA DEPARTMENT OF NATURAL RESOURCES

BLAIR WONDZELL P.E., SENIOR PETROLEUM ENGINEER, ALASKA OIL AND GAS CONSERVATION COMMISSION

TOM CHAPMAN, PETROLEUM MEASURMENT AND CUSTODY TRANSFER TECHNICAL EXPERT.

Discussion Notes of

James E. Eason, Director
Division of Oil and Gas
Alaska Department of Natural Resources

Before the
Senate Resources Committee
and
Senate Special Committee on Oil and Gas

September 20, 1990

Are Present Methods of Measuring Throughput for the Purpose of Determining Revenue Adequate?

(Afternoon Session)

1. The discussion of metering and volume accounting can be divided into three principal categories. First, are the meters and other hardware of acceptable quality? In a purely technical sense, can they do the job? Second, assuming that the meters are up to the job, are they maintained, monitored, calibrated and used in a correct fashion? Are the numbers properly collected and reported? Third and last, does the state understand and interpret the reported numbers in a correct fashion? Do AOGCC, DNR and DOR really understand the reports?

2. Are the meters and hardware up to job? While I have not personally reviewed the specifications of the meters used on the North Slope, I have no reason to believe that the best available equipment was not used. There was (and still is) too much at stake not to start with the best available equipment. The diverse ownership interests in the various fields and various pipelines on the North Slope result in a self-policing system in this regard. As a reminder, though, a meter that is designed to be accurate within one tenth of one percent should not be expected to be any more accurate than that design standard.

3. Are the meters being properly maintained and calibrated? Again, there is self policing in this regard, as well as regular monitoring by the AOGCC. The lease owners, purchasers, shippers, pipeline owners and the state are all interested in maintaining the integrity of the system. Too many parties use the metering results to allow any room for discrepancy. AOGCC is responsible for monitoring and surveillance of the metering on the state's behalf. I have no reason to believe that both the pipeline companies and the AOGCC are not doing a good job.

4. Does the state understand and audit the volume and metering reports that are filed each month? I can only speak to the reports that DNR receives in conjunction with its royalty accounting functions and those reports that are filed with the AOGCC that we in DNR also use. I have

every belief that AOGCC understands the reports that it receives and which we also review. We understand the volume and metering reports that are filed with the Division in conjunction with the monthly royalty reports. When questions arise, we consult with AOGCC and the producers to reconcile the specific concern. Extensive research conducted in association with the ongoing Amerada Hess royalty litigation has confirmed that there is not a volume accounting problem with respect to royalty oil. There are no orphan barrels, lost barrels or pirated barrels.

5. The respective AOGCC, DNR and DOR monthly volume numbers need not and will not be the same. Each agency has different standards and policies it uses to perform its functions. The AOGCC statutes and regulations, the DNR lease and the DOR statutes and regulations do not read the same. All parties involved should agree on the volume of material that comes out of the ground each month--although even there, there is a disagreement over whether to label certain liquids oil or gas. All parties can also agree on the volume number that each meter reads at the end of a day or a month. However, each agency follows its own path with respect to its own volume accounting in between the meter and the wellhead, and with respect to any adjustments that are made to the meter readings.

6. There are valid reasons why different volume numbers are reported to the different agencies. The produced volume, the volume subject to royalty and the volume subject to tax are not the same volume. AOGCC is concerned with a gross volume while DNR is interested in the net volume subject to royalty. Listed below are a few of the reasons why the "produced" volume figures for each of the agencies will not be the same.

a) One agency may label the fluid oil while a second agency may label the same fluid gas. A third agency may label the same fluid

NGLs. In this instance, the three agencies' net oil figure for the month will not be the same.

b) Fuel use in the field is also treated differently by the agencies. DNR allows free fuel use for lease operations--no royalty is due on those hydrocarbons and they are not included in the totals for royalty obligations. AOGCC on the other hand has to include fuel use in its reservoir voidage figures since it represents produced (but not royalty reportable) hydrocarbons.

c) Each agency uses its own labels and names for the fluids produced and reported in the fields. NGLs are a good example of this difference. The NGL totals may show up in the oil, gas or NGL column depending on the company, the agency and the reporting year. Just because the labels are different does not mean that one or the other is wrong.

d) The crude oil topping plant output is also treated differently by the agencies. A portion of the output is not royalty bearing, but AOGCC is certainly interested in accounting for all the fluid that leaves the plant in order to correctly calculate reservoir voidage.

e) Gas and liquids that are reinjected are not subject to royalty, yet these fluids show up on the appropriate AOGCC reports. Fluid losses in the field are also accounted for differently by DNR and the AOGCC.

f) Each of the agencies has its own statutes, regulations and policies that it follows in accounting for oil and gas production. For royalty purposes, DNR also has to abide by the oil and gas lease contracts. Until all three agencies follow the exact same rules, the volume figures will always be different.

7. The oil that leaves Pump Station #1 is metered and accounted for. Likewise, the oil that leaves and returns to TAPS at the GVEA connection is metered and accounted for. We do not believe that there is a metering or volume accounting problem. Extensive auditing and independent accounting done in conjunction with the Amerada Hess litigation have confirmed that the numbers do make sense. If we thought that there was a problem, we would be doing something about it.

8. In order to be able to verify the reported figures, should the state install its own meters at Pump Station #1? The answer is obvious to me--NO. To do the job right we would have to install meters for each separate field and this would involve a lot of meters. It would take 16 separate LACT meters just to replicate the existing meter configuration at Pump Station #1. Having two meters at each field would be like having two watches on one arm. The numbers would never exactly match. Constantly checking and monitoring the accuracy of the existing meters is by far the better approach to proper volume accounting.

9. Metering and correct volume accounting are important issues, and we treat them seriously. The figures are desk audited every month. If there are problems identified, we take steps to correct them. There are provisions for more extensive audits to be performed for DNR by the Department of Revenue in conjunction with major royalty or net profit share lessee audits. Any problems identified during those audits can be addressed at that time.

10. Future commingling of production and shared production facilities will complicate the upstream accounting for oil and gas, but the meters at the point of tendering and the point of tendering itself will not change.

11. For the most part, downstream of the point of tendering we are not concerned with metering. We are interested in the meters at the GVEA connection since return oil is measured at that point. We are also concerned with downstream losses if they affect royalty value.

STATE OF ALASKA

ALASKA OIL AND GAS
CONSERVATION COMMISSION

STEVE COWPER, GOVERNOR

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ANCHORAGE, ALASKA 99501-3192
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SEP 18 1990

September 14, 1990

The Honorable Bettye Fahrenkamp
The State Senate
Chair, Senate Resources Committee
119 N Cushman St Ste 201
Fairbanks, AK 99701

Dear Senator Fahrenkamp:

Enclosed is the testimony which I will summarize orally before the Senate Resources Hearing to be held in Fairbanks on September 20, 1990.

On behalf of the Commission, I thank you for this opportunity.

Sincerely,

Blair E. Wondzell

Blair E Wondzell, P.E.
Sr Petroleum Engineer

jo/A.BEW.019-13

encl

Testimony of Blair E Wondzell
before the
SENATE RESOURCES COMMITTEE
Senate Special Committee on Oil and Gas
Hearing
September 20, 1990
Noel Wien Library, Fairbanks

WHY THE ALASKA OIL AND GAS CONSERVATION COMMISSION IS CONCERNED WITH OIL MEASUREMENT.

The Alaska Oil and Gas Conservation Commission (AOGCC) is charged by statute to protect correlative rights and to prevent physical waste of hydrocarbons upstream of the sales meter. Physical waste can occur from blowouts, failure of surface equipment, or poor reservoir management.

In this case, reservoir means the porous underground formation in which hydrocarbons have accumulated. Recovery of hydrocarbons from a reservoir (at field depletion) may be 30-50% of the hydrocarbons initially in place. The recovery is dependent on formation characteristics (permeability, homogeneity, faulting, etc.); fluid properties (viscosity, gas-oil ratio); and reservoir management.

Reservoir management consists, in part, of making decisions on such items as well spacing, completion techniques, production rates, injection fluid type and rates, injection well pattern, and production of wells having high gas and/or water rates. An essential part of reservoir management is relating the reservoir volume of produced fluids to injected fluids to determine net reservoir voidage. This can be correlated to the increase or drop in reservoir pressure.

Produced fluids consist of the water, oil, and gas removed or produced from the reservoir, but measured at surface (standard) conditions. Alaska Statute 31.05.170(4) and regulation 20 AAC 25.570(34) prescribe standard conditions as a pressure base of 14.65 psia and a temperature base of 60°F. AS 31.05.030 Powers and duties of the Commission...(d)(6) "may require gauging or other measurements of oil and gas to determine the quality and quantity of oil and gas produced."

The Commission needs to know the volume of oil, gas, and water removed from and/or added to the reservoir in order to help ensure efficient reservoir management. This data can be compiled from the summation of individual well gauges times the appropriate days between gauges, or from a field "master" gauge (lease measurement). The master gauge is the Lease Automatic Custody Transfer meter (LACT), such as those located at Pump Station No. 1 (PS#1). By monitoring the meters at PS#1, we have accurate oil production figures to use for reservoir voidage calculations, and the Departments of Natural Resources and Revenue can use the figures for roylaty and revenue tax respectively. Therefore, we choose to monitor the LACT meters to obtain produced oil volumes.

Specifically, we monitor the metering and oil quality testing equipment and procedures to ensure that they comply with the American Petroleum Institute's (API) Manual of Petroleum Measurement Standards (MPMS). The metered volume of oil is based on utilizing the appropriate temperature and pressure correction factors in the correct equations, and the API gravity, sediment, and water content are obtained by properly conducted API certified methods. Our confirmation of LACT metering accuracy is routinely furnished to the Department of Natural Resources, Division of Oil and Gas.

WHY THERE IS A NEED TO CONFIRM METERING ACCURACY.

Liquid meters pass fluid through a housing in which a rotating wheel either measures the amount of fluid which passes through the housing (a positive displacement -- PD -- meter); or it measures the velocity of fluid passing through a conduit of known cross-sectional area (a turbine meter). Gas volumes are frequently measured by passing the gas through an orifice (in an orifice meter) which represents a significant reduction in the internal cross-sectional area of the meter run; the drop in pressure can be related to flow rate and thence volume.

AOGCC representatives witness the examination and calibration of the gas meters; however, most of our efforts are directed toward the liquid meters.

Liquid meters are rotating devices with movable parts which are designed to measure liquids of various specific gravities at various temperatures and pressures. To correct the meter reading for inaccuracies in the meter, slippage due to fluid viscosity, and effects of temperature and pressure, it is necessary to compare metered volume to an actual volume. This comparison is done with a meter prover to result in a meter factor which is the ratio of actual volume to metered volume.

In Alaska (with minor exceptions), all meter provers are "U"-shaped "pipe" provers -- a section of pipe fabricated in the shape of a "U" which varies from 4" O.D. at Amoco's East Foreland facilities to 24" O.D. at Alyeska's PS#1 at Prudhoe Bay. Please see Figure 1, page 3. These provers are equipped with a sphere which can move end-to-end in the prover. In the process, the sphere trips micro switches which start and stop a counter connected to the operating meter. The known volume between the switches is compared to the metered volume to obtain a meter (correction) factor which, when multiplied by the metered volume, results in an actual volume.

The volume of the prover between the switches is determined by a procedure described as "water drawing the prover". The inside of the prover is carefully cleaned and filled with water. The water is removed (drawn) from the prover as the sphere travels between the two micro switches; the water is caught and measured in vessels

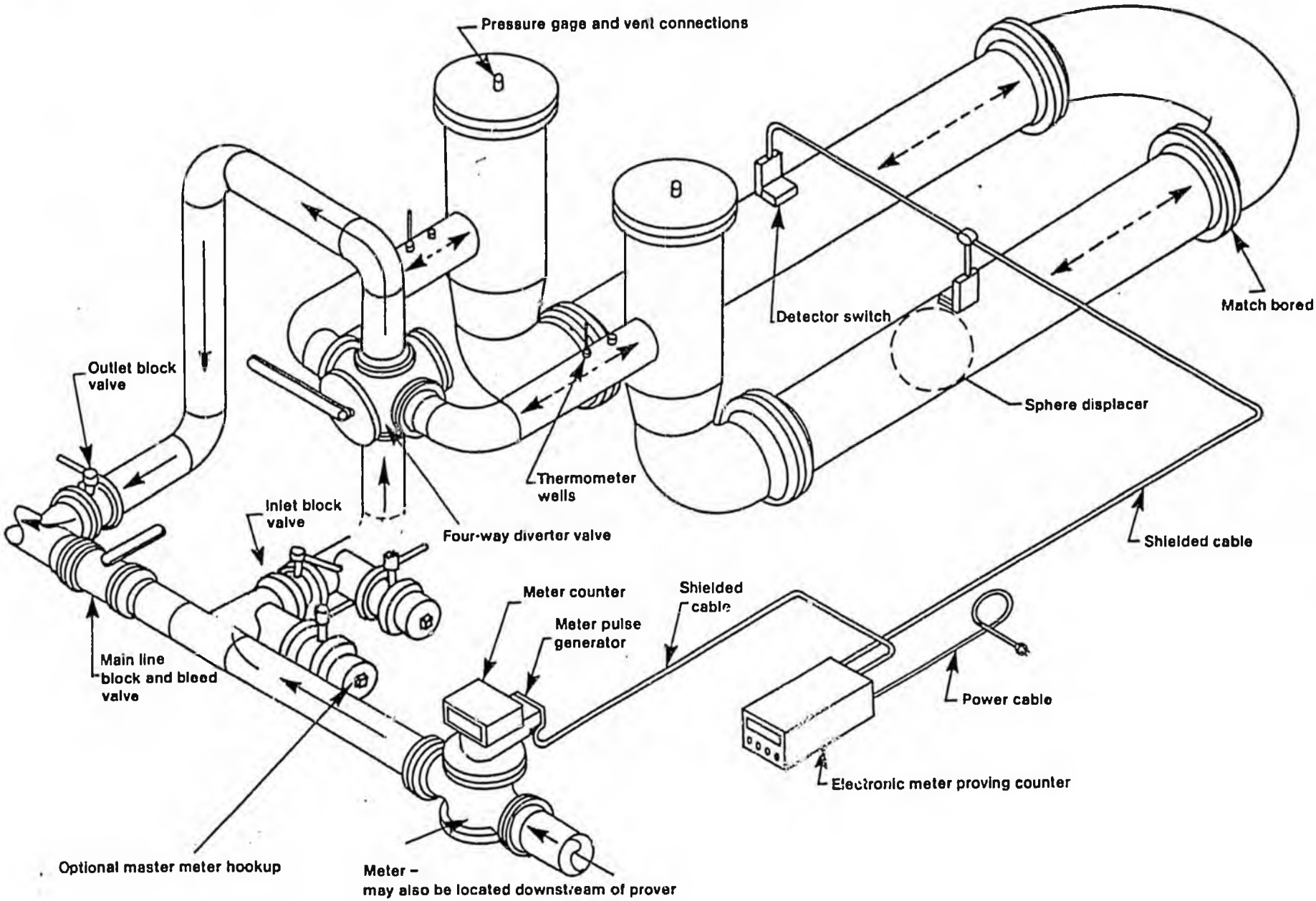


Fig. 1 – Typical bidirectional U-type sphere meter prover

having volumes certified by the U.S. Bureau of Standards. The volume of the shells of the prover and of test vessels and the volume of fluid (in this case water) contained in the prover and test vessels, are corrected for temperature and pressure. Typical calculations and AOGCC checks are shown in APPENDIX I, Alyeska Pipeline Certificate of Volume, Certificate No. 12, Date 04-19-88, Valdez Terminal - Master Prover.

Normally three runs are made, and three volumes obtained. The first two runs must be repeatable to within 0.02% (API MPMS 4.2.6.19). The third run should be at a different rate, usually 20% higher or lower to check for test system bias (leaks). The Commission regulation, 20 AAC 25.230(e)(1), requires that "water drawing of provers utilized for certification of custody transfer meters" must be consistant with API's "Manual of Petroleum Measurement Standards."

Once a certified volume of the prover has been obtained, the prover can be used to prove meters; i.e., determine the meter factor which is the correction factor by which the metered volume is multiplied to obtain the corrected volume at standard conditions, that is, adjusted for temperature and pressure. The meter factor is obtained by correcting the base prover volume for temperature and pressure effects on the shell of the prover and on the fluid in the prover, divided by the meter reading obtained, corrected for temperature and pressure of the fluid, while the sphere in the prover was traveling between the switches. The meter factors are normally near one when correcting metered volumes which are expressed in barrels. (In APPENDIX II, the meter factors obtained are 1.0039, 1.0036 and 1.0034.)

In Alaska, oil at low volume installations (Cook Inlet fields) is measured by positive displacement meters. At high volume installations such as the North Slope, it is measured by turbine meters. The meters are proved at least once a day at PS#1; several times a week at Kuparuk and Endicott; weekly at Milne Point; and once a month at Swanson River and the Cook Inlet onshore locations at Granite Point, West Foreland, and East Foreland.

The Commission witnesses meter provings at all LACT locations that meter oil subject to state royalty and severance tax. We try to visit high volume facilities such as PS#1 every month, versus every quarter for Cook Inlet facilities. Copies of field inspection reports of metering facilities and the daily PS#1 throughput reports for the Prudhoe Oil Pool are sent to Ed Park of DNR's Royalty Audit Section. On a monthly basis, I check the meter factor calculations and LACT volumes for one day for all LACT meters at all North Slope fields, and on a quarterly basis for the Cook Inlet area fields.

METER FACTORS FOR NORTH SLOPE OIL FIELDS

Meter factors are obtained by dividing the corrected prover volume by the corrected meter volume. The prover volume is obtained by water-drawing the prover into certified containers. Those used by Alyeska in Alaska are of 225 gallons, five gallons, and one gallon capacity (other sizes are probably available).

The big 24" diameter Prudhoe Oil Pool prover at PS#1 has a capacity of 150 barrels (actually 149.80676 barrels). To water-draw that prover with Alyeska's certified vessels would require 27 fillings of the 225-gallon vessel, 43 fillings in the five-gallon vessel, and three fillings in the one-gallon vessel. Because of the large number of fillings, the possibility of mistakes increases. Because of the long time involved to water-draw the prover, fluctuation affecting the shells of the vessels and the volume of fluids would contribute to inaccuracies.

Additionally, a prerequisite for a water draw is that the inside of the prover be absolutely clean. This is especially difficult with the large volume provers.

Alyeska used a master prover as an alternate to water-drawing their big provers.

Each year Alyeska moves their 11-barrel portable prover and a large tank of water to the East Metering building at the Valdez terminal. The meter and water are moved into the building a few days before the water draw so that the temperatures of the prover and the water can stabilize. Representatives from the owner companies and the AOGCC are invited to witness the water draw. Either two or three runs are made, depending on the repeatability with the previous "official" volume. If a new official volume is obtained, three runs are made -- two at a high rate and one at a low rate to ensure there is no bias, such as leaks.

The portable prover is trailer-mounted. Annually, after the water draw at Valdez, it is moved to PS#1 and placed inside the metering building. It is hooked up so that warm crude oil flows through the prover to stabilize the prover temperature. The particular crude oil (Prudhoe Oil Pool, Lisburne, etc.) is that which normally flows through the prover to be certified.

The volume of the portable prover is a nominal 11 barrels; the Prudhoe Oil Pool prover is 150 barrels. The portable prover can not directly prove or certify the volume of the 150-barrel prover. However, mounted on the portable prover skid is a 4" A.O. Smith P.D. (positive displacement) meter which is used as a master meter.

The portable prover is used to obtain a meter factor for the master meter, appropriately corrected for temperature and pressue. The master meter is then used to determine (certify) the volume of the large prover.

The volumes and calculations, including our checks, for this type of certification are shown in APPENDIX II, Alyeska Pipeline, Certificate of Volume, Certificate No. 12, Pump Station No. 1-24". During these operations and the pre-operation warm-up period, the fluid flowing through the portable prover is the same as the fluid flowing through the prover which is to be certified; this ensures both are at similar temperatures, and there is no difference in fluid viscosity or vapor pressure.

To obtain corrected meter volumes at PS#1, and the other North Slope LACT installations, the necessary sequence is as follows:

1. Calibrated vessels, 225, 5, and 1 gallon volumes are certified by the U.S. Department of Commerce, National Bureau of Standards.

2. The volume of Alyeska's portable prover is certified by a water draw.

3. The portable prover is trailered north and placed in the PS#1 metering building; it is hooked up so the appropriate crude oil flows through the prover.

4. The 4" A.O. Smith PD master meter correction factor is obtained by utilizing the portable prover.

5. The volume of the large (operational) prover is determined by using the master meter.

6. The meter (correction) factor for a particular LACT meter (lease sales) is obtained by proving with the operational prover.

7. The LACT meter readings are corrected by applying the meter factor and the appropriate pressure and temperature correction factors. See APPENDIX III Meter Volume Calculations for an example of the equations used to determine meter factors and metered volumes (gross standard volumes).

APPENDIX IV is a copy of the 06/30/90 Meter Proof Reports for each of the three ARCO and three BPX meters at PS#1 which measure Prudhoe Oil Pool crude oil. Also, for each operator there is a summary sheet which shows the total corrected volume through their meters on 06/30/90.

APPENDIX V lists some of the metering problems found by AOGCC personnel.

Orifice Meter

As the fluid approaches the orifice the pressure increases slightly and then drops suddenly as the orifice is passed. It continues to drop until the "vena contracta" is reached and then gradually increases until at approximately 8 diameters downstream another maximum pressure point is reached. The decrease in pressure as the fluid passes thru the orifice is a result of the increased velocity of the gas passing thru the reduced area of the orifice. When the velocity decreases as the fluid leaves the orifice the pressure increases and tends to return to its original level. All of the pressure loss is not recovered because of friction and turbulence losses in the stream. The pressure drop across the orifice (h in Fig.) increases when the rate of flow increases. When there is no flow there is no differential. The differential pressure is proportional to the square of the velocity, it therefore follows that if all other factors remain constant, then the differential is proportional to the square of the rate of flow.

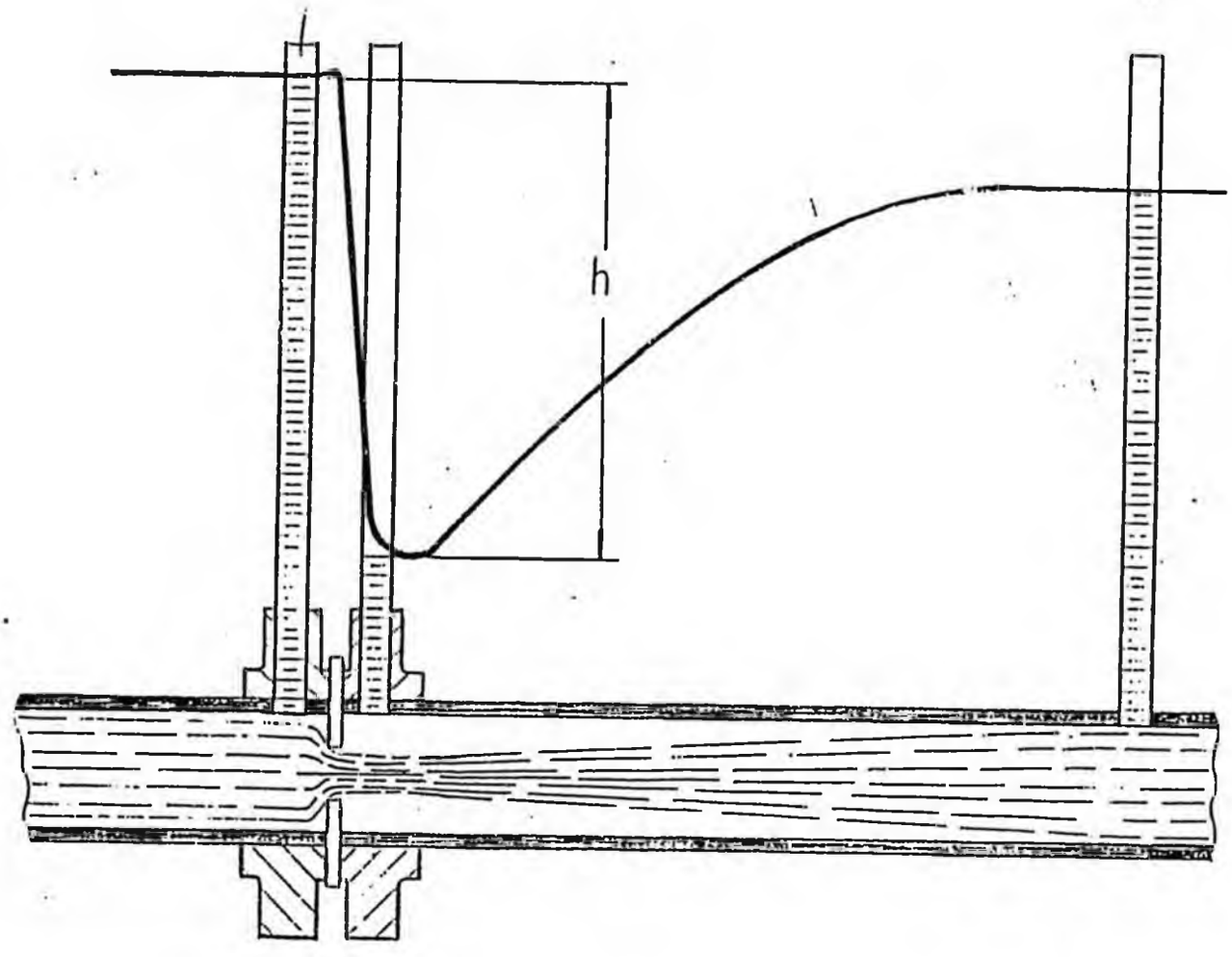


FIGURE 2
TYPICAL ORIFICE FLOW PATTERN
(FLANGE TAPS SHOWN)

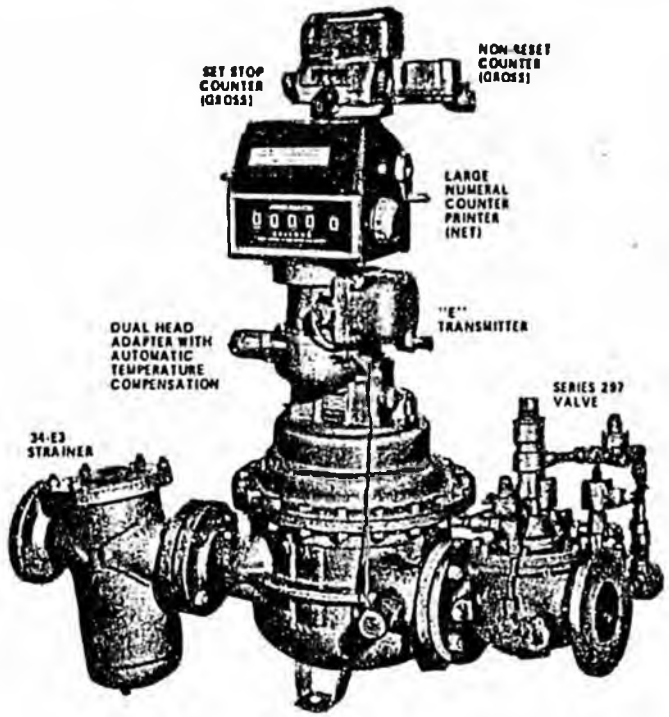
A.O. Smith METER SYSTEMS

Bulletin 1.3.3

3" 150 lb. FLANGED METERS and ACCESSORIES

October 1968

3" 150 lb. FLANGED METERS and ACCESSORIES



MODEL E3-S1 METER WITH ACCESSORIES

The E3 Series are double case Rotary Positive Displacement Meters designed for use on all petroleum products and for many chemical and industrial applications. The E3-S1 and E3-S3 models are straight-through type meters. The E3-A1 and E3-A3 models are 90° angle type meters. The S1 and A1, are designed for 150 PSI and the S3 and A3 for 275 PSI operating pressures.

Meters and accessory items described in this bulletin are suitable for use in 3" meter systems with nominal maximum flow rates of 400 GPM.

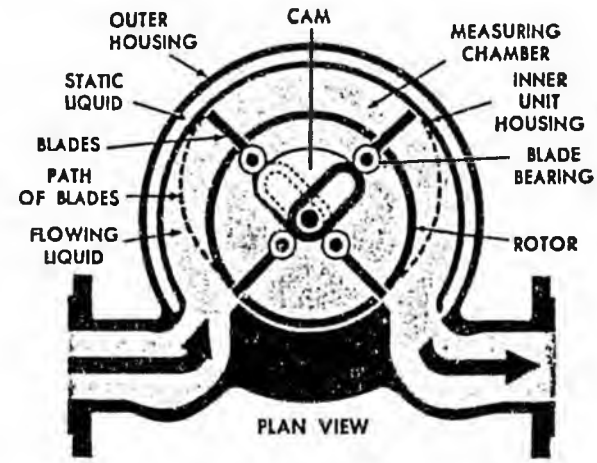
With the Smith meter principle, flow of liquid is literally undisturbed while it is being metered. This principle results in both low hydraulic and low mechanical loss through the meter. Low pressure loss is important from the standpoint of minimum power consumption in a pump pressure system and allows maximum obtainable flow rates in a gravity system. Low mechanical loss contributes to overall reduced pressure drop and assures GREATER ACCURACY over varying flow rates as slippage in a liquid seal meter is a function of pressure loss due to mechanical friction. Low pressure drop due to streamlined flow and minimum of mechanical friction results in long life and low maintenance, assuring SUSTAINED ACCURACY.

APPLICATIONS

Petroleum -- Product Pipe Lines, Crude Oil Pipe Lines; Blending Operations Transport Truck Loading, Tank Car and Barge Loading, L. P. G. and Asphalt Services.

Industrial -- Petrochemical, Chemical, Paints, Fats, Oils, Fertilizers.

PRINCIPLE OF OPERATION



The rotor, which revolves on stainless steel bearings, has four evenly spaced slots. The slots control the position of two blades that are at right angles to each other. As liquid flows through the meter, the rotor and blades revolve around a fixed cam. Ball bearings fixed to the blades roll around the cam, causing the blades to move radially. The successive movement of the blades, outward toward the case wall, forms a measuring chamber of precise volume between the blades, the rotor, the case wall, the cover, and the bottom of the case. A continuous series of these closed chambers is produced, four for each revolution of the rotor. Neither the blades nor the rotor contact the stationary walls of the measuring chamber.

Drawing reflects straight-through meter. Port location of angle meters and does not change this basic principle of operation

ADJUSTMENT

Dry, accessible calibration is made in extremely fine increments with any A. O. Smith adjustment device. These adjustment devices are protected from dirt and foreign matter, and may be sealed against unauthorized tampering. E3 Series meters supplied with standard manual calibrators provide adjustment in increments of 1/20th of 1%. The following devices are optionally available for specific installation or operational requirements: ATC (Automatic Temperature Compensation), ATG (Automatic Temperature Compensation with gravity selection), "G" Calibrator (for reverse flow), Dummy calibrator (direct drive) and AMR (wide correction range, non-pulsing output).

SPECIFICATIONS

Nominal Rated Capacity (Standard Trim Meter)

	Available Registration			
	U.S. Gallons Per Minute	Imperial Gallons Per Minute	Dekaliters Per Minute	Barrels Per Hour
Maximum	400	350	165	600
Minimum	80	70	30	120

WORKING PRESSURE .... 150 PSI.....10.5 Kg Cm2.....(E3-S1 and A1)
275 PSI..... 20.2 Kg Cm2.....(E3-S3)

FLANGES..... 3" 150 lb. USASA B16.5

MATERIALS OF CONSTRUCTION*

	Standard Trim**	All Iron Trim	LPG Trim
Outer Housing and Cover	Fabricated Steel	Fabricated Steel	Fabricated Steel
Inner Unit Housing, Cover, Rotor and Block	Cast Iron	Cast Iron	Cast Iron
Bearings	Stainless Steel	Stainless Steel	Stainless Steel with Phenolic Retainers
Pins and Rollers	Stainless Steel	Stainless Steel	Stainless Steel
CamShaft and Gears	Steel	Steel	Steel
Blades	Anodized High Tensile Aluminum Alloy with Stainless Steel Wear Strips	Close grained Cast Iron	Anodized High Tensile Aluminum with Stainless Steel Wear Strips
Bushings	Sintered Iron	Sintered Iron	Rulon
Packing Gland***	Steel & Thiokol	Steel & Thiokol	Steel & Thiokol

*Internal meter parts are treated with ARMORLOY, a SOLID FILM LUBRICANT with certain corrosion resistant properties.

**Includes No-brass Trim.

***Steel and teflon glands also available.

FIGURE 3

Supersedes Bulletin 1.3.3 Issue of December 1967

Smith Meters

an Operation of the
Flow Measurement & Control Division
Geosource Inc.

Technical Paper 103A

Turbine Meters for Liquid Measurement

Philip D. Baker and Raymond J. Kalivoda

Introduction

The purpose of this paper is to examine the application of Turbine Meters for liquid flow measurement. The focus will be on petroleum service, but the principles can be applied to other industrial, chemical and commercial applications. To accomplish this objective, the basic design and operation of Turbine Meters and factors influencing their performance, will be discussed.

History

The Turbine Meter is not a new flow measurement device. Records indicate that in 1886 the first patent for a Turbine Meter was issued. In 1914 a patent was granted for a Turbine Meter which related flow rate to frequency. However, it was not until the 1950's the Turbine Meter was developed into a precise flow measurement transducer. With the development of jet engines and liquid propellant rockets, the need arose for an accurate, fast responding meter that could be used on exotic fuels and oxidizers at extreme temperatures. The Turbine Meter met this need. It was soon applied to many other industrial flow measuring applications.

Turbine Meters began to be applied extensively in the Petroleum Industry in the mid-1960's. Since publication of API Standard 2534 "Measurement of Liquid Hydrocarbon by Turbine Meter Systems" in March, 1970, the Turbine Meter has gained broad acceptance for custody transfer of petroleum liquids such as liquefied petroleum gases (LPG's), light distillates and light crude oils, primarily at large petroleum storage and transfer terminals.

Types of Meters

Fluid flow meters can in general be classified as either Positive Displacement or Inference Type Meters. Positive Displacement (P.D.) Meters measure volumetric flow *directly* by continuously separating (isolating) a flow stream into discrete volumetric segments and counting them. Inference meters *infer* volumetric flow rate by measuring some dynamic property of the flow stream. Turbine Meters fall in this latter category.

Some of the most common examples of inference meters are orifice plates, flow nozzles, venturis and pilot tubes, all of which infer flow rate from differential pressure measurements. Other types of meters infer flow rate from the measurement of: mechanical force, flow area, electro-magnetic force, speed of sound, magnetic resonance, vortex shedding, drag, swirl, etc.

Basic Assumptions

Turbine Meters infer flow rate from the measurement of rotational movement (angular velocity) of a bladed rotor or impellor suspended in the flow stream. Thus, two levels of inference (basic assumptions) are necessary to obtain volumetric flow rate from a Turbine Meter:

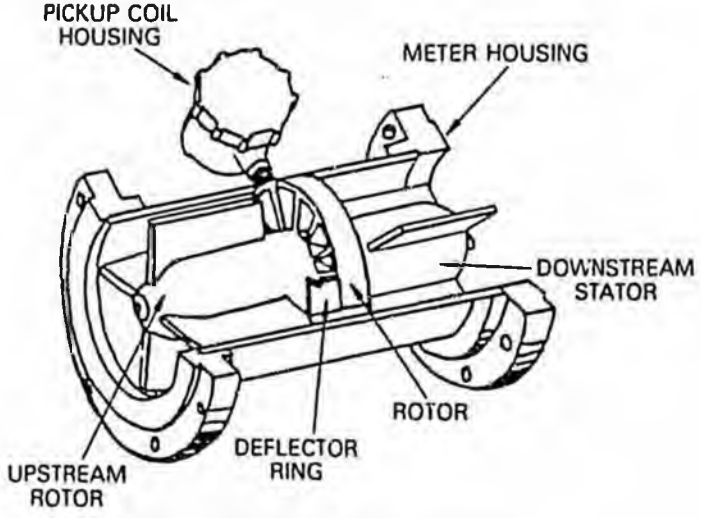
First Assumption:
Volumetric Flow Rate $\propto$ Ave. Stream Velocity
Second Assumption:
Ave. Stream Velocity $\propto$ Rotor Angular Velocity

The degree to which these two basic assumptions are correct determines the accuracy of the Turbine Meter. The subsequent discussion on meter accuracy is centered about these two assumptions and the influence the various design, installation and application variables have on their validity.

Construction

The construction details of a typical Turbine Meter are described at this point as an aid to understanding the Turbine Meter operation and accuracy discussions that follow. There are three basic sub-assemblies in a conventional Turbine Meter (see Figure 1):

1. Housing Sub-assembly
2. Internal Parts Sub-assembly
3. Detector Sub-assembly.



Typical Turbine Meter Assembly
Figure 1

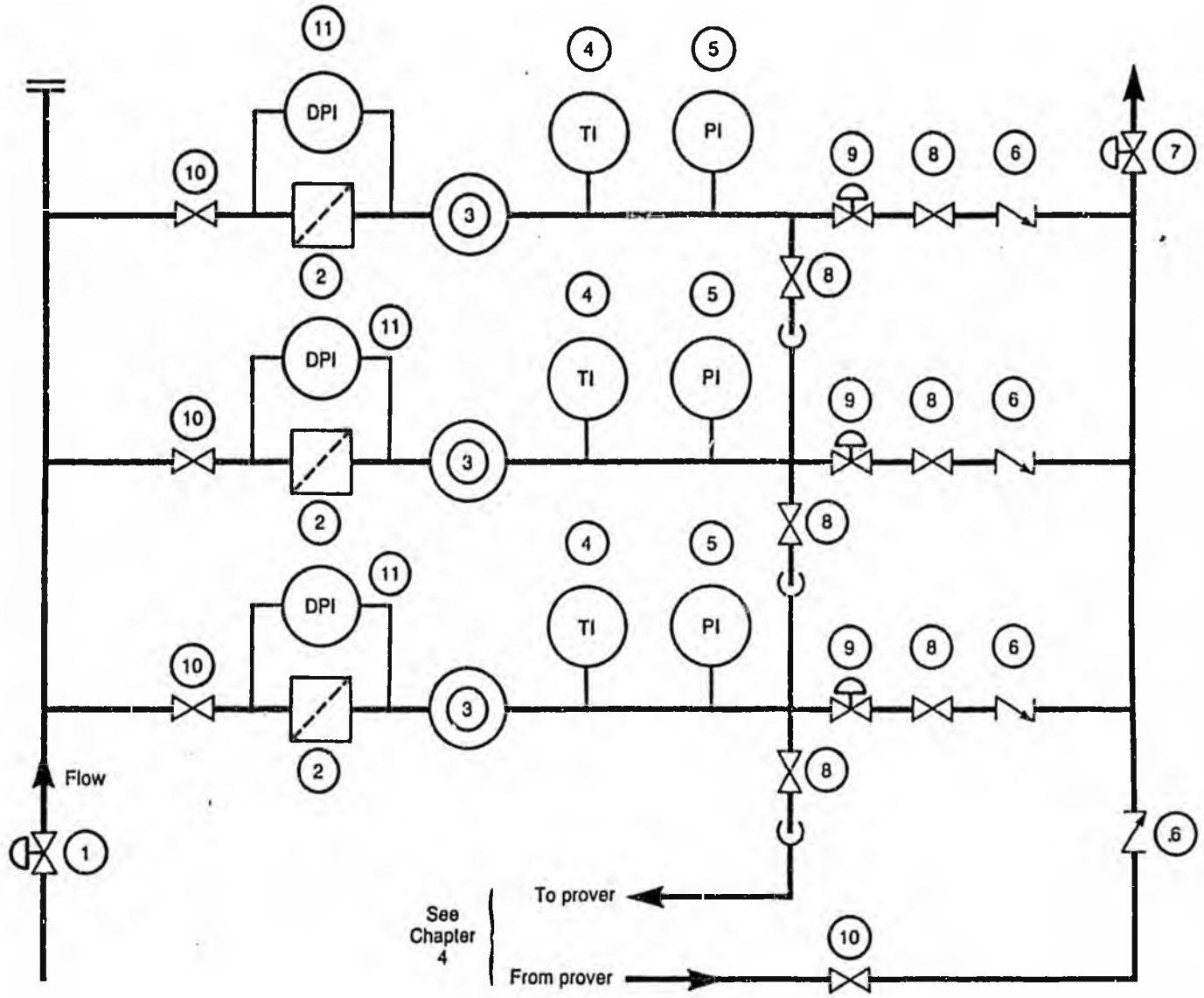
Housing Sub-assembly

The Housing Sub-assembly is normally constructed of a flanged pipe spool in sizes from 1/4" to 24", with pressure ratings from 150 lb. to 2,500 lb. ANSI (275 to 6,000 PSI W.P.) for flow rates up to 60,000 BPH.

Materials are selected to be compatible with the product being handled and the ambient conditions. Since usually only the pipe spool comes in contact with the fluid, the flanges (being non-wetted) generally need not be compatible with the fluid. Thus carbon steel flanges are normally used with an alternative, such as stainless steel, only used for corrosive atmospheres or low temperature applications.

A deflector ring of the same material as the housing is used with a rimmed rotor to prevent the flow stream from impacting on the rotor rim and to provide a smooth flow transition into the rotor area.

FIGURE 4



1. Pressure-reducing valve—manual or automatic, if required.
2. Filter, strainer, and/or vapor eliminator (if required) for each meter or whole station.
3. Displacement meter.
4. Temperature measuring device.
5. Pressure device.
6. Check valve, if required.
7. Control valve, if required.
8. Positive-shutoff double block-and-bleed valves.
9. Flow control valve, if required.
10. Block valve, if required.
11. Differential pressure device, if required.

Note: All sections of the line that may be blocked between valves shall have provisions for pressure relief (preferably not to be installed between the meter and the prover).

or Turbine

Figure —Typical Schematic Arrangement of Meter Station With Three Displacement Meters

FIGURE 5

APPENDIX - I

Alyeska pipeline SERVICE COMPANY

CERTIFICATE OF VOLUME

CERTIFICATE NO. 12 DATE 04-19 1988

THIS IS TO CERTIFY THAT THE PROVER DESCRIBED BELOW WAS CALIBRATED TO ESTABLISH A VOLUME FOR PROVING METERS.

PIPE PROVER

LOCATION: VALDEZ TERMINAL - MASTER PROVER

DISTANCE BETWEEN DETECTOR SWITCHES: --

BI-DIRECTIONAL: YES UNI-DIRECTIONAL: --

STRAIGHT: -- U-BEND: YES TYPE OF DISPLACER: SPHERE

TYPE OF CALIBRATION: WATER DRAW YES MASTER METER --

CALIBRATING FLUID WATER

AVERAGE VOLUME BETWEEN DETECTOR SWITCHES CORRECTED FOR TEMPERATURE AND PRESSURE IS 11.11819 BARRELS AT 60°F. AND ATMOSPHERIC PRESSURE. VOLUME SHOWN FOR BI-DIRECTIONAL PROVER IS FOR A ROUND TRIP.

OTHER INFORMATION:

TEST NO. 1 - VOLUME 11.11884 @ 55 BPH

TEST NO. 2 - VOLUME 11.11771 @ 55 BPH

TEST NO. 3 - VOLUME 11.11802 @ 41 BPH

TEST NO. 4 - VOLUME

AVERAGE VOLUME: 11.11819 BBL

THE VOLUMES SHOWN HAVE BEEN CORRECTED IN ACCORDANCE WITH PROVISIONS OUTLINED IN SECTION II OF API STANDARD 1101.

REMARKS: this volume was Determined using the New Volumes Determined by NBS For master cans. As per revised procedures this becomes the New Official Volume for 1988 certification All Gauges were Deadweight Tested and Electronic Thermometer certified against NBS Thermometers were used.

SIGNED BY: [illegible] / Alyeska Pipeline FOR: [illegible]

SIGNED BY: B.W. McCorkey / ARCo PipeLine Co. FOR: [illegible] Williams / ARCo

SIGNED BY: Blair E. Wondzell AOGCC FOR: [illegible]

Form 0054

ALYESKA PIPELINE SERVICE COMPANY
PROVER CALIBRATION - WATER DRAW METHOD

CALIBRATION NO: 12

DATE:04/19/88

SHEET NO. 5

PROVER SERIAL NO.:MOP-175   SIZE: 12

CERTIFIED TEST MEASURES			
SIZE	1 GAL	5 GAL	225 GAL
CU-IN	231.61	1154.93	51966.62
SER.NO.	5484	5483	5482

FILL NO.	RUN DIR	AVG PROVER PRESS	AVG PROVER TEMP.	CAN VOLUME CU-IN	SCALE READ CU-IN	TOTAL VOLUME CU-IN	AVG CAN TEMP	TEMP. FACTOR 11.2.3	ADJUST FOR 302 SS	CORRECTED VOLUME @ 60 F	PROVER TEMP DEG-C	CAN TEMP DEG-C	RHO TMEASUR	RHO TPROVER
5A	R/L	47	57.5	51966.62	189.00	52155.62	57.7	0.999984	0.999986	52154.06	14.17	14.28	999.2035	999.2193
				1154.93	(6.50)	1148.43	57.5	1.000000	0.999980	1148.41		14.17	999.2193	
				231.61	3.50	235.11	57.5	1.000000	0.999980	235.11		14.17	999.2193	
				231.61	6.50	238.11	57.5	1.000000	0.999980	239.11		14.17	999.2193	
				231.61	10.50	242.11	57.6	0.999992	0.999983	242.10		14.22	999.2114	
					TOTAL	54019.38			TOTAL	54017.79				
5B	L/R	49	57.8	51966.62	40.00	52006.62	58.0	0.999984	0.999988	52005.16	14.33	14.44	999.1797	999.1956
				1154.93	(1.00)	1153.93	57.9	0.999992	0.999985	1153.90		14.39	999.1876	
				231.61	4.00	235.61	57.8	1.000000	0.999983	235.61		14.33	999.1956	
				231.61	12.00	243.61	57.8	1.000000	0.999983	243.61		14.33	999.1956	
				231.61	1.00	232.61	58.0	0.999984	0.999988	232.60		14.44	999.1797	
					TOTAL	53872.38			TOTAL	53870.88				

PROVER VOLUME CALCULATION

TOTAL VOLUME CU-IN @ 60F	107889
WATER COMP.FACTOR	0.999848
CORR.FACTOR FOR STEEL	0.999949

	CU-IN	GAL	BARRELS
CORRECTED PROVER VOL.	107867	466.96	11.11802

WITNESSED BY:

[signature] /APSC

B. W. McCorkey /ARCO PIPE LINE Co.

[signature] AOGCC

[signature] (SOHIO)

Kenneth D. Williams (ARCO)

[signature] ARCO

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

JFH:gk
775
TN 241384
7752604

Gaithersburg, Maryland

March 28, 1988

REPORT OF CALIBRATION

Submitted by: Alyeska Pipeline Service Company
Anchorage, Alaska

Seal No. 5482

Reference: Purchase Order No. 8027034 dated 3-21-88

Item: 225 gallon vessel (Graduated Neck Type)

Maker: Seraphin (maker #8229)

Material: Stainless Steel

Assumed Cubical Coefficient of Expansion, 0.0000265 per degree Fahrenheit

With the vessel described above, in a standing position and a reference attitude established by leveling the (attached levels), and when drained for 30 seconds after cessation of the main flow, the volume of water delivered is as follows:

Scale Reading*	Volume Delivered at 60°F (U.S. Gal)**	Volume Delivered at 60°F (in^3)	Estimated Uncertainty (in^3)
0	224.9637	51966.62	± 4.80

The volume stated above is the average of 6 Calibration runs.

A scale division, between -300 and +300 is, as established by separate test, equivalent to 10 in^3.

The position of the graduated scale was not moved as part of the calibration procedure.

*The scale reading is determined by the intersection of the horizontal plane, tangent to the bottom of the meniscus.

**The volume established is based on the density of water (reference available upon request). A U.S. gallon is equivalent to .003785412 m^3 or 231 in^3.

For the Director,
ORIGINAL SIGNED BY
Dr. Hratch G. Semerjian

Dr. Hratch G. Semerjian
Chief, Chemical Process Metrology Division
Center for Chemical Engineering
National Engineering Laboratory

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
Gaithersburg, Maryland

JFH:gk
775
TN 241384
7752604

March 28, 1988

REPORT OF CALIBRATION

Submitted by: Alyeska Pipeline Service Company
Anchorage, Alaska

Seal No. 5483

Reference: Purchase Order No. 8027034 dated 3-21-88

Item: 5 gallon vessel (Graduated Neck Type)

Maker: Seraphin (maker #20026)

Material: Stainless Steel

Assumed Cubical Coefficient of Expansion, 0.0000265 per degree Fahrenheit

With the vessel described above, in a standing position and a reference attitude established by leveling the (plane of the supporting base), and when drained for 10 seconds after cessation of the main flow, the volume of water delivered is as follows:

Scale Reading*	Volume Delivered at 60°F (U.S. Gal)**	Volume Delivered at 60°F (in^3)	Estimated Uncertainty (in^3)
0	4.99969	1154.93	± 0.30

The volume stated above is the average of 10 Calibration runs.

A scale division, between -10 and +10 is, as established by separate test, equivalent to 1 in^3.

The position of the graduated scale was not moved as part of the calibration procedure.

*The scale reading is determined by the intersection of the horizontal plane, tangent to the bottom of the meniscus.

**The volume established is based on the density of water (reference available upon request). A U.S. gallon is equivalent to .003785412 m^3 or 231 in^3.

For the Director,
ORIGINAL SIGNED BY
Dr. Hratch G. Semerjian

Dr. Hratch G. Semerjian
Chief, Chemical Process Metrology Division
Center for Chemical Engineering
National Engineering Laboratory

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
Gaithersburg, Maryland

JFH:gk
775
TN 241384
7752604

March 28, 1988

REPORT OF CALIBRATION

Submitted by: Alyeska Pipeline Service Company
Anchorage, Alaska

Seal No. 5484

Reference: Purchase Order No. 8027034 dated 3-21-88

Item: 1 gallon vessel (Graduated Neck Type)

Maker: Seraphin (maker #19996)

Material: Stainless Steel

Assumed Cubical Coefficient of Expansion, 0.0000265 per degree Fahrenheit

With the vessel described above, in a standing position and a reference attitude established by leveling the (plane of the supporting base), and when drained for 10 seconds after cessation of the main flow, the volume of water delivered is as follows:

Scale Reading*	Volume Delivered at 60°F (U.S. Gal)**	Volume Delivered at 60°F (in^3)	Estimated Uncertainty (in^3)
0	1.00265	231.61	± 0.14

The volume stated above is the average of 7 Calibration runs.

A scale division, between -10 and +10 is, as established by separate test, equivalent to 1 in^3.

The position of the graduated scale was not moved as part of the calibration procedure.

*The scale reading is determined by the intersection of the horizontal plane, tangent to the bottom of the meniscus.

**The volume established is based on the density of water (reference available upon request). A U.S. gallon is equivalent to .003785412 m^3 or 231 in^3.

For the Director,

ORIGINAL SIGNED BY
Dr. Hratch G. Semerjian

Dr. Hratch G. Semerjian
Chief, Chemical Process Metrology Division
Center for Chemical Engineering
National Engineering Laboratory

Form 0050

Alyeska Pipeline Service Company

PROVER CALIBRATION REPORT
WATER DRAW METHOD

OWNER	STARTING TEMP. (AVG.) (PROVER TANK ONLY)	CERTIFIED CONTAINERS USED	SHEET 5 OF
LOCATION	ATMOSPHERIC TEMP.	NOMINAL SIZE	CALIBRATION NUMBER 12
NAME OF PROVER	SERIAL NUMBER	VOLUME CU. IN.	
CALIBRATION MEDIUM / TYPE OF PROVER	NOMINAL SIZE	SERIAL NUMBER	DATE 4/19/88

FILL NO.	DIR. OF RUN	AVERAGE PROVER PRESSURE PSIG	CAN VOLUME CU. IN.	SCALE READING ABOVE ZERO + CU. IN.	SCALE READING BELOW ZERO – CU. IN.	ACTUAL QUANTITY READING CU. IN.	AVG. TEMP. PROVER	AVG. TEMP. LIQUID DRAWN	TEMP. DIFF.	TEMP. CORRECTION FACTOR	ADJUSTMENT FOR 30 SS	VOL. ADJ. TO 60° F AT CAL. PRESS.
5A		48.5	225	189			57.5	57.7				
			5		-6.5			57.5				
			1	3.5				57.5				
			1	6.5				57.5				
			1	10.5				57.6				
5B		48.5	225	40			57.8	58.0				
			5		-1.0			57.9				
			1	4.0				57.8				
			1	12.0				57.8				
			1	1.0				58.0				

REMARKS	RUN NO. 1	RUN NO. 2	RUN NO. 3	RUN NO. 4
TOTAL VOLUME AT 60 DEG. F. AND CALIBRATING PRESSURE (NOT CORRECTED FOR PRESSURE EFFECTS)				
WATER COMPRESSIBILITY FACTOR (CALIBRATING PRESSURE TO ATMOSPHERIC)				
PRESSURE CORRECTION FACTOR FOR STEEL (CALIBRATING PRESSURE TO ATMOSPHERIC)				
PROVER VOL. @ 60 DEG. F. AND ATM. PRESS.				
FINAL TOTAL AVERAGE PROVER VOLUME AT 60 DEG. F. AND ATMOSPHERIC PRESSURE	CU. IN.	GALS.	BBL.	

WITNESS:	WITNESS:	WITNESS:
FOR:	FOR:	FOR:

Alyeska Pipeline Service Co — WATER DRAW 4/19/88

Valdez Marine Terminal

12" Portable Prover, Bi-Directional SN MOP 175 I.D. 12.250", Wt = 0.375

FILL No.	DIR OF FILL	AVG PROVER PRESS PSIG	CAN VOL CU. IN.	SCALE READING ABOVE ZERO + CU. IN	SCALE READING BELOW ZERO - CU IN	ACTUAL QUANTITY CU. IN.	AVG PROVER TEMP °F	AVG MEAS. TEMP °F	TEMP DIFF °F	TEMP CORR FACTOR	ADJUSTMENT FOR 302 SS	VOL. ADJ. TO 60°F AT CAL. PRESS.
			Gal									
5A		48.5	225 51966.62	189		52,155.62	57.5	57.7	+0.2	0.999984	0.9999856	52154.034
			5 1154.98		-6.5	1,148.43	"	57.5	-	-	0.9999802	1148.407
			1 231.61	3.5		235.11	"	57.5	-	-	0.9999802	235.105
			1 231.61	6.5		238.11	"	57.5	-	-	0.9999802	238.105
			1 231.61	10.5		242.11	"	57.6	+0.1	0.999992	0.9999829	242.104
												54017.755
5B		48.5	225 51966.62	40		52006.62	57.8	68.0	+0.2	0.999984	0.9999875	52005.138
			5 1154.93		-1.0	1153.93	"	57.9	+0.1	0.999992	0.9999853	1153.904
			1 231.61	4.0		235.61	"	57.8	-	-	0.9999826	235.606
			1 231.61	12.0		243.61	"	57.8	-	-	0.9999826	243.606
			1 231.61	1.0		232.61	"	58.0	+0.2	0.999984	0.9999875	232.603
												53870.857
												107,888.61

TOTAL VOLUME @ 60° AND CALIBRATING PRESS (NOT CORRECTED TO "0" PSIG) 107,888.61

WATER COMPRESSIBILITY FACTORS (CALIBRATING PRESSURE TO "0" PSIG) CPL = $\frac{1}{1-PE}$ = 1.000 1552

PRESSURE CORRECTION FACTOR FOR STEEL (CALIBRATING PRESS TO "0" PSIG CPS = 1+(PD/ET) 1.000 0528

FINAL PROVER VOLUME = 107,866.29 cu in; 466.95364 gal; 11.117944 Bbls ①

(Using Computer Printout Press) 107,866.4 cu in; 466.95411 gal; 11.117955 Bbls ②

CPL = 1.000 11536

CPS = 1.000 0523 Computer calculated Volume is 11.11802 Bbls ③

The main difference ① to ③ is in rounding the Volumes { Diff. ① to ③ = 0.000076 Bbls

Valdez Water Draw 4/19/88

$CTS = 1 + (T - 60)\gamma$

corr for 30255 : $CTS = \dfrac{1 + (T_m - 60°)\gamma_{55}}{1 + (T_p - 60°)\gamma_{ms}}$ $\gamma_{55} = 2.65 \times 10^{-5}$ $\gamma_{ms} = 1.86 \times 10^{-5}$

RUN 5A

$T_p = 57.5$ $T_m = 57.7$

$CTS = \dfrac{1 + (57.7 - 60)2.65 \times 10^{-5}}{1 + (57.5 - 60)1.86 \times 10^{-5}} = \dfrac{.9999391}{.9999535} = 0.9999856$

$T_m = 57.5$ $CTS = \dfrac{1 + (57.5 - 60)2.65 \times 10^{-5}}{.9999535} = \dfrac{0.9999338}{.9999535} = 0.9999802$

$T_m = 57.6$ $CTS = \dfrac{1 + (57.6 - 60)2.65 \times 10^{-5}}{.9999535} = \dfrac{.9999364}{.9999535} = .9999829$

RUN 5B

$T_p = 57.8$
$T_m = 58.0$ $CTS = \dfrac{1 + (58 - 60)2.65 \times 10^{-5}}{1 + (57.8 - 60)1.86 \times 10^{-5}} = \dfrac{.999947}{.9999591} = .9999875$

$T_m = 57.9$ $CTS = \dfrac{1 + (57.9 - 60)2.65 \times 10^{-5}}{1 + (57.8 - 60)1.86 \times 10^{-5}} = \dfrac{.9999444}{.9999591} = .9999853$

$T_m = 57.8$ $CTS = \dfrac{1 + (57.8 - 60)2.65 \times 10^{-5}}{1 + (57.8 - 60)1.86 \times 10^{-5}} = \dfrac{.9999417}{.9999591} = .9999826$

$CPL = \dfrac{1}{1 - (P - P_e)F}$; for $P_e = 0 = \dfrac{1}{1 - (P \times F)} \simeq 1 + PF$. $F = 3.2 \times 10^{-6}$

$= 1 + [48.5 \times (3.2 \times 10^{-6})] = 1.0001552$

$CPS = 1 + \dfrac{P \times D}{E \times t} = 1 + \dfrac{48.5 \times 12.25}{(30 \times 10^6).375} = 1.00005281$

$\dfrac{1 + 48.5 \times 12.00}{(30 \times 10^6).375} = 1.0000520$

Blair
4/21/88

APPENDIX - II

Alyeska pipeline SERVICE COMPANY

CERTIFICATE OF VOLUME

CERTIFICATE NO. 12 DATE 6-7 19 88

THIS IS TO CERTIFY THAT THE PROVER DESCRIBED BELOW WAS CALIBRATED TO ESTABLISH A VOLUME FOR PROVING METERS.

PIPE PROVER

LOCATION: Pump Station No. 1 - 24"

DISTANCE BETWEEN DETECTOR SWITCHES:

BI-DIRECTIONAL: YES UNI-DIRECTIONAL:

STRAIGHT: U-BEND: YES TYPE OF DISPLACER: Sphere

TYPE OF CALIBRATION: WATER DRAW MASTER METER YES

CALIBRATING FLUID ANS Crude

AVERAGE VOLUME BETWEEN DETECTOR SWITCHES CORRECTED FOR TEMPERATURE AND PRESSURE IS 149.84921 BARRELS AT 60°F. AND ATMOSPHERIC PRESSURE. VOLUME SHOWN FOR BI-DIRECTIONAL PROVER IS FOR A ROUND TRIP.

OTHER INFORMATION:

Test #1 Volume 149.85938 BBL @ 803 BPH

Test #2 Volume 149.83904 BBL @ 589 BPH

Avg Volume 149.84921 BBL } OFFICIAL VOLUME

RECEIVED JUL 22 1988 Alaska Oil & Gas Cons. Commission

checked 7/27/88 Blair

THE VOLUMES SHOWN HAVE BEEN CORRECTED IN ACCORDANCE WITH PROVISIONS OUTLINED IN SECTION II OF API STANDARD 1101.

REMARKS: This Volume is a Volume Decrease of -0.007%. Per the Revised OM-41 Policy this will become the Official Volume. The Average Meter Factor for each Rate was used. All Gauges Were Deadweight Tested And All Electronic Thermometers Were Certified using NBS Traceable Glass thermometers with Stem Corrects

SIGNED BY: APSC FOR:

SIGNED BY: Benton S. Cyr APL FOR:

SIGNED BY: FOR:

LOCATION:PS01-24" HIGH RATE DATE: 06/07/88

API@60: 29.5 PROVER ID : 23.00

CALIBRATING FLUID:ANS CRUDE WALL THICKNESS: 0.500 OFFICAL VOL :149.96005

RUN NO.	1	2	3	4	5	AVERAGE	
1. PULSES-ONE WAY	627892	627896	627849	627890	627876		
2. PULSES-RD TRIP	1255776	1255798	1255736	1255739	1255776	1255765	1255765
3. GROSS BARRELS	149.49714	149.49976	149.49238	149.49274	149.49714	149.49583	149.49583
4. SECONDS	670.97	672.84	670.08	669.22	669.82	670.586	
5. FLOW RATE	802	800	803	804	803	803	
6. METER FACTOR	1.00390	1.00390	1.00390	1.00390	1.00390	1.00390	
7. METER PRESSURE	58	58	58	58	58	58	
8.							
9.							
10. CPL-METER	1.000342	1.000341	1.000342	1.000342	1.000342	1.000342	1.000342
11. METER TEMP.	138.6	137.7	138.4	138.5	138.4	138.3	T=138.3
12. CTL-METER	0.96489	0.96531	0.96500	0.96495	0.96500	0.96502	.96502 } CCF_m = .96535
13. CORR.METER REG	144.86034	144.92582	144.87232	144.86519	144.87693	144.87865	
14. PV-TEMP.IN	138.8	137.8	138.6	138.7	138.6	138.5	Prover
15. PV-TEMP.OUT	137.8	137.5	137.7	137.7	137.9	137.7	
16. PV-TEMP.AVG.	138.3	137.6	138.1	138.2	138.2	138.1	T=138.1
17. PV-PRESS.AVG	34	35	34	35	35	35	
18. PV-CTS	1.001456	1.001443	1.001453	1.001455	1.001455	1.001453	1.001453
19. PV-CPS	1.000052	1.000054	1.000052	1.000054	1.000054	1.000054	1.000053
20. PV-CPL	1.000200	1.000206	1.000200	1.000206	1.000206	1.000206	1.000206 } CCF_p = .96676
21. PV-CTL	0.96502	0.96534	0.96511	0.96507	0.96507	0.96511	.96511
22. PV-COMB. FACT	0.966668	0.966984	0.966756	0.966726	0.966726	0.966764	
23. BASE PV-VOL	149.85532	149.87406	149.85407	149.85134	149.86349	149.85938	
% DIFF.	-0.0032%	0.0093%	-0.0040%	-0.0058%	0.0023%	-0.0004%	
25. CPL-TAB12 MTR	0.590	0.588	0.589	0.589	0.589	0.589	
26. CPL-TAB12 PV	0.589	0.588	0.589	0.589	0.589	0.589	

: GCF=0.00009*N*(T-A)

27. GLASS CORR.MTR : 0.00
28. GLASS CORR.PV : 0.00
AMB.TEMP : 70
N-MTR : 0
N-PRV : 0

$$PV = \frac{149.49583 \times 1.00390 \times .96535}{.96676} = 149.85998$$

SIGNED BY: [signature] APSC REMARKS:

WITNESS: Benton S. Yule ARC

WITNESS:

WITNESS:

WITNESS:

B. Lai 7/12/88

Meter Factor
1.00390 to 1.00347
= 0.00043

LOCATION:PS01-24" LOW RATE DATE: 06/07/88

API@60: 29.5 PROVER ID : 23.00

CALIBRATING FLUID:ANS CRUDE WALL THICKNESS: 0.500 OFFICAL VOL :149.86005

RUN NO.	1	2	3	4	5	AVERAGE
1. PULSES-ONE WAY	628193	628216	628216	628221	628202	
2. PULSES-RD TRIP	1256466	1256500	1256501	1256504	1256465	1256487.2
3. GROSS BARRELS	149.57929	149.58333	149.58345	149.58381	149.57917	149.58181
4. SECONDS	914.51	915.47	912.95	914.76	914.20	914.378
5. FLOW RATE	589	588	590	589	589	589
6. METER FACTOR	1.00347	1.00347	1.00347	1.00347	1.00347	1.00347
7. METER PRESSURE	47	47	47	47	47	47
8.						
9.						
10. CPL-METER	1.000276	1.000277	1.000276	1.000277	1.000277	1.000277
11. METER TEMP.	137.4	138.4	137.7	138.6	138.2	138.1
12. CTL-METER	0.96543	0.96498	0.96529	0.96489	0.96507	0.96511
13. CORR.METER REG	144.94936	144.88582	144.93230	144.87282	144.89540	144.90394
14. PV-TEMP.IN	137.3	138.3	137.1	138.5	138.1	137.9
15. PV-TEMP.OUT	136.3	137.2	136.6	137.1	137.4	136.9
16. PV-TEMP.AVG.	136.8	137.8	136.9	137.8	137.8	137.4
17. PV-PRESS.AVG	34	34	34	34	34	34
18. PV-CTS	1.001428	1.001447	1.001430	1.001447	1.001447	1.001440
19. PV-CPS	1.000052	1.000052	1.000052	1.000052	1.000052	1.000052
20. PV-CPL	1.000199	1.000200	1.000200	1.000200	1.000200	1.000200
21. PV-CTL	0.96570	0.96525	0.96565	0.96525	0.96525	0.96543
22. PV-COMB. FACT	0.967321	0.966890	0.967274	0.966890	0.966890	0.967064
23. BASE PV-VOL	149.84618	149.84726	149.83583	149.83381	149.85717	149.83904
% DIFF.	-0.0093%	-0.0085%	-0.0162%	-0.0175%	-0.0019%	-0.0140%
25. CPL-TAB#2 MTR	0.588	0.589	0.588	0.590	0.589	0.589
26. CPL-TAB#2 PV	0.586	0.588	0.587	0.588	0.588	0.588

Handwritten beside the table:

1256487.2
149.58181
MMF = 1.00347
47
1.000277
138.1
.96511
} CCF_M = 0.965377
144.90392
137.4
34
1.001440
1.000052
1.000200
.96542
} CCF_P 0.967054

: GCT=0.00003*N*(T-A)

27. GLASS CORR.MTR :	0.00
28. GLASS CORR.PV :	0.00
AMB.TEMP :	70
N-MTR :	0
N-PRU :	0

$$PV = \frac{149.58181 \times 1.00347 \times .965377}{.967054} = 149.84056$$

− 149.83904
0.00152

$$\frac{.00152}{149.840} = 0.000010$$

= 0.001 %

SIGNED BY: [signature] APSC

REMARKS:

WITNESS: Benton S. [signature] ARL

WITNESS:

WITNESS:

WITNESS:

my Avg = 149.8502 ~ [initials] 1/2

0.0007 % high

REPORT # 1 RATE: 817 BPH DATE: 06/07/88

LOCATION: PS01-24 HIGH RATE AMB.TEMP: 32.0

SIZE: 12.75 WALL : 0.375

****

METER DATA:

SERIAL # SC-116576 PULSES/BBL: 8400 TEMP.COMP: NO

SIZE: 4 MODEL: F4-S7

****

RUN #	TEMPERATURE PROVER	TEMPERATURE METER	PRESSURE PROVER	PRESSURE METER	PULSES ONE-WAY	PULSES RND TRIP
1	138.8	138.5	68	60	46625	93162
2	138.8	138.5	68	60	46635	93164
3	138.8	138.5	68	60	46633	93171
4	138.8	138.5	68	59	46626	93161
5	138.8	138.5	68	59	46636	93169
AVERAGE	138.8 ✓	138.5 ✓	68.0 ✓	60.0 ✓	46631	93165.4 (93165.4)

API GRAVITY : 29.5

BASE PROVER VOLUME: 11.11819

CORRECTED PROVER VOLUME: 10.74760

CORRECTED AVG PULSES: 89930.05

NET MTR VOLUME IN BBL: 10.70536

1/K MTR FACTOR IN PUL/BBL: 8367.45
(FOR USE WITH 2233)

MTR FACTOR (1PULSE/BBL): 1.00389

PROVER

TAB#2-F PV : 0.590

CTSP60 : 1.001466 1.001466

CPSPR : 1.000073 1.000073

CPLPR : 1.000401 1.000402

CTLP60 : 0.964796 .96479

CCF_p = .96666

METER

TAB#2-F MTR: 0.590

CPLPM : 1.000354 1.000355

CTLM60 : 0.964931 .96493

CCF_m = .965273

$MF = \frac{11.11819}{93165.4 / 8400} \times \frac{.96656}{.96527} = 1.00388$

1.0039

WITNESSED BY: [signature] APSC
[signature] AL

COMMENTS:

[signature]

REPORT # 3 RATE: 600 BPH DATE: 06/07/88

LOCATION: PS01-24 LOW RATE AMB.TEMP: 32.0

SIZE: 12.75 WALL : 0.375

METER DATA:
SERIAL # SC-116576 PULSES/BBL: 8400 TEMP.COMP: NO

SIZE: 4 MODEL: F4-S7

	TEMPERATURE		PRESSURE		PULSES	
RUN #	PROVER	METER	PROVER	METER	ONE-WAY	RND TRIP
1	137.9	137.8	50	47	46656	93198
2	137.8	137.7	50	47	46666	93210
3	137.7	137.6	50	47	46660	93199
4	137.6	137.4	50	47	46656	93191
5	137.6	137.4	50	47	46651	93197
AVERAGE	137.7	137.6	50.0	47.0	46658	93199.0

API GRAVITY : 29.5

BASE PROVER VOLUME: 11.11819

CORRECTED PROVER VOLUME: 10.75153

CORRECTED AVG PULSES: 89993.33

NET MTR VOLUME IN BBL: 10.71349

1/K MTR FACTOR IN PUL/BBL: 8370.28
(FOR USE WITH 2233)

MTR FACTOR (1PULSE/BBL): 1.00355

PROVER

TAB#2-F PV : 0.588

CTSP60 : 1.001445 1.000145

CPSPR : 1.000053 1.000053

CPLPR : 1.000294 1.000294

CTLP60 : 0.965292 96529

$CCF_P = 0.96702$

METER

TAB#2-F MTR: 0.588

CPLPM : 1.000276 1.000276

CTLM60 : 0.965337 .96533

0.965596

$MF = \frac{11.11819}{\frac{93199}{8400}} \times \frac{.96702}{.96560} = 1.00355$ 1.0036

WITNESSED BY:

COMMENTS:

RECEIVED
JUL 22 1988
Alaska Oil & Gas Cons. Commission

1/27/9

MEMORANDUM

To:	Subject:	
Mike E. Kopp	Measurement Dept. Wahl Digital Thermometer Certification and Probe Checks	
From:	**Date:**	**File No.**
Perry A. Markley	5/21/88	

A calibration / certification was performed on 5/20/88 to the Measurement departments Wahl Platinum-RTD Heat-Prober Thermometers #5353 and #5354 also a check was performed on nine probes. This calibration and check was performed in preparation for the prover volume certifications to take place at NPMS and on the North Slope.

An OMEGA ice point cell SN#71001 was used for the 32 deg. ice point reference with a 1mm Brooklyn P-M thermo company thermometer SN#79203, no certificate was available at the testing site, SCADA AMF is to send a copy. A SYBRON TAYLOR certified total immersion glass thermometer #2541 was used for the range comparisons. An ice bath was made to check the above listed thermometer and several others used for counter checks.

The total immersion procedure was used with the glass thermometer, no glass correction factor was necessary.

During the accuracy check to the heat probes, probe #OM-4 went bad (see probe accuracy list). Degree of accuracy varied from probe to probe. Offsets should be applied to the particular probes.

Due to the frequent calibration drifts on the digital thermometer used PS-01, a check should be made anytime a temperature is questioned.

DIGITAL THERMOMETER CERTIFICAT

1. Digital Thermometer S/N 5363 Probe S/N om-3
2. NBS Glass Thermometer S/N 2541
3. Preliminary temperature checks:

		~~105.0~~ NA	~~125.0~~ 130.0	
~~Degrees~~ F	32.0			145.0
Digital Thermometer Reading	32.0			144.5
NBS Glass Thermometer Reading (totally submergad mercury column)	32.0			145.0
Or				
NBS Glass Thermometer Reading (submerged to 75 degree mark on stem)	NA			NA
TC - Corrected Temperature	NA			NA

Ambient Temperature 75.6

4. Temperature checks after calibration:

Digital Thermometer Reading	32.1	____	131.75	145.2
NBS Glass Thermometer Reading (totally submerged mercury column)	32.0	____	131.7	145.2
Or				
NBS Glass Thermometer Reading (submerged to 75 degree mark on stem)	NA	____	NA	NA
TC - Corrected Temperature	NA	____	NA	NA

Ambient Temperature 75.6

5. To calculate the temperature correction for the NBS glass thermometer, use the following formula:

Note: Use only if NBS glass thermometer was not fully submergea.

TC = Tb +/- SC +/- Slc

Where: TC = Corrected NBS glass thermometer reading
Tb = Temperature reading of NBS glass thermometer
SC = Stem correction in degrees F for ambient temperature effects on NBS glass thermometer
Slc = Stem correction obtained from NBS glass thermometer laboratory test certificate

SC = 0.00009 x (Tb - 75) x (Tb - Ta)

Where: SC = Stem correction in degrees F for ambient temperature effects on NBS glass thermometer
Tb - 75 = Number of thermometer scale degrees of mercury column not immersed in the liquid -75
Tb = Temperature reading of NBS thermometer
Ta = Average ambient temperature reading

6. Remarks: Adjustment to span was required then readjustment to zero.
7. Work performed by Percy Maubley Date: 5/20/98

Witnessed by _____

5/20/88

Platinum - RTD Heat Probe

Accuracy Checks

Reference Temperature
32.00 deg. F

Probe Numbers	Digital Thermometer #5353	Digital Thermometer #5354	AVG. Diff.
OM-A	32.10	32.10	0.10
OM-B	32.00	32.00	0.00
OM-1	32.10	32.00	0.05
OM-2	32.00	31.95	-0.03
OM-3	32.10	32.10	0.10
OM-4	NA	NA	NA
OM-5	31.90	31.90	-0.10
OM-6	32.10	32.10	0.10
PS-1 #9	31.80	31.80	-0.20

Reference Temperature
131.80 deg. F

Probe Numbers	Digital Thermometer #5353	Digital Thermometer #5354	AVG.
OM-A	131.95	131.95	0.15
OM-B	131.80	131.75	-0.03
OM-1	131.75	131.70	-0.08
OM-2	131.90	131.90	0.10
OM-3	131.85	131.80	0.02
OM-4	NA	NA	NA
OM-5	131.80	131.80	0.00
OM-6	132.00	132.05	0.22
PS-1 #9	131.80	131.80	0.00

Reference Temperature
145.20 deg. F

Probe Numbers	Digital Thermometer #5353	Digital Thermometer #5354	AVG. Diff.
OM-A	145.40	145.35	0.18
OM-B	145.05	145.15	-0.10
OM-1	145.05	145.05	-0.15
OM-2	145.30	145.30	0.10
OM-3	145.20	145.20	0.00
OM-4	NA	NA	NA
OM-5	145.10	145.20	-0.05
OM-6	145.45	145.40	0.23
PS-1 #9	145.15	145.20	-0.02

Probe #OM-4 went bad during its check, reading approximately 4 deg. F low at 145 deg F and 2 deg F low at 32 deg F. These checks were made after the Digital thermometers were calibrated and the errors should be applied during use with the particular probe.

SYBRON | Taylor

TAYLOR INSTRUMENT / CONSUMER PRODUCTS DIVISION SYBRON CORPORATION / ARDEN, N. C. 28704

REPORT OF CALIBRATION

CERTIFIED PRECISION QUALITY
Type of Instrument

Catalog No. 21013 Serial No. 65F 2541

Scale and Subdivision 122 to 176 F, 0.20 F

FEATURES: Total Immersion

Results of Tests

Reading of Thermometer	Temperature IPTS-68	Correction To Be Applied
32.000	32.000	0.
125.000	125.000	0.
145.000	145.000	0.
160.000	160.000	0.
174.980	175.000	+0.020

If the correction is + the true temperature is higher than the indicated temperature; if the correction is — the true temperature is lower than the indicated temperature.

The following paragraph applies to thermometers with an ice point. The tabulated corrections apply provided the ice-point reading, taken after exposure for not less than 3 days to a temperature of about 25° C. (77° F) is 32.000 If the ice-point reading is found to be higher (or lower) than stated, all other readings will be hi[illegible] (or lower) by the same amount. If the thermometer is used or tested at a given temperature shortly after being heated to a higher temperature, an error of (minus) —0.01° or less; for each 10° difference between the two temperatures, may be introduced.

We hereby certify that this thermometer is calibrated by comparison to "working standards" whose primary source of accuracy rests in platinum resistance thermometers calibrated by the National Bureau of Standards. Continuing accuracy is assured by periodically submitting our platinum resistance thermometers to the National Bureau of Standards. In addition, intermediate checks are made against a triple point of water cell, a freezing point of zinc cell, and a freezing point of tin cell.

Date 02/06/81 09:33:43
Recertified 4/5/82 No change

Signed [signature]

METER VOLUME CALCULATIONS

$$\text{Gross Std Volume} = \frac{\text{Meter Pulses}}{\text{"K" factor}} \times \text{CTL} \times \text{CPL} \times \text{MF}$$

$$\text{Meter Factor (MF)} = \frac{\text{Volume of Prover} \times \text{CPSP} \times \text{CTSP} \times \text{CPLP} \times \text{CTLP}}{\frac{\text{Meter Pulses}}{\text{"K" factor}} \times \text{CPLM} \times \text{CTLM}}$$

Gross Standard Volume -- the actual volume of fluid, at standard temperature and pressure, which passed through the meter. This value times the fractional percent of sediment and water provides Net Standard Volume.

Meter Pulses -- a series of electrical pulses, generated by the meter, whose number is proportional to the volume measured and whose frequency is proportional to the flow rate.

CPSP -- correction for the effects of pressure on the shell of the prover.

CTSP -- correction for the effects of temperature on the shell of the prover.

CPLP -- correction for the effects of pressure on the liquid in the prover.

CTLP -- correction for the effects of temperature on the liquid in the prover.

CPLM -- correction for the effects of pressure on the liquid in the meter.

CTLM -- correction for the effects of temperature on the liquid in the meter.

"K" factor -- a number which, for a particular meter, represents the uncorrected pulses per barrel.

TEMPERATURE & PRESSURE CORRECTION FACTORS FOR STEEL & CRUDE OIL

$$CPSP = 1 + \frac{P \times I.D.}{Wt \times (30 \times 10^6)}$$

Where:
P = pressure - psig
I.D. = internal diameter - in.
Wt = wall thickness - in.
(30×10^6) = ste modulus of elasticity

$$CTSP = 1 + (Tp - 60°)(18.6 \times 10^{-6})$$

Tp = prover shell temperature - °F
(18.6×10^{-6}) = steel expansion coefficient - per °F

$$CPL = 1 + PF$$

$$F = C(A + BT + \frac{C}{\rho^2} + \frac{DT}{\rho^2})$$

P = pressure - psig
A = constant - -1.99470
B = " - 0.00013427
C = " - 0.79392
D = " - 0.0023260
ρ = density - gM/cm³

$$\rho^2 = \frac{141.5 \times 0.999012}{131.5 \times °API \text{ @ } 60°F}$$

$$CTL = e\left\{-\alpha c_T \Delta t \ (1 = 0.8 \ \alpha c_T)\right\}$$

ρ^2 = as above

$$\alpha c = \frac{ko + k_1 T}{\rho^2 \times 10^6}$$

Ko = constant = 341.0957
K_1 = " = 0.0

APPENDIX IV A

ARCO's Prudhoe Oil Pool Meters at Pump Station #1

Total, corrected volume thru ARCO's meters on 6/30/90

07/01/90 00:03:52

METER SET - FE0520 LOG SUMMARY - ARCO

SET AVERAGE

API GE/60	29.4	TEMP (DEGF)	119.5
S.G. TEMP	119.0	PRES (PSIG)	67
V.P. (PSIA)	10.2#	WATER (%)	0.2

START TIME 06/30/90 00:00:00

STOP TIME 06/30/90 24:00:02

NET

	NON RST	FE-052A	FE-052C	FE-0520
START	3176680	3700672	25371756	23989965
STOP	3771275	3909161	25567951	24179885
TOTAL	594595	208489	196195	189920

CPLM = 1.00037
CTLM = 0.97357
CCF = 0.97387

FLOW WEIGHTED AVERAGE

METER ID	METER PULSES	CURRENT K-FACTR	CALC GROSS	INSTR GROSS	TEMP DEGF	PRESS PSIG	S.G. 60/60	S.G. TEMP
FE-052A	43767006	204.45	214078	214077	119.5	67	0.8796	119.0
FE-052C	41370220	205.28	201451	201455	119.5	67	0.8797	119.0
FE-0520	40474989	207.53	195013	195010	119.5	67	0.8796	119.0
GROSS TOTALS			610542	610542				
INSTR NET TOTAL			594,679	594604				

Meter Proof Report

ARCO Meter 52A

06/30/90 21:22:19

6/30/90

METER PROOF-REPORT - ARCO
METER ID - FE-052A
PROOF TYPE AUTOMATIC

AVERAGE:		AVERAGE:		AVERAGE:	
METER PRESS (PSIG)	65	PROVER PRESS (PSIG)	59	S.G. CORRECTED	0.8801
METER TEMP (DEGF)	120.2	PROVER TEMP (DEGF)	120.3	S.G. RAW	0.8570
FLOW RATE (BPH)	8566			S.G. TEMP (DEGF)	119.8

RUN	L-R	R-L	TOTAL PULSES	TRIAL 1/K FACTOR	METER PSIG	METER TEMP	PROVER PSIG	PROVER TEMP	S.G.60 CORR	FLOW RATE
1	15332	15331	30663	0.00489111	66	120.2	61	120.3	0.8797	8593
2	15332	15330	30662	0.00489153	66	120.3	61	120.3	0.8800	8589
3	15332	15330	30662	0.00489128	66	120.3	61	120.4	0.8800	8518
4	15330	15331	30661	0.00489133	61	120.1	55	120.2	0.8804	8514
5	15336	15330	30666	0.00489085	64	120.1	58	120.1	0.8803	8614
			30662.8		65	120.2	59	120.3	.88008	
									29.28	

ACTUAL DEVIATION WAS 0.014% OF 5 CONSECUTIVE RUNS OUT OF 5 TOTAL RUNS.
ALLOWABLE DEVIATION 0.020%

PROVER BASE VOLUME IN BBLS (SV 1-2)	149.80676	PROVER:	
PROVER VOL. CORR FOR TEMP AND PRESS	146.01506	CTSP60 = 1.00112	
AVERAGE METER PULSES PER RUN	30662.8	CPSPR = 1.00009	
AVERAGE METER PULSES PER RUN (CORRECTED FOR PRESS & TEMP)	29852.7	CPLPR = 1.00033	
		CTLP60 = 0.97319	
AVERAGE METER FACTOR (BBLS PER PULSE)	0.0048912		
TRANSMITTED K FACTOR (PPB)	204.45	METER:	MF-PSP = 204.
FACTOR FROM PREVIOUS PROOF	204.44	CPLM60 = 1.00036	
FACTOR FROM METER CURVE	204.53	CTLM60 = 0.97323	= 204.450
DIFFERENCE FROM METER CURVE	0.04%		

Meter Proof Report

ARCO Meter 52C

06/30/90 22:57:23

6/30/90

METER PROOF REPORT - ARCO
METER ID - FE-052C
PROOF TYPE AUTOMATIC

AVERAGE:		AVERAGE:		AVERAGE:	
METER PRESS (PSIG)	66	PROVER PRESS (PSIG)	64	S.G. CORRECTED	0.8790
METER TEMP (DEGF)	122.4	PROVER TEMP (DEGF)	122.1	S.G. RAW	0.8551
FLOW RATE (BPH)	7175			S.G. TEMP (DEGF)	121.6

RUN	L-R	R-L	TOTAL PULSES	TRIAL I/K FACTOR	METER PSIG	METER TEMP	PROVER PSIG	PROVER TEMP	S.G.60 CORR	FLOW RATE
4	15398	15396	30794	0.00487117	65	120.5	62	120.3	0.8775	7176
5	15397	15399	30796	0.00487140	66	121.7	64	121.3	0.8784	7176
6	15398	15400	30798	0.00487092	65	122.6	62	122.3	0.8790	7166
7	15397	15394	30791	0.00487210	66	123.3	63	123.0	0.8793	7168
8	15399	15394	30793	0.00487140	68	123.7	66	123.6	0.8807	7187
			30794.4		66	122.4	63	122.1	.87898	

ACTUAL DEVIATION WAS 0.024% OF 5 CONSECUTIVE RUNS OUT OF 8 TOTAL RUNS. 29.48
ALLOWABLE DEVIATION 0.025%

PROVER BASE VOLUME IN BBLS (SW 1-2)	149.80676	PROVER:
PROVER VOL. CORR FOR TEMP AND PRESS	145.89474	CTSP60 = 1.00116
AVERAGE METER PULSES PER RUN	30794.4	CPSPR = 1.00010
AVERAGE METER PULSES PER RUN (CORRECTED FOR PRESS & TEMP)	29949.1	CPLPR = 1.00036
		CTLP60 = 0.97232
AVERAGE METER FACTOR (BBLS PER PULSE)	0.0048714	
TRANSMITTED K FACTOR (PPB)	205.28	METER:
FACTOR FROM PREVIOUS PROOF	205.36	CPLM60 = 1.00037 ✓
FACTOR FROM METER CURVE	205.54	CTLM60 = 0.97219 ✓
DIFFERENCE FROM METER CURVE	0.13%	

MF-PSP = 205.278

06/30/90 22:24:30

Meter Proof Report

ARCO Meter 52D

6/30/90

METER PROOF REPORT - ARCO
METER ID - FE-0520
PROOF TYPE AUTOMATIC

AVERAGE:		AVERAGE:		AVERAGE:	
METER PRESS (PSIG)	66	PROVER PRESS (PSIG)	60	S.G. CORRECTED	0.8797
METER TEMP (DEGF)	119.5	PROVER TEMP (DEGF)	119.5	S.G. RAW	0.8568
FLOW RATE (BPH)	7852			S.G. TEMP (DEGF)	119.1

RUN	L-R	R-L	TOTAL PULSES	TRIAL 1/K FACTOR	METER PSIG	METER TEMP	PROVER PSIG	PROVER TEMP	S.G.60 CORR	FLOW RATE
3	15564	15565	31129	0.00481827	66	119.5	62	119.4	0.8777	7861
4	15564	15564	31128	0.00481830	66	119.7	61	119.7	0.8805	7850
5	15562	15560	31122	0.00481917	67	119.6	62	119.6	0.8807	7834
6	15567	15560	31127	0.00481830	64	119.4	58	119.4	0.8796	7829
7	15565	15560	31125	0.00481861	65	119.3	59	119.3	0.8801	7885
			31126.2		66	119.5	60	119.5	.87972	

29.35

ACTUAL DEVIATION WAS 0.019% OF 5 CONSECUTIVE RUNS OUT OF 7 TOTAL RUNS.
ALLOWABLE DEVIATION 0.020%

PROVER BASE VOLUME IN BBLS (SW 1-2)	149.80676	PROVER:
PROVER VOL. CORR FOR TEMP AND PRESS	146.06415	CTSP60 = 1.00111
AVERAGE METER PULSES PER RUN	31126.2	CPSPR = 1.00009
AVERAGE METER PULSES PER RUN (CORRECTED FOR PRESS & TEMP)	30312.9	CPLPR = 1.00034
		CTLP60 = 0.97352
AVERAGE METER FACTOR (BBLS PER PULSE)	0.0048185	
TRANSMITTED K FACTOR (PPB)	207.53	METER:
FACTOR FROM PREVIOUS PROOF	207.55	CPLM60 = 1.00036
FACTOR FROM METER CURVE	207.47	CTLM60 = 0.97352
DIFFERENCE FROM METER CURVE	0.03%	

MF-PSP = 207.533

APPENDIX IV B

BPX's Prudhoe Oil Pool Meters at Pump Station #1

Total corrected volume thru BPX meters on 6/30/90

07/01/90 00:03:48

METER SET - FE0510 LOG SUMMARY - BPX

START TIME 06/30/90 00:00:00

STOP TIME 06/30/90 24:00:02

SET AVERAGE

API 60/60	29.3	TEMP (DEGF)	125.8
S.G. TEMP	125.2	PRES (PSIG)	60
V.P. (PSIA)	11.4#	WATER (%)	0.4

CPLM = 1.000314
CTLM = 0.97072
CCF = 0.97105

NET

	NON RST	FE-051A	FE-051B	FE-0510
START	44289880	20883230	20354082	1498152
STOP	45009022	21120554	20585965	1748093
TOTAL	719142	237324	231883	249941

FLOW WEIGHTED AVERAGE

METER ID	METER PULSES	CURRENT K-FACTR	CALC GROSS	INSTR GROSS	TEMP DEGF	PRESS PSIG	S.G. 60/60	S.G. TEMP
FE-051A	49773149	203.54	244404	244408	125.8	60	0.8797	125.2
FE-051B	49009678	205.22	238799	238805	125.8	60	0.8797	125.2
FE-0510	53157186	206.50	257405	257403	125.8	60	0.8797	125.2
GROSS TOTALS			740608	740616				
INSTR NET TOTAL			719175	719148				

Meter Proof Report

BPX Metal 51A

6/30/90

06/30/90 20:10:43

METER PROOF REPORT - BPX
METER ID - FE-051A
PROOF TYPE AUTOMATIC

AVERAGE:		AVERAGE:		AVERAGE:	
METER PRESS (PSIG)	60	PROVER PRESS (PSIG)	53	S.G. CORRECTED	0.8806
METER TEMP (DEGF)	129.9	PROVER TEMP (DEGF)	129.9	S.G. RAW	0.8538
FLOW RATE (BPH)	10335			S.G. TEMP (DEGF)	129.3

RUN	L-R	R-L	TOTAL PULSES	TRIAL 1/K FACTOR	METER PSIG	METER TEMP	PROVER PSIG	PROVER TEMP	S.G.60 CORR	FLOW RATE
6	15268	15267	30535	0.00491261	61	130.1	54	130.1	0.8814	10349
7	15266	15265	30531	0.00491326	61	130.1	54	130.1	0.8807	10325
8	15268	15265	30533	0.00491296	60	129.9	53	129.9	0.8804	10343
9	15268	15265	30533	0.00491296	61	129.8	53	129.8	0.8803	10368
10	15268	15263	30531	0.00491320	60	129.6	52	129.6	0.8805	10290
			30532.6		61	129.9	53	129.9	0.88066	

ACTUAL DEVIATION WAS 0.013% OF 5 CONSECUTIVE RUNS OUT OF 10 TOTAL RUNS. 29.17
ALLOWABLE DEVIATION 0.020%

PROVER BASE VOLUME IN BBLS (SW 1-2)	149.80676	PROVER:
PROVER VOL. CORR FOR TEMP AND PRESS	145.39465	CTSP60 = 1.00130
AVERAGE METER PULSES PER RUN	30532.6	CPSPR = 1.00008
AVERAGE METER PULSES PER RUN (CORRECTED FOR PRESS & TEMP)	29593.7	CPLPR = 1.00030
		CTLP60 = 0.96892
AVERAGE METER FACTOR (BBLS PER PULSE)	0.0049130	
TRANSMITTED K FACTOR (PPB)	203.54	METER:
FACTOR FROM PREVIOUS PROOF	203.67	CPLM60 = 1.00034
FACTOR FROM METER CURVE	203.74	CTLM60 = 0.96892
DIFFERENCE FROM METER CURVE	0.10%	

MF-PSP = 203.
= 203.541

Meter Proof Report

BPX Meter 51B

06/30/90 20:35:40

6/30/90

METER PROOF REPORT - BPX
METER ID - FE-0518
PROOF TYPE AUTOMATIC

AVERAGE:		AVERAGE:		AVERAGE:	
METER PRESS (PSIG)	60	PROVER PRESS (PSIG)	51	S.G. CORRECTED	0.8804
METER TEMP (DEGF)	128.9	PROVER TEMP (DEGF)	128.9	S.G. RAW	0.8539
FLOW RATE (BPH)	10297			S.G. TEMP (DEGF)	128.4

RUN	L-R	R-L	TOTAL PULSES	TRIAL I/K FACTOR	METER PSIG	METER TEMP	PROVER PSIG	PROVER TEMP	S.G.60 CORR	FLOW RATE
1	15394	15390	30784	0.00487276	60	129.0	51	129.0	0.8812	10305
2	15392	15388	30780	0.00487340	60	129.0	51	129.0	0.8807	10270
3	15391	15393	30784	0.00487275	60	128.9	52	128.9	0.8800	10265
4	15393	15391	30784	0.00487270	60	128.9	51	128.9	0.8802	10366
5	15392	15393	30785	0.00487254	61	128.8	51	128.8	0.8800	10280
			30783.4		60	128.9	51	128.9	0.88022	

ACTUAL DEVIATION WAS 0.018% OF 5 CONSECUTIVE RUNS OUT OF 5 TOTAL RUNS. 29.26
ALLOWABLE DEVIATION 0.020%

PROVER BASE VOLUME IN BBLS (SW 1-2)	149.80676	PROVER:
PROVER VOL. CORR FOR TEMP AND PRESS	145.45766	CTSP60 = 1.00128
AVERAGE METER PULSES PER RUN	30783.4 ✓	CPSPR = 1.00008
AVERAGE METER PULSES PER RUN (CORRECTED FOR PRESS & TEMP)	29850.7	CPLPR = 1.00029
		CTLP60 = 0.96937
AVERAGE METER FACTOR (BBLS PER PULSE)	0.0048728	
TRANSMITTED K FACTOR (PPB)	205.22	METER:
FACTOR FROM PREVIOUS PROOF	205.24	CPLM60 = 1.00034 ✓
FACTOR FROM METER CURVE	205.26	CTLM60 = 0.96937 ✓
DIFFERENCE FROM METER CURVE	0.02%	

MF-PSP = 205.21
= 205.219

Meter Proof Report

BPX Meter 51D

6/30/90

06/30/90 21:01:09

METER PROOF REPORT - BPX
METER ID - FE-0510
PROOF TYPE AUTOMATIC

AVERAGE:		AVERAGE:		AVERAGE:	
METER PRESS (PSIG)	60	PROVER PRESS (PSIG)	54	S.G. CORRECTED	0.8802
METER TEMP (DEGF)	128.7	PROVER TEMP (DEGF)	128.7	S.G. RAW	0.8538
FLOW RATE (BPH)	10382			S.G. TEMP (DEGF)	128.1

RUN	L-R	R-L	TOTAL PULSES	TRIAL 1/K FACTOR	METER PSIG	METER TEMP	PROVER PSIG	PROVER TEMP	S.G.60 CORR	FLOW RATE
3	15490	15489	30979	0.00484208	61	128.8	53	128.8	0.8799	10316
4	15486	15489	30975	0.00484269	61	128.6	53	128.6	0.8794	10402
5	15488	15487	30975	0.00484275	61	128.6	55	128.6	0.8806	10423
6	15491	15487	30978	0.00484228	60	128.7	53	128.7	0.8806	10347
7	15489	15485	30974	0.00484293	60	128.9	54	128.9	0.8807	10425
			30976.2		61	128.7	54	128.7	0.88024	

ACTUAL DEVIATION WAS 0.017% OF 5 CONSECUTIVE RUNS OUT OF 7 TOTAL RUNS. 29.25
ALLOWABLE DEVIATION 0.020%

PROVER BASE VOLUME IN BBLS (SW 1-2)	149.80676	PROVER:
PROVER VOL. CORR FOR TEMP AND PRESS	145.46800	CTSP60 = 1.00128
AVERAGE METER PULSES PER RUN	30976.2	CPSPR = 1.00008
AVERAGE METER PULSES PER RUN (CORRECTED FOR PRESS & TEMP)	30039.5	CPLPR = 1.00031
		CTLP60 = 0.96942
AVERAGE METER FACTOR (BBLS PER PULSE)	0.0048426	
TRANSMITTED K FACTOR (PPB)	206.50	METER:
FACTOR FROM PREVIOUS PROOF	206.51	CPLM60 = 1.00035
FACTOR FROM METER CURVE	206.33	CTLM60 = 0.96942
DIFFERENCE FROM METER CURVE	0.08%	

MF-PSP = 206.5
= 206.501

APPENDIX V

Listing of Some of the Metering Problems Found by AOGCC Personnel

General Comments

At some of the Cook Inlet area LACT facilities, meter maintenance is lax at times. When contacted by AOGCC regarding metering, the operators are very responsive.

On the North Slope, the metering system originally installed at PS#1 pushed "state-of-the-art" to new limits. While the equipment was excellent, it was not being operated properly -- perhaps the maintenance was higher than envisioned. In early to mid-1981, Alyeska set up a separate measurement group. Since then we have had good cooperation from Alyeska, and major metering problems have been virtually non-existent.

ARCO has established a Kuparuk River Unit measurement group and a Prudhoe Bay measurement group. BPX has a measurement group for the Endicott Field.

We believe that the LACT facilities at the North Slope fields have excellent equipment, and are being used and maintained properly.

McArthur River Field

09/20/79 - found that data had been changed on the meter proving report form after it was signed by our inspector.

11/80 - insisted that Cook Inlet Pipeline Company use the API tables 5A and 6A for correction of gravity and temperature of the fluid, respectively.

07/07/90 - an incorrect pressure correction factor was used in the meter factor calculation. A corrected measurement ticket has been issued.

Middle Ground Shoal

01/22/79 - found error in calculation of one of Shell's LACT meters.

01/16/80 - letter to Shell regarding inadequate meters.

06/03/82 - an AOGCC inspector found the isolation block valve leaking which results in incorrect meter factors.

06/25/84 - letter to Shell insisting that they maintain their meters in good repair.

ARCO's Crude Oil Topping Plant - Prudhoe Bay Field

02/22/79 - contacted ARCO regarding erratic meter factors. ARCO was not concerned. As a result, we set an action limit of 0.0025 between successive meter factors. The temperature compensator was found to be worn.

03/31/81 - found that ARCO used the wrong master meter factor.

09/17/81 - our inspector noted that the ATG compensator was 0-150°F, the oil being metered was 160°F. They changed the temperature compensator.

04/14/82 - found that ARCO was not using a correction factor for the pressure of the liquid. They agreed, eventually, and started using it.

08/18/83 - found that the new master meter curves were invalid due to numerous errors. ARCO had the meters reproved.

Endicott Oil Field

09/88 - we told BP that for the period February 17 through August 16, 1984, they had a problem with metering software. The correction involved an increase of 396 barrels.

Kuparuk River Field

08/04/83 - letter from ARCO this date stating they agreed with us that incorrect meter factors had been used at startup of the field. They adjusted Kuparuk production upward by 21,305 barrels.

03/13/85 - letter to ARCO pointing out that they had been using incorrect meter factors on February 27 due to negligence on ARCO's part. Our letter resulted in a meeting which brought about minor changes in metering procedure to improve reliability.

04/26/89 - letter to ARCO concerning use of incorrect average pressure and temperature correction factor for liquids for meter proof reports.

Milne Point Unit

During the engineering phase of this project, I was asked by Conoco to look at their proposed metering facilities. I requested some changes in the computer printout, and insisted they add equipment to preserve the meter pulses in the event of a power and/or computer failure.

On 11/07/85, for reasons unknown, the computer was "zero-ed" causing a loss of data. The on-skid gross (pulse) totalizer was used to arrive at the day's throughput. We were verbally thanked for requiring the "power-off" pulse totalizer.

Prudhoe Oil Pool

06/12/81 - called Alyeska's attention to a difference in value of the API gravity listed on the measurement ticket vs. the gravity used for meter factors. This was corrected.

07/07/81 - at our insistence, Alyeska decided to make the oil quality test prior to proving so the same API gravity valve would be used for meter factor calculations as would be reported on the run tickets.

09/26/83 - called Alyeska's attention to a discrepancy between the API gravity value used for metering vs. that used in the meter factor calculations. They found the API gravity analyzer needed repair.

Testimony concerning:

QUANTITY AND QUALITY MEASUREMENTS OF CRUDE OIL AND GAS IN THE STATE OF ALASKA

Prepared for:

Senate Resources Committee
and
Senate Special Committee on Oil and Gas

Hearing
September 20, 1990

by

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QUANTITY AND QUALITY MEASUREMENTS OF CRUDE OIL AND GAS IN THE STATE OF ALASKA

I. QUESTIONS OF CONCERN

* Do quantity and quality determinations of ANS crude oil produced and transported meet the accuracy requirements of all parties to custody transfer?

* Do all parties to custody transfer have adequate assurance that standard methods are being employed and the results are valid?

* Are measurements data being collected, processed, and reported in a form that can be substantiated and is appropriate for various revenue determinations?

* Are improvements in measurement systems and data acquisition warranted and economically justifiable?

II. INTRODUCTION AND SCOPE

These are extremely sensitive questions given the competitive nature of the petroleum industry and the often adversarial relationship between the industry and the State of Alaska. There are no quick and easy answers, but there are ways to reduce the friction generated by these issues. With over four billion dollars in outstanding litigation between the petroleum industry and the State, there is obviously room for improvement.

Petroleum measurements is a complex subject, and one in which technology has advanced far beyond the comprehension of all except those dedicated to the subject. Technological advances in instrumentation, data acquisition, and computer sciences has greatly enhanced measurements capabilities. The benefits are great if appropriate applications of technology are correctly employed. If not, we are simply deluded by faith in a "black box" and have only gained the capability to make mistakes much faster.

All petroleum revenues, for both industry and State, are derived from quantity and quality measurements. Methods of value determination and financial accounting, though intimately related, are even more complex and sensitive subjects. The requirements of these subjects determine "what", "where", "when", and "how" volume measurements must be made. However, for the sake of simplicity, the scope of this testimony is limited strictly to quality and quantity measurements. A basic knowledge of how the value of crude oil, tariffs, royalties, quality bank payments, and taxes are determined is essential in analyzing and understanding volume measurements.

III. PERSPECTIVES

If these issues are to be resolved, it is imperative that the different perspectives be well defined and and the mission of each interested party respected and understood.

III.1 The Industry's Perspective:

The purpose of the oil and gas industry is to discover, produce, transport, and refine these State resources to meet energy requirements in Alaska and the rest of the nation and world. Furthermore, to move crude and refined products to market in a cost effective manner that is safe for people and the environment. Whether this mission is being accomplished may be arguable from other perspectives, but at least it is well defined.

Industry professionals take great pride in the accuracy of meter systems and reported values. A substantial investment is put into these systems because they are the cash register of the business. Advanced technology is employed to produce the most accurate results possible, and every attempt is made to meet or exceed industry standards as set forth by API, ASTM, ISO and other international standards setting organizations.

Measurements within the Alaskan oil and gas network is a complex task. The product varies widely in quality and comes from a number of different fields and production companies, each with different accounting requirements. Each producer has the responsibility of measuring quality and quantity for custody transfer from the producing leases to the transporting carrier. This data and the wellhead price, by net-back accounting from the refinery gate price, determines ownership value and quality bank payments. Data is also reported to the State of Alaska for determination of royalty shares and tax liability. All production is then integrated in the TAPS system for transport to Valdez. The operators of the TAPS system have the responsibility to all producers, owners, and the State of Alaska to measure quality and quantity of the combined input and output for determination of transportation and operating costs, taxes, tariffs, and custody transfer from, and back to the separate owners.

III.2 The State's Perspective:

The State has a dual purpose, two hats to wear. In one hand is the policeman's hat. It is the State's responsibility to monitor and police the industry in the best interest of the Alaskan people and environment. In the other hand is the hard-hat of an oil producer. The State receives approximately 25% of the wellhead value of the oil in taxes and royalty payments both in-kind and in-value. It is also the State's responsibility to maximize the benefits of these revenues for the people and environment of Alaska. The priority of this paradoxical mission is not always well defined and varies with the political climate as determined at the polls.

The State of Alaska has interests and obligations similar to industry's, as a party to custody transfer, but with all eight individual producers and the carriers, not just one. The State has the added responsibility of accounting for quality and quantity measurements by the various requirements of several State agencies, DOR, DNR, DEC, and others. Royalty payments are made in-value (dollars) and in-kind (oil). Custody transfer of in-kind payments is made both within the State to local refiners and outside the State. Regulations and tariffs of intra-State oil is governed by the APUC, while inter-state regulations and tariffs are governed by FERC.

The added complexities of various tax legislation and regulation make it abundantly clear that the State has many diverse interests in being assured that the reported quality and quantity values of oil and gas are valid, as accurate as possible, and standardized. The State has tasked the Oil and Gas Conservation Commission with this responsibility, along with many other duties. Volume measurements is an intricate, specialized, and highly technical field. It is hard to imagine the Commission accomplishing this task, in conjunction with other duties, to the satisfaction of all parties involved without the resources, expertise, and technology of contemporary measurements professionals.

IV. SPECIFIC CONCERNS AND RECOMMENDATIONS

IV.1 Validity assurance of reported measurements data:

No matter how well the industry meters oil and gas, all parties to custody transfer, including the State of Alaska, have the right to maximize their assurance that reported quality and quantity data are valid. The Alaskan crude oil network contains two types of meter systems for the purpose of custody transfer:

1) LACT systems (Lease Automatic Custody Transfer) designed for the unattended transfer of liquid hydrocarbons from producing leases to the transporting carrier.

2) Pipeline systems designed for optimum measurement accuracy for custody transfer regardless of the volume handled.

The following is quoted from The Manual of Petroleum Measurement Standards, API Chapter 6, section 1, concerning these systems: "The system must provide a proper means for net volume determination, quality determination, and fail-safe and tamper proof operation while meeting requirements of accuracy and dependability as agreed to by such mutually concerned parties as the producer, the transporter, the royalty owner, and federal, state, and municipal regulatory bodies."

Assurance that meter systems achieve these criteria can only be attained from an independent third party monitor with documentable expertise, experience, and knowledge of the Alaskan petroleum industry. Employment of a third party monitor (metrologist) is common in the custody transfer of petroleum products. Measurements records, data, and computer software are considered proprietary and confidential. An independent third party monitor can attest to the accuracy of data within specified limits, can document deviations from these limits, and mitigate disputes and settlements that otherwise would proceed to costly litigation.

IV.2 Explicitly define measurements requirements of the State of Alaska and all parties to custody transfer:

Measurements data is used in a variety of revenue determinations, as well as for resource and environmental management. Each use of measurements data has its own peculiar requirements. What is appropriate for custody transfer from one company to another may be of little or no value in determining tax liabilities or meeting regulatory agency requirements. It is much more costly to dis-integrate a composite crude oil stream for individual value determination than to make the appropriate measurements prior to integration.

Each party, and within the State each department or agency, must specifically define the measurements it requires. This should include explicitly:

1) What parameters are to be measured.
2) Where (physical location) these parameters are measured.
3) When (time & frequency) of these measurements.
4) How, by what instruments or methods.
5) Format of raw, reduced, and reported data.
6) What is the degree of surety (quality assurance) of the data.

Cooperation within industry and with the State would be expected, as clear definitions of requirements are in the economic interest of all parties. The problem to resolve is not the relatively small value of quality and quantity measurements in question, but rather saving many of the costs of settlement and litigation incurred by not having the appropriate source data.

IV.3 Conduct an internal audit of State departments and agencies directly involved with petroleum measurements and revenue determinations:

An independent audit review would assist the explicit definition of requirements listed in IV.2 above, resulting in the ability to standardize data collection. It would also deliniate the State's contradictory roles as policeman and producer.

In cases such as measurements, the State's obligations are quite similar to that of industry. Various State agencies are attempting to satisfy these obligations without the resources, experience, and expertise required and utilized by industry. An independent audit review of these functions may reveal which should be performed by the State and which should be contracted to specialist.

To be effective, audit teams would require a broad degree of freedom, authority, and expertise in specialized areas. They should be composed of volume measurements experts, royalty and tax accounting experts, legislators, and be coordinated by an ombudsman.

IV.4 There are areas in measurements where industry and the State could cooperate to the benefit of both.

One such area is research into the physical and chemical properties of Alaskan crude oil and gas. All will agree these resources are limited and their efficient and appropriate measurement, use, and conservation cannot be over estimated.

Crude oil is a composite of a wide spectrum of elemental hydrocarbon fractions. The physical properties of crude oil vary according to the chemical composition. The effects of temperature and pressure will differ from one crude oil to another. In order to facilitate petroleum measurements extensive testing has been done to determine a "global crude oil constant" which reflects the average physical properties of crude oil in general. This global constant is used in the API methods of computing volume correction factors.

A more appropriate constant for the composite of Alaskan crude oil would undoubtedly be different than the global constant, especially when the injection of LNG's is considered. This project was last completed jointly by API (The American Petroleum Institute) and NBS (The National Bureau of Standards) over five years (1974 to 1979) at a cost of $500,000. Given the scientific and professional resources of industry and the State, research into this, and related subjects, could be rewarding to both parties.

V. CONCLUSION

Knowledge and expertise in quality and quantity determinations, and resultant revenue determinations, is costly and not openly shared. It is an area where a little knowledge can be dangerous and industry may understandably fear a deluge of questions, that appear as accusations, from semi-informed sources. It is the State's (or any party to custody transfer) right and obligation to question, verify, and obtain maximum quality assurance of reported measurements data. However, without knowing what questions to ask, the answers will be irrelevant and only serve to aggravate an already sensitive issue.

Validity assurance and standardization of measurements can best be obtained through employment of third party professionals. The State must explicitly define its requirements and determine what tasks can best be accomplished by governmental bodies and where the State's interest may best be served by utilizing the expertise of private consultants. The cost savings of such an investment probably are not in increased accuracy, but rather in reduced settlement and litigation costs by having assured, appropriate, and standardized source data.

Resolution of these issues should increase cooperation between the State and the petroleum industry, not add to the adversarial relationship. Where cooperation is not possible due to constraints of a proprietary or confidential nature, an independent third party should be employed as a monitor or mediator to provide all parties the necessary surety without risking security.

- Late Entry - September 13, 1990:

A CASE IN POINT: Recent Settlement of the "Amerada Hess" ligation.

The primary issue resolved was the price of crude oil at the refinery gate, of a producer/shipper selling crude to a subsidiary refinery. Once this price dispute was settled, it remained to recalculate the wellhead price, by net back accounting utilizing the 1985 TAPS settlement method (TSM) of computing tariffs.

As this increased the wellhead price per barrel, for the previous thirteen years, the State Departments of Revenue and Natural Resources must have had to apply this adjusted wellhead price(s) to reported quantities and qualities, over the same time period, to ascertain an adjusted value for settlement.

It would be enlightening to pose the initial questions in section I of this testimony to the accounting personnel involved, considering similar settlements may be made with other parties to the case. Furthermore, how much of the costs of this case could have been saved by having reliable, verifiable, and appropriate source measurements data?

A settlement is obviously a compromise to avoid further litigation. Is it the refinery gate price that is being compromised or is it total settlement value based on volumetric measurements that is being compromised?

Chapter 30. Alaska Native Claims State Settlement Act of 1968.

[Repealed, § 9 ch 70 SLA 1972.]

Chapter 35. Right-of-Way Leasing Act.

NOTES TO DECISIONS

Applied in Arco Pipeline Co. v. 3.60 Acres, More or Less, 539 P.2d 64 (Alaska 1975).

Sec. 38.35.010. Legislative declaration of policy. (a) The natural resources of this state in crude oil and natural gas and in its land for transportation of these resources and their products by pipeline toward markets both in and out of the state are capable of making a significant contribution to the general welfare of the people of this state. It is the policy of this state that the development, use, and control of a pipeline transportation system be directed to make the maximum contribution to the development of the human resources of this state, the increase in the standard of living for all of its residents, the advancement of existing and potential sectors of its economy, the strengthening of free competition in its private enterprise system, and the careful protection of its incomparable natural environment.

(b) The State of Alaska reserves unto itself all rights, powers, privileges and immunities not preempted by federal interstate commerce laws and regulations in the right-of-way leasing of any state land for

pipeline construction, transmission, or operation within its boundaries. (§ 1 ch 72 SLA 1972; am § 1 ch 3 FSSLA 1973)

Collateral references. — 63A Am. Jur. 2d, Public Lands, §§ 31 to 34, 113 to 121.

73A C.J.S., Public Lands, §§ 68 to 70.

Sec. 38.35.015. Powers of the commissioner. The commissioner has all powers necessary and proper to implement the policy, purposes, and provisions of this chapter, so as to subserve, as the exercise of reasoned discretion determines, the public interest, convenience and necessity, including but not limited to

(1) granting leases of state land for pipeline right-of-way purposes;

(2) leasing, purchasing, or otherwise acquiring (including condemning by declaration of taking), easements or other interests in land in this state for the purpose of utilizing or granting leases of the land, easements or interests for pipeline right-of-way purposes;

(3) purchasing interests in pipelines in accordance with options included in right-of-way leases;

(4) investigating any matters concerning any lessee with a view to assuring compliance by it with its right-of-way lease, this chapter, and any other applicable state or federal law;

(5) developing from time to time and maintaining a comprehensive master plan for pipeline transportation development;

(6) developing and promoting programs to foster efficient, economical, and safe pipeline transportation services in the state;

(7) coordinating the activities of the commissioner under this chapter with the transportation and other relevant activities of other public agencies and authorities;

(8) constructing, extending, enlarging, improving, repairing, acquiring, operating, or engaging in transportation, service, or sale by any pipeline or providing for these by contract, lease, or other arrangement on those terms that the commissioner may consider necessary, convenient or desirable with any agency. corporation, or person, including but not limited to any carrier or any state agency, when the commissioner determines that a lessee carrier is not willing to undertake and complete the action within a reasonable time, and to sell, lease, grant, and dispose of any property constructed or acquired in the exercise of this power. (§ 3 ch 72 SLA 1972; am §§ 25 — 27 ch 3 FSSLA 1973; am § 38 ch 127 SLA 1974)

Revisor's notes. — Formerly AS 38.05.020(c). Renumbered in 1984.

NOTES TO DECISIONS

Construction of state lease provision reserving right to grant right-of-way. — Provision in a lease issued by the State of Alaska, division of lands, expressly reserving the right to grant an easement or right-of-way across the leased property was construed to include an interagency transfer of a right-of-way to the Department of Transportation and Public Facilities. Wessells v. State, Dep't of Hwys., 562 P.2d 1042 (Alaska 1977).

Sec. 38.35.020. Grant of right-of-way lease. (a) Rights-of-way on state land including rights-of-way over, under, along, across, or upon the right-of-way of a public road or highway or the right-of-way of a railroad or other public utility, or across, upon, over, or under a river or other body of water or land belonging to or administered by the state may be granted by noncompetitive lease by the commissioner for pipeline purposes for the transportation of oil, products or natural gas under those conditions prescribed by law or by administrative regulation. Except to the extent authorized by an oil and gas lease or unit agreement approved by the state, no person may engage in any construction or operation of any part of an oil, products, or natural gas pipeline, which in whole or in part is or is proposed to be on state land unless that person has obtained from the commissioner a right-of-way lease of the land under this chapter.

(b) The commissioner may by regulation exempt the construction or operation of field gathering lines or any reasonable classification of them from the requirement of a right-of-way lease under this chapter.

(c) The commissioner may provide in a lease issued under this section that a lessee may, with the approval of the commissioner, use materials from state land when necessary to protect state land and resources from the dangers or hazards resulting from damage caused by a pipeline disaster or emergency. If the commissioner approves the use of state materials under this subsection, the materials remain the property of the state until the material is sold to the lessee in accordance with the provisions of the lease. However, the approval does not transfer responsibility for clean up of the materials to the state. (§ 1 ch 72 SLA 1972; am § 2 ch 3 FSSLA 1973; am § 2 ch 119 SLA 1986)

Effect of amendments. — The 1986 amendment added subsection (c).

Opinions of attorney general. — The lease conversion provisions enacted by 1977 legislation (§§ 12, 13, ch. 138, SLA 1977, as amended by § 21, ch. 182, SLA 1978) applied only to those leases entered into under the substantive statutory provisions which were amended by the 1977 legislation. Hence, substantive amendments to AS 38.05 could not be applied to a lease which was not authorized by the leasing provisions of AS 38.05, but rather by the leasing provisions of this chapter, and the state was not estopped from challenging the validity of the terms of a wrongfully converted lease. December 10, 1985, Op. Att'y Gen.

Chapter 30. Alaska Native Claims State Settlement Act of 1968.

[Repealed, § 9 ch 70 SLA 1972.]

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(b) The State of Alaska reserves unto itself all rights, powers, privileges and immunities not preempted by federal interstate commerce laws and regulations in the right-of-way leasing of any state land for

pipeline construction, transmission, or operation within its boundaries. (§ 1 ch 72 SLA 1972; am § 1 ch 3 FSSLA 1973)

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(1) granting leases of state land for pipeline right-of-way purposes;

(2) leasing, purchasing, or otherwise acquiring (including condemning by declaration of taking), easements or other interests in land in this state for the purpose of utilizing or granting leases of the land, easements or interests for pipeline right-of-way purposes;

(3) purchasing interests in pipelines in accordance with options included in right-of-way leases;

(4) investigating any matters concerning any lessee with a view to assuring compliance by it with its right-of-way lease, this chapter, and any other applicable state or federal law;

(5) developing from time to time and maintaining a comprehensive master plan for pipeline transportation development;

(6) developing and promoting programs to foster efficient, economical, and safe pipeline transportation services in the state;

(7) coordinating the activities of the commissioner under this chapter with the transportation and other relevant activities of other public agencies and authorities;

(8) constructing, extending, enlarging, improving, repairing, acquiring, operating, or engaging in transportation, service, or sale by any pipeline or providing for these by contract, lease, or other arrangement on those terms that the commissioner may consider necessary, convenient or desirable with any agency, corporation, or person, including but not limited to any carrier or any state agency, when the commissioner determines that a lessee carrier is not willing to undertake and complete the action within a reasonable time, and to sell, lease, grant, and dispose of any property constructed or acquired in the exercise of this power. (§ 3 ch 72 SLA 1972; am §§ 25 — 27 ch 3 FSSLA 1973; am § 38 ch 127 SLA 1974)

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(b) The commissioner may by regulation exempt the construction or operation of field gathering lines or any reasonable classification of them from the requirement of a right-of-way lease under this chapter.

(c) The commissioner may provide in a lease issued under this section that a lessee may, with the approval of the commissioner, use materials from state land when necessary to protect state land and resources from the dangers or hazards resulting from damage caused by a pipeline disaster or emergency. If the commissioner approves the use of state materials under this subsection, the materials remain the property of the state until the material is sold to the lessee in accordance with the provisions of the lease. However, the approval does not transfer responsibility for clean up of the materials to the state. (§ 1 ch 72 SLA 1972; am § 2 ch 3 FSSLA 1973; am § 2 ch 119 SLA 1986)

Effect of amendments. — The 1986 amendment added subsection (c).

Opinions of attorney general. — The lease conversion provisions enacted by 1977 legislation (§§ 12, 13, ch. 138, SLA 1977, as amended by § 21, ch. 182, SLA 1978) applied only to those leases entered into under the substantive statutory provisions which were amended by the 1977 legislation. Hence, substantive amendments to AS 38.05 could not be applied to a lease which was not authorized by the leasing provisions of AS 38.05, but rather by the leasing provisions of this chapter, and the state was not estopped from challenging the validity of the terms of a wrongfully converted lease. December 10, 1985, Op. Att'y Gen.

(h) The issuance of a conditional lease does not prevent the commissioner from issuing other conditional or unconditional leases for the same right-of-way. A conditional lease may be revoked at any time that the commissioner determines that the applicant or conditional lessee will not be fit, willing, and able to perform during the term of the lease or when another applicant or conditional lessee is determined to be fit, willing, and able to perform under an application or lease for all or part of the right-of-way. An applicant or conditional lessee accrues no rights, including preference or priority rights, to a particular right-of-way until the commissioner makes a determination that the applicant or conditional lessee is then fit, willing, and able to perform the transportation or other acts proposed under (a) of this section.

(i) The commissioner shall insert a provision implementing the requirements of (a)(5) of this section into each agreement entered into by the commissioner for the construction and operation of a pipeline within the state. (§ 1 ch 72 SLA 1972; am § 9 ch 3 FSSLA 1973; am §§ 1, 2 ch 51 SLA 1987)

Effect of amendments. — The 1987 amendment in subsection (a) inserted "in a written finding" in the first sentence, added paragraph (5), and made minor punctuation changes; in subsection (b) in the first sentence substituted "the" for "these" preceding "determinations" and inserted "under (a) of this section" and added the second and third sentences; rewrote subsection (c); and added subsections (d) — (i).

Sec. 38.35.110. Term of lease. Each lease of state land for pipeline right-of-way purposes must contain a provision that the lease shall run for a specified term of not greater than 30 years, and shall be renewable for additional periods of up to 10 years each, so long as the lessee is in commercial operation and is in full compliance with all state law, including but not limited to state law pertaining to regulation and taxation of the pipeline facility, and is in compliance with all terms of the lease. In making this determination the commissioner shall take into consideration the cost of the proposed pipeline, its useful life, and the probable financing requirement for the proposed pipeline. (§ 1 ch 72 SLA 1972; am § 10 ch 3 FSSLA 1973)

Sec. 38.35.120. Covenants required to be included in lease. (a) A noncompetitive lease of state land for a right-of-way for an oil or natural gas pipeline valued at $1,000,000 or more may be granted only upon the condition that the lessee expressly covenants in the lease, in consideration of the rights acquired by it under the lease, that

(1) it assumes the status of and will perform all of its functions undertaken under the lease as a common carrier and will accept, convey, and transport without discrimination crude oil or natural gas,

depending on the kind of pipeline involved, delivered to it for transportation from fields in the vicinity of the pipeline subject to the lease throughout its route both on state land obtained under the lease and on the other land; however, a lessee who owns or operates a natural gas pipeline subject to regulation either (A) under the Natural Gas Act (15 U.S.C. 717 et seq.) of the United States, or (B) by the state or political subdivisions with respect to rates and charges for the sale of natural gas, is, to the extent of that regulation, exempt from the common carrier requirement in this paragraph; it will accept, convey, and transport crude oil or natural gas without unjust or unreasonable discrimination in favor of one producer or person, including itself, as against another but will take the crude oil or natural gas, depending on the kind of pipeline involved, delivered or offered, without unreasonable discrimination, that the Alaska Public Utilities Commission shall, after a full hearing with due notice to the interested parties and a proper finding of facts, determine to be reasonable in the performance of its duties as a common carrier;

(2) it will interchange crude oil or natural gas, depending on the kind of pipeline involved, with each like common carrier and provide connections and facilities for the interchange of crude oil or natural gas at every locality reached by both pipelines when the necessity exists, subject to rates and regulations made by the appropriate state or federal regulatory agency;

(3) it will maintain and preserve books, accounts, and records and will make those reports that the state may prescribe by regulation or law as necessary and appropriate for purposes of administration of this chapter;

(4) it will accord at all reasonable times to the state and its authorized agents and auditors the right of access to its property and records, of inspection of its property, and of examination and copying of records;

(5) it will provide connections, as determined by the Alaska Public Utilities Commission under AS 42.06.340, to facilities on the pipeline subject to the lease, both on state land and other land in the state, for the purpose of delivering crude oil or natural gas, depending on the kind of pipeline involved, to persons (including the state and its political subdivisions) contracting for the purchase at wholesale of crude oil or natural gas transported by the pipeline when required by the public interest;

(6) it shall, notwithstanding any other provision, provide connections and interchange facilities at state expense at such places the state considers necessary if the state determines to take a portion of its royalty or taxes in oil or natural gas;

(7) it will construct and operate the pipeline in accordance with applicable state laws and lawful regulations and orders of the Alaska Public Utilities Commission;

(8) it will, at its own expense, during the term of the lease

(A) maintain the leasehold and pipeline in good repair;

(B) promptly repair or remedy any damage to the leasehold;

(C) promptly compensate for any damage to or destruction of property for which the lessee is liable resulting from damage to or destruction of the leasehold or pipeline;

(9) it will not transfer, assign, or dispose of in any manner, directly or indirectly, or by transfer of control of the carrier corporation, its interest in a right-of-way lease, or any rights under the lease or any pipeline subject to the lease to any person other than another owner of the pipeline (including subsidiaries, parents and affiliates of the owners), except to the extent that the commissioner, after consideration of the protection of the public interest (including whether the proposed transferee is fit, willing and able to perform the transportation or other acts proposed in a manner that will reasonably protect the lives, property and general welfare of the people of Alaska), authorizes; the commissioner shall not unreasonably withhold consent to the transfer, assignment or disposal;

(10) it will file with the commissioner a written appointment of a named permanent resident of the state to be its registered agent in the state and to receive service of notices, regulations, decisions and orders of the commissioner; if it fails to appoint an agent for service, service may be made by posting a copy in the office of the commissioner and filing a copy of it in the office of the lieutenant governor and by mailing a copy to the lessee's last known address;

(11) the applicable law of this state will be used in resolving questions of interpretation of the lease;

(12) the granting of the right-of-way lease is subject to the express condition that the exercise of the rights and privileges granted under the lease will not unduly interfere with the management, administration, or disposal by the state of the land affected by the lease, and that the lessee agrees and consents to the occupancy and use by the state, its grantees, permittees, or other lessees of any part of the right-of-way not actually occupied or required by the pipeline for the full and safe utilization of the pipeline, for necessary operations incident to land management, administration, or disposal;

(13) it will be liable to the state for damages or injury incurred by the state caused by the construction, operation or maintenance of the pipeline and it will indemnify the state for the liabilities or damages;

(14) it will procure and furnish liability and property damage insurance from a company licensed to do business in the state or furnish other security or undertaking upon the terms and conditions the commissioner considers necessary if the commissioner finds that the net assets of the lessee are insufficient to protect the public from damage for which the lessee may be liable arising out of the construction or operation of the pipeline.

(b) For a right-of-way lease granted under this chapter for an oil or natural gas pipeline valued at $1,000,000 or more to be valid and of legal effect, it must contain the terms required to be inserted under the provisions of AS 38.35.110 — 38.35.140. An oil or natural gas pipeline right-of-way lease granted under this chapter that does not contain the required terms is null and void and without legal effect and does not vest any interest in state land or any authority in the carrier granted the lease.

(c) The commissioner may insert in any right-of-way lease other reasonable provisions and conditions required by the public interest.

(d) The lease will also contain terms and conditions that are reasonably necessary to obligate the lessee, to the extent reasonably practicable, to

(1) prevent conflicts with other existing uses of the land involving a superior public interest;

(2) protect state and private property interests;

(3) prevent any significant adverse environmental impact, including but not limited to the erosion of the surface of the land, and damage to fish and wildlife and their habitat;

(4) restore and revegetate during the term and at termination of the lease; and

(5) protect the interests of individuals living in the general area of the right of way who rely on the fish, wildlife, and biotic resources of the area for subsistence purposes.

(e) In the event the commissioner proposes to offer a lease or leases to two or more lessees for the same pipeline, the commissioner may include terms in the lease or leases which establish the limit of the obligations and liabilities of each lessee arising under this chapter or under the lease or leases. (§ 1 ch 72 SLA 1972; am § 11 ch 3 FSSLA 1973; am §§ 2, 3 ch 110 SLA 1981; am § 69 ch 59 SLA 1982)

Revisor's notes. — Former (f) of this section was renumbered as AS 38.35.122 in 1984.

Sec. 38.35.122. Products pipeline leases. The commissioner has discretion to include any or all of the terms set out in AS 38.35.120 in leases of state land for products pipeline right-of-way purposes. (§ 11 ch 3 FSSLA 1973)

Revisor's notes. — Formerly AS 38.35.120(f). Renumbered in 1984.

Effect of amendments. — The 1986 amendment added the last two sentences in subsection (b).

Sec. 38.35.150. Additional provisions of lease. [Repealed, § 14 ch 3 FSSLA 1973.]

Sec. 38.35.160. Transfer of right-of-way lease, certificates, or pipeline. [Repealed, § 15 ch 3 FSSLA 1973.]

Sec. 38.35.170. Forfeiture of lease. Failure to begin construction of the pipeline facility within a reasonable time of the granting of a right-of-way lease under this chapter for reasons within the control of the lessee or failure of an owner of an interest in the granted right-of-way substantially to comply with the terms of the right-of-way shall be grounds for forfeiture of the right-of-way interest of the lessee or owner in an action brought by the commissioner in the superior court. Before the commencement of any action for forfeiture of an interest in a right-of-way under this section, the commissioner shall give the lessee or owner of the interest notice in writing of the alleged default and shall not commence the proceeding unless the lessee or owner of the interest has failed to initiate good faith efforts to cure the default within 60 days of the notice of the alleged default. (§ 1 ch 72 SLA 1972; am § 16 ch 3 FSSLA 1973)

Sec. 38.35.180. Suits to enjoin or recover damages for defaults. (a) When in the judgment of the commissioner a person has violated or is about to violate a provision of this chapter or an obligation, condition, or provision of a right-of-way lease, the attorney general, on advice of the commissioner, shall seek a prohibition or mandatory injunction from the superior court to remedy the violation.

(b) A penalty imposed by the provisions of a right-of-way lease issued under this chapter may be enforced in the superior court by proceedings in personam against the lessee carrier, or, in the case of a lien, by proceedings in rem against any of the lessee carrier's property.

(c) Neither this section nor the state's obtaining an injunction or recovering penalties extinguishes any civil cause of action arising out of a violation of this chapter or the provisions of a right-of-way lease. (§ 1 ch 72 SLA 1972; am § 17 ch 3 FSSLA 1973)

Sec. 38.35.190. Application of the Administrative Procedure Act. (a) AS 44.62.010 — 44.62.320, 44.62.640 and 44.62.650 apply to regulations adopted by the commissioner under the authority of this chapter.

(b) *[Repealed, § 18 ch 3 FSSLA 1973.]*

(c) *[Repealed, § 18 ch 3 FSSLA 1973.]*

SEP 1 0 1990

RIGHT-OF-WAY LEASE FOR THE TRANS-ALASKA PIPELINE

Offered by the Commissioner of the Department of Natural Resources on behalf of the State of Alaska, having determined pursuant to AS 38.35.100 that a pipeline right-of-way lease may be offered to the applicants that applied on March 7, 1974, for a pipeline right-of-way lease across State lands under AS 38.35 for the Trans-Alaska Pipeline, namely:

Amerada Hess Corporation

ARCO Pipe Line Company

Exxon Pipeline Company

Mobil Alaska Pipeline Company

Phillips Petroleum Company

Sohio Pipe Line Company

Union Alaska Pipeline Company

Copy inserted for reference 6/15/88

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RIGHT-OF-WAY LEASE FOR THE TRANS-ALASKA PIPELINE

This lease is entered into as of this 3rd day of May, 1974 (hereinafter referred to as the "Effective Date"), by the State of Alaska (hereinafter referred to as the "State"), acting through the Commissioner of Natural Resources (hereinafter referred to as the "Commissioner"), and by

Amerada Hess Corporation, a Delaware Corporation,
ARCO Pipe Line Company, a Delaware Corporation,
Exxon Pipeline Company, a Delaware Corporation,
Mobil Alaska Pipeline Company, a Delaware Corporation,
Phillips Petroleum Company, a Delaware Corporation,
Sohio Pipe Line Company, a Delaware Corporation,
Union Alaska Pipeline Company, a California Corporation,

(hereinafter sometimes referred to as the "Original Lessees").

It is the intent of the parties that, in the performance of this Lease, the following principles shall apply:

(1) In the construction (including, but not limited to, design), operation, maintenance (including but not limited to a continuing and reasonable program of preventative maintenance) and termination of the Pipeline, Lessees shall employ the best practicable technology available and use all practicable means and measures to preserve and protect the environment, as provided in this lease.

(2) The parties shall protect environmental amenities and values within the practicable bounds of economic and technical feasibility and in accordance with applicable State policies. In so doing, the parties shall take into account, among other considerations, the following:

(a) The benefit or detriment to persons, property and the environment that may be anticipated to result from a proposed course of conduct.

(b) The particular environmental technical, and economic benefits or detriments reasonably expected to flow from a proposed course of conduct.

NOTE: Terms having special meaning are defined in the body of this Lease or in Exhibit "A" hereof. Such terms are capitalized herein.

(3) Lessees shall manage, supervise, and implement the construction, operation, maintenance and termination of the Pipeline in accordance with the best practicable engineering technology available, particularly with regard to permafrost and seismic areas, to the extent allowed by the state of the art and the development of technology. In the exercise of these functions, Lessees consent and shall submit to such review, inspection, and compliance procedures relating to construction, operation, maintenance, and termination of the Pipeline as are provided for in this Lease and other applicable authorizations.

1. Grant of Right-of-Way

a. Pursuant to the provisions of AS 38.35, the Alaska Right-of-Way Leasing Act, as amended, and for and in consideration of the annual rental fee prescribed in Section 3 hereof and the covenants herein contained to be kept and performed on the part of the Lessees and subject to the conditions and requirements herein contained, the State hereby grants to the Original Lessees, for the period of limited duration prescribed in Section 2 hereof and for the purpose prescribed in Subsection "c" of this section, a right-of-way (hereinafter referred to as the "Right-of-Way") for a pipeline with its Related Facilities (such pipeline and Related Facilities being hereinafter referred to as the "Pipeline"), the width and location thereof being subject to the provisions of Subsection "d" hereof, across, through and upon State land now owned or hereafter acquired (hereinafter sometimes referred to as "State Land"), along the General Route of the Pipeline shown in the application and accompanying alignment and Related Facility site location drawings referred to in Exhibit "B" hereof. The grant made hereby is of the following undivided interests in and to the Right-of-Way to the companies designated:

Amerada Hess Corporation, an undivided interest of 3.00% of the whole;

ARCO Pipe Line Company, an undivided interest of 28.08% of the whole;

Exxon Pipeline Company, an undivided interest of 25.52% of the whole;

Mobil Alaska Pipeline Company, an undivided interest of 8.68% of the whole;

Phillips Petroleum Company, an undivided interest of 3.32% of the whole;

Sohio Pipe Line Company, an undivided interest of 28.08% of the whole;

Union Alaska Pipeline Company, an undivided interest of 3.32% of the whole.

b. This grant is made subject to (i) all applicable laws and regulations of the State of Alaska, and (ii) any valid existing rights in the lands subject to the Right-of-Way.

c. The Right-of-Way is granted for the purpose of the construction, operation, maintenance and termination of one (1) Oil transportation pipeline, consisting of one (1) line of forty-eight (48)-inch-diameter pipe and its Related Facilities. Lessees shall not use the Right-of-Way or the land subject thereto for any other purpose and shall not locate or construct any other pipelines (including looping lines) or other improvements within the Right-of-Way without prior written approval of the Commissioner. The Pipeline shall be used for only the transportation of Oil, and it shall not be used for any other purpose without the prior written approval of the Commissioner. Each Lessee shall not allow or suffer any person or business entity, with the exception of the other Lessees under this Lease, to use the Right-of-Way for the purpose set forth in this section. Nothing in this subsection is intended to (i) excuse or preclude Lessees from complying with their obligations under Section 4 of this Lease, or (ii) preclude Lessees from employing agents or contractors to effect construction, operation, maintenance or termination of all or any part of the Pipeline.

d. (i) During construction of the Pipeline and prior to the execution of the release of interests in the Right-of-Way provided for in paragraph (ii) of this subsection, the width of the Right-of-Way shall be 400 feet, except (1) that in locations where the line of pipe is to enter or cross any river bed or flood plain, the width of the Right-of-Way shall be 600 feet within an area bounded by parallel lines on each side of and 1,000 feet from the centerline of the particular river, and (2) that the dimensions of the Right-of-Way for Related Facilities shall be those more particularly set forth in Exhibit "D" hereof.

(ii) After completion of construction of the Pipeline within a particular Mapping Segment, the land subject to the Right-of-Way shall be (1) 400 feet in width along the line of pipe across State Land, except that in locations where the line of pipe enters or crosses any river, river bed or flood plain, the width of the Right-of-Way shall be 600 feet in width within an area bounded by parallel lines on each side of and 1,000 feet from the centerline of the particular river, the centerline of the pipe being also the centerline of the 400 and 600 foot Rights-of-Way, and (2) the sites for Related

Facilities described in Exhibit "D." Within 360 days following the Commissioning of the Pipeline, Lessees shall execute and deliver to the State a release of all interest in such portions of the Right-of-Way as will result in Lessees retaining only (1) the Right-of-Way for Related Facilities described in Exhibit "D," and (2) the Right-of-Way not exceeding 100 feet in width along the line of pipe with the centerline of the line of pipe being the centerline of the Right-of-Way, except that at such locations where Lessees have requested authority from the Commissioner to retain a wider Right-of-Way and the Commissioner has found and recorded the reasons for his finding that in his judgment a wider Right-of-Way is necessary for the operation and maintenance of the Pipeline after construction, or that a wider Right-of-Way is necessary to protect the environment or public safety, the width of the Right-of-Way which Lessees retain may exceed 100 feet in width in accordance with the Commissioner's finding.

e. Upon the release required by Subsection "d" of this section, Lessees shall survey and provide adequate monumentation as the Commissioner may require to locate and describe the Right-of-Way and the Lessees shall file: (i) Proof of construction of the Pipeline in accordance with the provisions of this Lease and the applicable regulations of the Department of Natural Resources; and (ii) a map, or maps or survey, approved by the Commissioner, showing the final "as built" location of the completed Pipeline, including the final locations of all buried and above-ground improvements, the centerline of the Right-of-Way, as definitely located, and, referenced to the centerline, the boundaries of the Right-of-Way, as definitely located.

f. All construction activities within the Right-of-Way shall be limited to a construction zone approved by the Pipeline Coordinator in the applicable Notice to Proceed.

2. Duration of Right-of-Way Grant

a. The grant hereby made of the Right-of-Way shall come to an end and expire on the 2nd day of May, 2004, at 12 noon, (Alaska Standard Time) unless prior thereto it is released, abandoned, or otherwise terminated pursuant to the provisions of this Lease or of any applicable law or regulation.

b. Upon the expiration of the initial or any subsequent grant of the Right-of-Way, or its earlier relinquishment, abandonment, or other termination, the provisions of this Lease, to the extent applicable, shall continue in effect and shall be binding on the parties hereto, their successors or assigns, until they have fully performed their respective obligations and liabilities accruing before or on account of the expiration, or the prior termination, of the grant.

c. The Commissioner shall renew the Lease for additional periods up to ten (10) years each, so long as the Pipeline is in commercial operation and the Lessees are in full compliance with State law, including but not limited to State law pertaining to regulation and taxation of the Pipeline.

d. Any subsequent conveyance, transfer or other disposition of any right, title, or interest in the State Land or any part thereof, burdened by and subservient to this Lease, shall, to the extent allowed by law, be subject to the Right-of-Way and the provisions of this Lease, including Lessees' right to renew the Lease under Subsection "c" of this section.

3. Rental

a. Lessees shall pay to the State, annually and in advance, the fair market rental value of the Right-of-Way based on the appraised fair market value of the land.

b. The initial charge for the first year's rental shall be One Hundred Forty-One Thousand Two Hundred Twenty-Five Dollars ($141,225.00); however, this amount shall be adjusted based on a formal appraisal conducted before January 1, 1975.

c. The annual rental payment is subject to adjustment at five-year intervals and charges or adjustments shall be the reappraised fair market rental value of the land.

d. Rental shall not be charged for any land acquired under AS 38.35.130 and conveyed without cost to the State.

e. For the year in which portions of the Right-of-Way are released to the State pursuant to Section 1, Subsection "d", paragraph (ii) hereof, the State shall credit Lessees against the payment of future rental for a portion of the rental paid to the State for that year, the amount of the credit to be the portion of rental paid for that year attributable to the lands so reconveyed to the State reduced pro rata by the portion of the lease year which had elapsed prior to the reconveyance.

4. Common Carrier

Each Lessee shall assume the status and perform all of its functions undertaken under the Lease as a common carrier and accept, convey and transport without discrimination, crude oil delivered to it for transportation from fields in the vicinity of the Pipeline subject to the Lease throughout its route, both on State Land obtained under the Lease and on other land; Lessee shall accept, convey and transport crude oil without unjust or unreasonable discrimination in favor of one producer or person, including itself, as against another,

but will take the crude oil delivered or offered, without unreasonable discrimination, that the Alaska Pipeline Commission shall, after a full hearing with due notice to the interested parties and a proper finding of facts, determine to be reasonable in the performance of its duties as a common carrier.

5. Interchange of Oil

Lessees agree to interchange crude oil with each like common carrier and provide connections and facilities for the interchange of crude oil at every locality reached by both pipelines when the necessity exists, subject to rates and regulations made by the appropriate State or federal regulatory agency.

6. Books, Accounts and Records; Access to Property and Records

a. Each Lessee shall maintain and preserve books, accounts and records and make those reports that the State may prescribe by regulation or law as necessary and appropriate for the purposes of administering AS 38.35. Each Lessee shall accord at all reasonable times to the State and its authorized agents and auditors the right of access to its property and records, of inspection of its property, and of examination and copying of such records.

b. Each Lessee agrees that it shall submit to the Commissioner or the Pipeline Coordinator, on request, any information or documents or other materials which are submitted to the Secretary of the Interior or to the Authorized Officer under the Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline between the United States and the Lessees and which are relevant to the enforcement of the rights of the State under this Lease.

7. Connections for Delivery

Lessees shall provide connections, as determined by the Alaska Pipeline Commission, under AS 42.06.340, to facilities on the Pipeline subject to the Lease, both on State Land and on other land in the State, for the purpose of delivering crude oil to persons (including the State and its political subdivisions) contracting for the purchase at wholesale of crude oil transported by the Pipeline when required by the public interest.

8. Connections for State-Owned Oil

Lessees shall, notwithstanding any other provisions, provide connections and interchange facilities at State expense at such places the State considers necessary, if the State determines to take a portion of its royalty or taxes in oil.

9. Compliance with State Laws and with Regulations and orders of the Alaska Pipeline Commission

Lessees shall construct and operate the Pipeline in accordance with applicable State laws and lawful regulations and orders of the Alaska Pipeline Commission.

10. Damage or Destruction of Leasehold or Other Property

Lessees shall, at their own expense, during the term of this Lease:

a. Maintain the leasehold and Pipeline in good repair;

b. Promptly repair or remedy any damage to the leasehold; and

c. Promptly compensate for any damage to or destruction of property for which the Lessees are liable resulting from damage to or destruction of the leasehold or Pipeline.

11. Transfer, Assignment, or other Disposition

a. Lessees shall not transfer, assign, or dispose of in any manner, directly or indirectly, or by transfer of control of the carrier corporation, their interest in this Lease, any rights under this Lease or the Pipeline subject to this Lease to any person other than another Owner of the Pipeline (including Subsidiaries, Parents and Affiliates of the Owners), except to the extent that the Commissioner, after consideration of the protection of the public interest (including whether the proposed transferee is fit, willing and able to perform the transportation or other acts proposed in a manner that will reasonably protect the lives, property and general welfare of the people of Alaska), authorizes. The Commissioner shall not unreasonably withhold his consent to the transfer, assignment or disposal.

b. A Lessee transferring in whole or in part its right, title and interest in the Right-of-Way and this Lease shall be released from its liabilities and obligations (accrued, contingent or otherwise) to the State under this Lease to the extent and limit that the transferee assumes unconditionally the performance and observance of each such liability and obligation; provided, that if such transferee is any person other than another Owner of the Pipeline, a Lessee and/or its guarantor or guarantors shall be released from its and/or their liabilities and obligations to the State under this Lease to the extent and limit assumed by the transferee in a transfer authorized by the Commissioner under Subsection "a" of this section.

12. Appointment of Agent for Service of Process

Lessees shall file with the Commissioner a written appointment of a named permanent resident of the State to be their registered agent in the State and to receive service of notices, regulations, decisions and orders of the Commissioner; if any Lessee fails to appoint an agent for service, service may be made upon that Lessee by posting a copy in the office of the Commissioner and filing a copy of it in the office of the Lieutenant Governor and by mailing a copy to the Lessee's last known address.

13. Indemnification of the State; Liabilities or Damages Arising where there is Concurrent Use

a. Lessees shall be liable to the State for liabilities, damages or injury incurred by the State caused by the construction, operation or maintenance of the Pipeline, and they shall indemnify the State for these liabilities, damages or injuries.

b. The party at fault shall be liable under the provisions of Article VIII, Section 8, of the Alaska Constitution for the payment of damages for injury arising from noncompliance with all terms and conditions governing concurrent use.

14. Liability and Property Damage Insurance, Security, Undertaking or Guaranty

a. Any lessee shall procure and furnish liability and property damage insurance from a company licensed to do business in the State, or furnish other security or undertaking upon the terms and conditions the Commissioner considers necessary if the Commissioner finds that the net assets of that Lessee are insufficient to protect the public from damage for which such Lessee may be liable arising out of the construction or operation of the Pipeline.

b. (i) If the Commissioner finds that the net assets of any of the Lessees are insufficient to protect the public from damage for which any of the Lessees may be liable arising out of the construction or operation of the Pipeline, the Commissioner may require such Lessee to deliver to the Commissioner a valid and unconditional guaranty of the full and timely payment of all liabilities and obligations of the Lessee to the State under or in connection with this Lease.

(ii) It is recognized that a proposed guarantor of a Lessee may be a corporation (or an individual stockholder thereof), a partnership (or an individual partner thereof), an association that is authorized and empowered to sue and be sued and to hold the title to property in its own name (or an

individual associate thereof), a joint stock company that is authorized and empowered to sue and be sued and to hold the title to property in its own name (or any individual participant therein), or a business trust (or any individual settlor thereof), and may or may not directly or indirectly own a legal or beneficial interest in the Lessee whose liabilities and obligations are sought to be guaranteed. In the case of multiple guarantors that are acceptable to the Commissioner, each shall be severally liable for only its proportionate share of any sum or payment covered by the guaranty.

(iii) Each guaranty shall be satisfactory to the Commissioner in all respects including, without limitation, the form and substance of the guaranty, the financial capability of a proposed guarantor, the availability of such guarantor to service of process, the availability of the assets of such guarantor with respect to the enforcement of judgments against the guarantor, and the number of guarantors that will be necessary to guarantee all of the liabilities and obligations which will be covered by a particular guaranty; provided, however, that the Commissioner shall not unreasonably withhold his approval with respect to a guaranty or guarantor.

(iv) The Commissioner shall have the right at any time, and from time to time, to require the substitution and delivery of a new form of guaranty in the event either that an outstanding guaranty is held to be invalid or unenforceable, in whole or in part, by a court of competent jurisdiction or that the controlling law is, by statute or judicial decision, so altered as to impair, prevent or nullify the enforcement or exercise of any right or option of the State under an outstanding guaranty; provided, however, that the outstanding guaranty (to the extent of its validity or enforceability, if any) shall continue in full force and effect with respect to any claim, suit, accrued liability or defense thereunder that exists at the time of substitution; provided, further, that the new form of guaranty, in each such case, shall be required as to all Lessees that at the time of substitution have delivered, or are required to deliver, a guaranty.

(v) Each guaranty shall be accompanied by such certificates and opinions of legal counsel as the Commissioner may require to establish its validity. The guaranty shall include an appointment of an agent for service of process that is satisfactory to the Commissioner.

15. Lands Condemned under AS 38.35.130

Any interest in land acquired under the provisions of AS 38.35.130 for the Pipeline will become part of the land leased to the Lessees under this Lease and the costs for the acquisition thereof shall be borne by the Lessees.

16. Construction Plans and Quality Assurance

a. Lessees shall submit construction (including design) plans, a quality assurance program, and other related documents as required by the Pipeline Coordinator for review and approval prior to the issuing of Notices to Proceed.

b. The quality assurance program shall be comprehensive and designed to assure that the environmental and technical stipulations in this Lease will be fully complied with throughout all phases of construction, operation, maintenance and termination of the Pipeline.

c. The following criteria shall be included in the quality assurance program, although Lessees are not limited to these criteria:

(i) Provide practicable and appropriate means and procedures, including contingency plans approved by the Pipeline Coordinator, for the prevention, detection and prompt abatement of any actual or potential condition that is susceptible to prevention or abatement by Lessees which arises out of, or could affect adversely, the construction, operation, maintenance or termination of all or any part of the Pipeline and which at any time may cause or threaten to cause (A) a hazard to the safety of workers or to public health or safety (including but not limited to personal injury or loss of life with respect to any Person or Persons) or (B) significant harm or damage to the environment (including but not limited to public or private property, whether real, personal or mixed, or areas of vegetation or timber, fish or other wildlife populations or their habitats, water quality, air quality or any other natural resource).

(ii) Provide practicable and appropriate means and procedures, including contingency plans approved by the Pipeline Coordinator, for the repair and replacement of substantially damaged tangible property and the rehabilitation of substantially damaged natural resources (including but not limited to revegetation, restocking fish or other wildlife populations and reestablishing their habitats, and restoring air and water quality) if the cause of the damage arises in connection with, or results from, the construction, operation, maintenance or termination of all or any part of the Pipeline.

(iii) Provide for practicable and appropriate component and systems quality through quality control management and planning, and inspection and test procedures approved by the Pipeline Coordinator.

(iv) Assure that the selection of Lessees' contractors, subcontractors, and contract purchases of materials and services are consistent with quality control procedures required by this section.

(v) Determine quality performance by conducting surveys and field inspections approved by the Pipeline Coordinator of all the facilities of Lessees' contractors and subcontractors.

(vi) Maintain quality determination records on all of the above procedures to ensure data identification and retrieval approved by the Pipeline Coordinator.

17. Reservation of Certain Rights to the State

a. The State reserves and shall have a continuing and reasonable right of access to any part of the lands (including the subsurface of, and the air space above, such lands) that are subject to this Lease, and a continuing and reasonable right of physical entry to any part of the Pipeline, for inspection or monitoring purposes and for any other purpose or reason that is reasonably consistent with any right or obligation of the State under any law or regulation, this Lease, or any other agreement, permit or authorization relating in whole or in part to all or any part of the Pipeline.

b. The right of access and entry reserved in Subsection "a" of this section shall extend to and be enjoyed by any contractor of the State, any subcontractors (at any tier) of the contractor and their respective agents and employees, as well as such other Persons as may be designated from time to time in writing by the Pipeline Coordinator.

c. The granting of this Lease is subject to the express condition that the exercise of the rights and privileges granted under this Lease will not unduly interfere with the management, administration, or disposal by the State of the land affected by this Lease, and that the Lessees agree and consent to the occupancy and use by the State, its grantees, permittees, or other lessees of any part of the Right-of-Way not actually occupied or required by the Pipeline for the full and safe utilization of the Pipeline, for necessary operations incident to land management, administration, or disposal.

d. Pursuant to AS 38.05.125, the State reserves rights as follows:

> "The party of the first part, Alaska, hereby expressly saves, excepts and reserves out of the grant hereby made, unto itself, its lessees, successors, and assigns forever, all oils, gases, coal, ores, minerals, fissionable materials, and fossils of every name, kind or description, and which may be in or upon said lands above described, or any part thereof, and the right to explore the same for such oils, gases, coal, ores, minerals, fissionable materials, and fossils, and it also hereby expressly saves and reserves out of the grant hereby made, unto itself, its lessees, successors, and assigns forever, the right to enter by itself, its or their agents, attorneys, and servants upon said lands, or any part or parts thereof, at any and all times, for the purpose of opening, developing, drilling, and working mines or wells on these or other lands and taking out and removing therefrom all such oils, gases, coal, ores, minerals, fissionable materials and fossils, and to that end it further expressly reserves out of the grant hereby made, unto itself, its lessees, successors, and assigns forever, the right by its or their agents, servants and attorneys at any and all times to erect, construct, maintain, and use all such buildings, machinery, roads, pipelines, powerlines, and railroads, sink such shafts, drill such wells, remove such soil, and to remain on said lands or any part thereof for the foregoing purposes and to occupy as much of said lands as may be necessary or convenient for such purposes hereby expressly reserving to itself, its lessees, successors, and assigns, as aforesaid, generally all rights and power in, to, and over said land, whether herein expressed or not, reasonably necessary or convenient to render beneficial and efficient the complete enjoyment of the property and rights hereby expressly reserved."

e. There is reserved to the State the right to grant additional permits or easements for rights-of-way or other uses to third parties for compatible uses on, or adjacent to, the lands subject to the Right-of-Way. Before the State grants an additional right-of-way permit for a compatible use, the State will notify Lessees of its intentions and

shall consult with Lessees before taking final action in that regard.

f. No rights shall be exercised by the State under this section until it complies with the provisions of AS 38.05.130.

18. Reimbursement of State Expenses

a. Lessees shall reimburse the State for all reasonable costs incurred by the State in monitoring construction (including but not limited to design review) and termination of all or any part of the pipeline system. The Commissioner shall administer this lease to reasonably assure that unnecessary employment of personnel and neeedless expenditure of funds are avoided.

b. Reimbursement provided for in this section and in Section 19 hereof shall be made for each quarter ending on the last day of March, June, September and December. On or before the sixtieth (60th) day after the close of each quarter, the Commissioner shall submit to Lessees a written statement of any costs incurred by the State during that quarter which are reimbursable. This statement may be supplemented within sixty (60) days after the end of a fiscal year for costs incurred in that year but by excusable neglect not previously submitted.

c. Lessees shall have the right to conduct, at their own expense, reasonable audits by auditors or accountants designated by Lessees, of the books, records and documents of the State relating to the items on any particular statement that shall be submitted in accordance with the procedure outlined in Subsection "b" of this section, at the places where such books, records and documents are usually maintained and at reasonable times; provided, however, that written notice of a desire to conduct such an audit must be given to the Commissioner (1) at least fifteen (15) days prior to such audit, and (2) by not later than the seventy-fifth (75th) day after the close of the quarter for which the books, records and documents are sought to be audited; and provided, further, that any such audits shall be completed within ninety (90) days after receipt by Lessees of the statement containing the items to be audited.

d. Nothing herein shall require the State to maintain books, records or documents other than those usually maintained by it, provided such books, records and documents reasonably segregate and identify the costs for which reimbursement is required by this section. Such books, records and documents shall be preserved or caused to be preserved for a period of at least two (2) years after the State submits a statement for reimbursement based on such books, records and documents. The auditors or accountants designated by Lessees shall have

reasonable access to, and the right to copy, at their expense, all such books, records and documents.

e. Lessees shall pay to the State the total amount shown on each statement by not later than the ninetieth (90th) day following the close of the quarter to which the statement relates; provided, however, that if any of the Lessees decide to dispute any item of a statement for reimbursement, Lessees, on or before the date on which the statement is due and payable, shall give the Commissioner written notice of each item that is disputed, accompanied by a detailed explanation of their objection, or written notice of each item to be audited, and shall pay the State those amounts for the items that are not disputed or are not to be audited. Lessees shall give the Commissioner prompt written notice of the completion of the audit of all items of a statement being audited. On a date fixed by the Commissioner, but not more than thirty (30) days after notice of a disputed statement or after notice of the completion of the audit, the Commissioner and the Lessees shall meet to discuss and attempt to resolve, all items which are disputed or which have not been resolved by the audit. Any items resolved as being payable to the State shall be paid within thirty (30) days after being resolved, together with interest thereon, up to the date of payment at a total annual percentage rate equal to the discount rate of the Federal Reserve Bank for District Twelve (San Francisco) in effect on the original due date of the statement.

f. In addition to the right to audit quarterly statements as provided in Subsection "c" of this section, if Lessees believe that unnecessary employment of personnel or needless expenditure of funds has occurred or is likely to occur, Lessees may request the approval of the Commissioner for Lessees to conduct promptly, and at their own expense, a full and complete audit by auditors or accountants designated by Lessees, of the books, records and documents concerning the matters to be audited, at the places where the books, records and documents to be audited are usually maintained and at reasonable times. Such request shall be in writing, shall specify the matters to be audited and shall state the information available to Lessees upon which the request is based. The Commissioner shall approve or deny such request promptly, and approval of any such request shall not be unreasonably withheld. Any complaint which Lessees may have as a result of such audit shall be made to the Commissioner and shall be governed by the procedure set forth in Subsection "e" of this section to the extent applicable.

19. Right of the State to Perform

a. If, after thirty (30) days, or in emergencies such shorter periods as shall not be unreasonable, following the making of a demand therefor by the Commissioner in the manner that is provided in Stipulation 1.6 for giving written

notices, Lessees, or their respective agents, employees, contractors or subcontractors (at any tier), shall fail or refuse to perform any action required by this Lease or by the Pipeline Coordinator under this Lease, the State shall have the right, but not the obligation, to perform any or all of such actions at the sole expense of Lessees. Prior to delivery of any such demand, the Pipeline Coordinator shall confer with the Lessees, if practicable to do so, regarding the required action or actions that are included in the demand. The Pipeline Coordinator shall submit to Lessees a statement of the expenses incurred by the State during the preceding quarter in the performance by the State of any required action and the amount shown to be due on each such statement shall be paid by Lessees. Lessees may dispute whether the work involved was justified and the reasonableness of the specifications for, and the cost of, such work.

20. Breach; Extent of Liability of Lessees

The liabilities and obligations of each Lessee under this Lease are joint and several, except that the liabilities and obligations of each Lessee are several under the following sections:

Section 1 Grant of Right-of-Way

2 Duration of Right-of-Way

3 Rental

4 Common Carrier

5 Interchange of Oil

6 Books, Accounts and Records; Access to Property and Records

7 Connections for Delivery

8 Connections for State-Owned Oil

9 Compliance with State Laws and with Regulations and Orders of the Alaska Pipeline Commission

10 Damage or Destruction of Leasehold or Other Property

11 Transfer, Assignment, or other Disposition

12 Appointment of Agent for Service of Process

13 Indemnification of the State; Liabilities or Damages Arising where there is Concurrent Use

14 Liability and Property Damage Insurance, Security, Undertaking or Guaranty

15 Lands Condemned under AS 38.35.130

18 Reimbursement of State Expenses

19 Right of the State to Perform

22 Duty of Lessees to Prevent or Abate

28 Local Hire

29 Release of Right-of-Way

30 Forfeiture of Lease

31 Agreements among Lessees

35 Remedies Cumulative; Equitable Relief

39 Authority to Enter Agreements

42 Binding Effect of Covenants

Stipulation 1.4

Stipulation 1.10.1

Provided, however, that as to any obligation to pay money to the State, each Lessee shall not be liable for any greater portion thereof than the amount of the total liability multiplied times the percentage of its undivided interest in the Right-of-Way at the times the liability was incurred.

21. Valdez Terminal Facility

Lessees shall afford representatives of the United States Department of the Interior full and free access at all times to the Valdez Terminal site for the purpose of enforcing the stipulations of the United States Department of the Interior at the facility.

22. Duty of Lessees to Prevent or Abate

a. Lessees shall prevent or, if the procedure, activity, event or condition already exists or has occurred, shall abate, as completely as practicable, using the best practicable technology available, any physical or mechanical procedure, activity, event or condition, existing or occurring at any time (1) that is susceptible to prevention or abatement;

(2) that arises out of, or could affect adversely, the construction, operation, maintenance or termination of all or any part of the Pipeline; and (3) that causes or threatens to cause (a) a hazard to the safety of workers or to the public health or safety (including but not limited to personal injury or loss of life with respect to any Person or Persons) or (b) serious harm or damage to the environment (including but not limited to water and air quality, areas of vegetation or timber, fish or other wildlife populations, or their habitats, or any other natural resource).

b. Lessees shall cause their respective agents, employees, contractors and subcontractors (at any tier) to observe and comply with the foregoing provisions of this section.

23. Compliance with Notices to Proceed

All construction of the Pipeline on State Land undertaken by Lessees shall comply in all respects with the provisions of Notices to Proceed that are issued by the Pipeline Coordinator.

24. Temporary Suspension Orders of the Pipeline Coordinator

a. The Pipeline Coordinator may at any time order the temporary suspension of any or all construction, operation, maintenance or termination activities of Lessees, their agents, employees, contractors or subcontractors (at any tier) in connection with the Pipeline, including but not limited to the transportation of Oil, if

(i) An immediate temporary suspension of such activities is necessary to protect (A) public health or safety (including, but not limited to, personal injury or loss of life with respect to any Person or Persons), or (B) the environment from immediate, serious and irreparable harm or damage (including, but not limited to, harm or damage to water and air quality, areas of vegetation or timber, fish or other wildlife populations, or their habitats, or any other natural resource); or

(ii) Lessees, their respective agents, employees, contractors or subcontractors (at any tier) are failing or refusing, or have failed or refused, to comply with or observe (A) any provision of this Lease necessary to protect public health, safety or the environment, or (B) any order of the Pipeline Coordinator implementing any such

provisions of this Lease or of any agreement, permit or authorization that shall have been duly approved, issued or granted by the Pipeline Coordinator in connection with all or any part of the Pipeline.

b. The Pipeline Coordinator shall give Lessees prior notice of any temporary suspension order as he deems practicable. If circumstances permit, the Pipeline Coordinator shall discuss with Lessees, prior to issuing the order, appropriate measures to (i) forthwith abate or avoid the harm or threatened harm that is the reason for the issuance of the order or (ii) effect compliance with the provision or order, whichever is applicable.

c. After a temporary suspension order has been given by the Pipeline Coordinator, Lessees shall promptly comply with all of the provisions of the order and shall not resume any activity suspended or curtailed thereby except as provided in this Lease or pursuant to court order.

d. Any temporary suspension order which, in an emergency, is given orally shall be confirmed in writing, as provided for in Stipulation 1.6.2. Each written order or written confirmation of an order shall set forth the reasons for the suspension. Each temporary suspension order shall be limited, insofar as is practicable, to the particular area or activity that is or may be affected by the activities or conditions that are the basis of the order. Each order shall be effective as of the date and time given, unless it specifies otherwise. Each order shall remain in full force and effect until modified or revoked in writing by the Pipeline Coordinator.

e. Resumption of any suspended activity shall be promptly authorized by the Pipeline Coordinator in writing when he is satisfied that (i) the harm or threatened harm has been abated or remedied, or (ii) Lessees have effected, or are ready, willing and able to effect compliance with the provision or order, whichever is applicable.

f. Any temporary suspension order that is given or issued in accordance with this section shall be subject to the provisions of Section 25.

25. Appeal Procedure

a. Appeals from Temporary Suspension Orders of Pipeline Coordinator; Appeals from Denials of Resumption of Suspended Activities:

(i) Lessees may appeal directly to the Commissioner for review of (A) any temporary suspension order issued by the Pipeline Coordinator pursuant to Section 24 of this Lease; and (B) any denial

by the Pipeline Coordinator of a request for resumption of activities suspended pursuant to such temporary suspension order. Lessees shall file a notice of appeal for review promptly after the effective date of the order or denial being appealed. The notice shall set forth with particularity the order or denial being appealed. To perfect an appeal, Lessees shall promptly file with the Commissioner a statement of facts of the matter and a statement of applicable law supplemented by such documents and arguments on the facts and the law as Lessees may wish to present to justify modification or reversal of the order or denial. All statements of facts shall be under oath.

(ii) Except as provided hereinafer in this section, the Commissioner shall decide the appeal within three (3) days from the date the Commissioner receives notice from Lessees that all statements for review have been submitted. If the Commissioner does not render a decision within that time, the appeal shall be considered to have been denied by the Commissioner, and such denial shall constitute the final administrative decision of the Commissioner.

(iii) Any decisions of the Commissioner as to any matter arising out of this Lease shall constitute the final administrative decision of the Commissioner.

b. Appeals with Respect to Notices to Proceed:

(i) Lessees may appeal to the Commissioner if, with respect to a particular application for a Notice to Proceed (A) the Pipeline Coordinator has refused to issue the Notice to Proceed within the time prescribed pursuant to Stipulation 1.7.4.4; or (B) the Pipeline Coordinator has issued a Notice to Proceed not substantially in accord with the application therefor. If the Pipeline Coordinator has not acted within the prescribed time to either issue or deny the issuance of the Notice to Proceed, such failure to act shall be deemed to be a refusal by the Pipeline Coordinator to issue the Notice to Proceed.

(ii) The ground or grounds for such an appeal shall be one or more of the following:

(A) The Pipeline Coordinator has construed the applicable Stipulations erroneously; or

(B) The Pipeline Coordinator has imposed arbitrary and capricious requirements to enforce the Stipulations; or

(C) Lessees have made a bona fide effort to meet the requirements of the Pipeline Coordinator, but with the best practicable technology available, are unable to comply; or

(D) By failing to act upon the requested Notice to Proceed within the prescribed time, the Pipeline Coordinator has been unreasonable.

(iii) Each appeal under this subsection shall be subject to the appeal procedure set forth in Subsection "a" of this section.

c. As to any other matter relating to construction upon which a decision of the Commissioner is required under this Lease, the failure of the Commissioner to render a decision within three (3) days after receiving a request for a decision from the Lessees shall constitute a denial of that request and shall constitute the final administrative decision of the Commissioner.

d. As to matters not covered by Subsections "a," "b" and "c" of this section upon which a decision of the Commissioner is required under this Lease, the failure of the Commissioner to reach a decision within thirty (30) days after receiving a request for a decision from the Lessees shall constitute a denial of that request and shall constitute the final administrative decision of the Commissioner.

26. Requests to Resume; Appeals

a. If by a temporary suspension order issued pursuant to Section 24 of this Lease, the Pipeline Coordinator has ordered the suspension of an activity of Lessees, Lessees may at any time thereafter file with the Pipeline Coordinator a request for permission to resume that activity on the ground that the reason for the suspension no longer exists. The request shall contain a statement, under oath, of the facts which in Lessees' view support the propriety of resumption.

b. The Pipeline Coordinator shall render a decision, either granting or denying the request, within three (3) days

of the date that the request was filed with him. If the Pipeline Coordinator does not render a decision within that time, the request shall be considered denied and the Lessees may appeal to the Commissioner as provided in Section 25.

27. Liability of the State

Lessees agree that neither the State nor any of its officials, employees, agents or contractors shall be liable for money damages for any loss caused to Lessees, their agents or contractors, by reason of decisions made in respect to the application and administration of this Lease; provided, however, this Lease shall not be interpreted to excuse the State, its officials, employees, agents or contractors from liability for damages or injuries resulting from other acts which are acts of negligence or acts of willful misconduct.

28. Local Hire

Lessees shall comply with all valid and applicable laws and regulations with regard to hire of Alaska residents. Qualified Alaska residents shall be hired as required by AS 38.40; Lessees shall not discriminate against Alaska residents, as prohibited by AS 38.40 and other applicable and valid laws and regulations of the State of Alaska. All valid and appropriate provisions of AS 38.40 are incorporated by reference into this Lease.

29. Release of Right-of-Way

a. In connection with the relinquishment, abandonment or other termination before the expiration of the grant of the Right-of-Way, of any right or interest in the Right-of-Way, and/or in the use of all or any part of the lands subject to the Right-of-Way, each Lessee holding such right or interest shall promptly execute and deliver to the State, through the Commissioner, a valid instrument of release in recordable form, which shall be executed and acknowledged with the same formalities as a deed. The instrument of release shall contain, among other things, appropriate recitals, a description of the pertinent rights and interests, and for the benefit of the State and its grantees or assigns, express representations and warranties by the Lessees that they are the sole owners and holders of the rights or interests described therein and that such rights or interests are free and clear of all liens, equities or claims of any kind requiring or that may require the consent of a third party, claiming in whole or in part by, through or under the Lessees, for the valid release or extinguishment thereof, except for such that are owned or claimed by third parties which have joined in the execution of the release. The form and substantive content of each instrument of release shall be approved by the Commissioner, but except as otherwise expressly provided for in this subsection, in no event shall any such instrument operate to increase the then-existing liabilities and obligations of the Lessees furnishing the release.

b. Each release shall be accompanied by such resolutions and certifications as the Commissioner may require in connection with the power or the authority of the Lessees, or of any officer or agent acting on their behalf, to execute, acknowledge or deliver the release.

c. Neither the tender, nor the tender, approval and acceptance, of any such release shall operate as an estoppel or waiver of any claim or judgment against a Lessee or as a relief or discharge, in whole or in part, of any Lessee from any of its then-existing liabilities or obligations (accrued, contingent or otherwise); and notwithstanding any such tender or delivery, or any approval of the Commissioner, if a release shall contain any provision that operates, or that by implication might operate, to discharge or relieve, in whole or in part, a Lessee of and from any of its liabilities or obligations (accrued, contingent or otherwise) or that operates or might operate as an estoppel or waiver of any claim or judgment against a Lessee or as a covenant not to sue, such provision shall be, and shall be deemed to be, void and of no effect whatsoever insofar as it would have the effect of so discharging or relieving a Lessee or operating as an estoppel, waiver or covenant not to sue.

30. Forfeiture of Lease

Failure to begin construction of the Pipeline within a reasonable time of the granting of this Lease for reasons within the control of the Lessee or failure of a Lessee of an interest in the Right-of-Way substantially to comply with the terms of the Lease shall be grounds for forfeiture of the Right-of-Way interest of the Lessee in an action brought by the Commissioner in the Superior Court. Before the commencement of an action for forfeiture of an interest in the Right-of-Way under this section, the Commissioner shall give the Lessee or Owner of the interest notice in writing of the alleged default and shall not commence the proceeding unless the Lessee of the interest has failed to initiate good faith efforts to cure the default within 60 days of the notice of the alleged default.

31. Agreements Among Lessees

a. The Original Lessees, and each of them, represent and covenant with the State that they have entered into only the following agreements, and no other agreements, written or oral (excluding prior agreements that no longer have any force or effect), which establish each Original Lessee's interest in the Pipeline and each Original Lessee's relationships with the common agent, as referred to in Stipulation 1.4, for all or any phase of the construction, operation, maintenance and termination of the Pipeline or any part thereof:

(i) Agreement entitled "Trans-Alaska Pipeline System Agreement", dated as of August 27, 1970, by and among Atlantic Pipe Line Company*, BP Pipe Line Corporation*, Humble Pipe Line Company*, Amerada Hess Corporation, Home Pipe Line Company, Mobil Pipe Line Company, Phillips Petroleum Company, and Union Oil Company of California, with Exhibit "C," entitled "Enabling Agreement," annexed thereto;

(ii) Agreement entitled "First Supplemental Agreement," dated as of August 27, 1970, by the same parties;

(iii) Agreement entitled "Second Supplemental Agreement," dated as of August 27, 1970, by the same parties;

(iv) Agreement entitled "Third Supplemental Agreement," dated as of August 27, 1970, by the same parties;

(v) Agreement entitled "Fourth Supplemental Agreement," dated as of August 27, 1970, by the same parties;

(vi) Agreement entitled "Fifth Supplemental Agreement," dated as of August 27, 1970, by the same parties;

(vii) Agreement entitled "Agreement for the Design and Construction of the Trans-Alaska Pipeline System," dated as of August 27, 1970, by and among Atlantic Pipe Line Company, BP Pipe Line Corporation, Humble Pipe Line Company, Amerada Hess Corporation, Home Pipe Line Company, Mobil Pipe Line Company, Phillips Petroleum Company, Union Oil Company of California, and Alyeska Pipeline Service Company;

(viii) Agreement entitled "Shareholders Agreement for Alyeska Pipeline Service Company," dated as of August 27, 1970, by the same parties as those listed with respect to the Agreement referred to immediately above;

(ix) Assignment, Assumption, Release and Consent Agreement, dated as of August 28, 1970, in connection with the transfer by Home Pipe Line Company of all of its rights, title and interest in the Pipeline System and in the foregoing agreements, and as a shareholder in and to Alyeska Pipeline Service Company;

*Note: ARCO Pipe Line Company, a Delaware corporation, represents and covenants that it is the successor by merger to all of the rights and obligations of Atlantic Pipe Line Company. Sohio Pipe Line Company, a Delaware corporation, represents and covenants that it is the successor by merger to all of the rights and obligations of BP Pipe Line Corporation. Exxon Pipeline Company, a Delaware corporation, represents and covenants that it is the same corporation as Humble Pipe Line Company, but that its name has been duly changed to "Exxon Pipeline Company."

(x) Assignment, Conveyance, and Transfer Agreement, dated December 11, 1973, in connection with the transfer by Mobil Pipe Line Company to Mobil Alaska Pipeline Company, a Delaware corporation, of all of the former company's rights under all agreements relating to the Trans-Alaska Pipeline System, to which the former company is a party, and all real or personal property in which the former company may have acquired an ownership interest pursuant to such agreements, and under which Assignment, Conveyance, and Transfer Agreement Mobil Alaska Pipeline Company assumes all undischarged obligations of Mobil Pipe Line Company under any and all of the above mentioned Trans-Alaska Pipeline System agreements, together with certain supporting documents, each dated December 11, 1973; and

(xi) Assignment, Conveyance, and Transfer Agreement, dated January 8, 1974, in connection with the transfer by Union Oil Company of California to Union Alaska Pipeline Company, a California corporation, of all of the former company's rights under all agreements relating to the Trans-Alaska Pipeline System to which the former company is a party, and all real or personal property in which the former company may have acquired an ownership interest pursuant to such agreements, and under which Assignment, Conveyance and Transfer Agreement Union Alaska Pipeline Company assumes all undischarged obligations of Union Oil Company of California under any and all of the above mentioned Trans-Alaska Pipeline System agreements.

b. Said agreements are referred to collectively as the "Ownership Agreements." Each affected Lessee shall deliver promptly to the Commissioner true and correct copies of all modifications of the Ownership Agreements and of all instruments superseding, supplementing, cancelling or rescinding, in whole or in part, any one or more of the Ownership Agreements.

c. In the event Lessees execute an Operating Agreement, as contemplated in Section 5.1 of the Agreement described in Subsection "a"(i) above in this section, or any like or similar agreement with respect to the operation, maintenance or termination of all or any part of the Pipeline, Lessees shall promptly provide the Commissioner with a true and complete copy thereof, together with like copies of all modifications of, and all agreements superseding, supplementing, cancelling or rescinding, in whole or in part, the Operating Agreement or any such like or similar agreement.

32. Rights of Third Parties

The parties hereto do not intend to create any rights under this Lease that may be enforced by third parties for their own benefit or for the benefit of others.

33. Covenants Independent

Each covenant contained in this Lease is, and shall be deemed to be, separate and independent of, and not dependent on, any other covenant contained in this Lease.

34. Waiver not Continuing

The waiver by any party hereto of any breach of any provision of this Lease by any other party hereto, whether such waiver be expressed or implied, shall not be construed to be a continuing waiver or a waiver of, or consent to, any subsequent or prior breach on the part of such other party, of the same or any other provision of this Lease.

35. Remedies Cumulative; Equitable Relief

No remedy conferred by this Lease upon or reserved to the State or the Lessees is intended to be exclusive of any other remedy provided for by this Lease or by law, but each shall be cumulative and shall be in addition to every other remedy given hereunder or now or hereafter existing in equity or at law; and the State, in a proper action instituted by it, may seek a decree against a Lessee or Lessees for specific performance and injunctive or other equitable relief, as may be appropriate.

36. Section Headings

The section headings in this Lease are for convenience only, and do not purport to, and shall not be deemed to, define, limit or extend the scope or intent of the section to which they pertain.

37. Interpretation of Lease

The applicable law of the State will be used in resolving questions of interpretation of the Lease.

38. Multiple Copies

This Lease shall be executed in eight (8) counterparts, each of which shall be an original, but all of which shall constitute one and the same instrument.

39. Authority to Enter Agreement

Each Lessee represents and warrants to the State that (a) it is duly authorized and empowered under the applicable laws of the state of its incorporation and by its charter and by-laws to enter into and perform this Lease in accordance with the provisions hereof; (b) its board of directors or duly authorized executive committee has duly approved and has duly authorized the execution, delivery and performance of this Lease insofar as it pertains to the obligations of that Lessee; (c) all corporate and shareholder action that may be necessary or incidental to the approval of this Lease, and the due execution and delivery hereof by Lessee, has been taken; and (d) that all of the foregoing approvals, authorizations and actions are in full force and effect at the time of the execution and delivery hereof.

40. Exhibits; Incorporation of Certain Documents by Reference; Other Exhibits

a. The exhibits that are attached to this Lease and that are listed below in this subsection are, by this reference, incorporated into and made a part of this Lease as if the exhibits were set forth herein in their entirety:

(i) Stipulations for the Right-of-Way Lease for the Trans-Alaska Pipeline, being numbered 1 through 4.1, inclusive, attached hereto as Exhibit "A," which are sometimes referred to in this Lease as the "Stipulations." These provisions are included pursuant to the provisions of AS 38.35.120(d) which require terms and conditions that are reasonably necessary to obligate the Lessees, to the extent reasonably practicable, to (A) prevent conflicts with other existing uses of the land involving a superior public interest; (B) protect State and private property interests; (C) prevent any significant adverse environmental impact, including but not limited to the erosion of the surface of the land, and damage to fish and wildlife and their habitat; (D) restore and revegetate during the term and at termination of this Lease; and (E) protect the interests of individuals living in the general area of the Right-of-Way who rely on fish, wildlife and biotic resources of the area for subsistence purposes.

(ii) A reference to the application for a right-of-way and a reference to the accompanying alignment maps and site location drawings for the Pipeline attached hereto as Exhibit "B."

(iii) A description of the State Land included in the General Route attached hereto as Exhibit "C."

(iv) A description of the Right-of-Way, including all relevant dimensions, for Related Facilities attached hereto as Exhibit "D."

b. The exhibits that are attached to this Lease that are listed below in this subsection are not incorporated into, and are not intended to be made a part of, this Lease. They are attached hereto only for informational purposes:

(i) Cooperative Agreement between the State of Alaska and the United States Department of Interior regarding the Proposed Trans-Alaska Pipeline attached hereto as Exhibit "E."

(ii) Documents delegating certain responsibilities and authority of the Commissioner of Natural Resources to a Pipeline Coordinator attached hereto as Exhibit "F."

41. Lease Not a Waiver of Any State Regulatory Power

This Lease and the covenants contained herein shall not be interpreted as a limit on the exercise by the State of Alaska of any power conferred by valid statute or regulation to protect the environment, health, safety, general welfare, lives, or property of the people of the State of Alaska.

42. Binding Effect of Covenants

The parties acknowledge that all covenants of this Lease are required by the Commissioner. By entering into this Lease, each Lessee is bound by such covenants to the full extent of the power of the State to impose the covenants under its authority as owner of the land herein leased or under its police or regulatory powers or otherwise; provided that the rights of any or all Lessees to challenge the power of the State to require any of these covenants as owner of the land herein leased or under its police or regulatory powers or otherwise is preserved until such time as action to enforce the covenant is taken by the State. Before commencing any such action the Commissioner shall give all Lessees written notice of intent to enforce, and he shall not commence enforcement proceedings unless Lessees have failed to initiate good faith efforts to comply with the notice within thirty (30) days of said notice. Compliance with any covenant or with any such notice by any or all Lessees, shall not constitute a waiver of its or their rights to challenge, from time to time, the power of the State to require or to enforce the same or any other covenant in any subsequent action to enforce taken by the State. A judicial finding that any of these covenants is

unlawful or invalid shall not operate to invalidate this Lease or any other covenant of the Lease.

IN WITNESS WHEREOF, the parties hereto have duly executed this Lease as of the date first above written.

STATE OF ALASKA

By: _____
Commissioner, Department
of Natural Resources

AMERADA HESS CORPORATION

_____
SENIOR

ARCO PIPE LINE COMPANY

_____

EXXON PIPELINE COMPANY

_____
PRESIDENT

MOBIL ALASKA PIPELINE COMPANY

_____
E. J. WACKER, JR. Vice President

PHILLIPS PETROLEUM COMPANY

_____

SOHIO PIPE LINE COMPANY

_____
President

UNION ALASKA PIPELINE COMPANY

_____
PRESIDENT

Alaska Statutes

Title 31. Oil and Gas.

Chapter

Revisor's notes. — The provisions of this title were redrafted in 1985 to remove personal pronouns pursuant to § 4, ch. 58, SLA 1982, and to make other, minor word changes.

Chapter 05. Alaska Oil and Gas Conservation Act

Article

Revisor's notes. — Under sec. 5, ch. 158, SLA 1978, references in this chapter to the Department of Natural Resources have been changed to Alaska Oil and Gas Conservation Commission, except in AS 31.05.026.

Opinions of attorney general. — This chapter, which mandates the conservation of oil and gas and prohibits their waste, would not be contravened by a local coastal management plan which comports with the Alaska Coastal Management Program. May 12, 1980, Op. Att'y Gen.

Article 1. Administration.

Section

Sec. 31.05.005. Alaska Oil and Gas Conservation Commission created. (a) There is created as an independent quasi-judicial agency of the state the Alaska Oil and Gas Conservation Commission, composed of three commissioners appointed by the governor and confirmed by the legislature in joint session.

(b) The governor shall designate one member of the commission as chairman of the commission. This member shall serve as chairman for a term of four years, but may be appointed for successive terms. (§ 1 ch 158 SLA 1978)

SEE Chpt. 168 SLA 1990

Sec. 31.05.007. Term of office; vacancy; removal. (a) The term of office of each member is six years. ~~The governor shall designate who among the initial appointees shall serve respectively for terms of two years, four years and six years~~. A commissioner, upon the expiration of a term, shall continue to hold office until a successor is appointed and qualified.

(b) A vacancy arising in the office of a commissioner shall be filled by appointment by the governor and confirmed by the legislature in joint session, and an appointee selected to fill a vacancy shall hold office for the balance of the full term for which the predecessor on the commission was appointed.

(c) A vacancy in the commission does not impair the authority of a quorum of commissioners to exercise all the powers and perform all the duties of the commission.

(d) The governor may remove a commissioner from office for cause including but not limited to incompetence, neglect of duty or misconduct in office. A commissioner, to be removed for cause, shall be given a copy of the charges and afforded an opportunity to be publicly heard in person or by counsel in the commissioner's own defense upon not less than 10 days' notice. If a commissioner is removed for cause, the governor shall file with the lieutenant governor a complete statement of all charges made against the commissioner and the governor's finding based on the charges, together with a complete record of the proceedings. (§ 1 ch 158 SLA 1978)

Sec. 31.05.009. Qualifications of members. Members shall be qualified as follows: one member shall be a licensed professional engineer with educational and professional background in the field of petroleum engineering; one member shall be a geologist with educational and professional background in the field of petroleum geology; one member need not be trained and experienced in the fields of petroleum engineering or petroleum geology. (§ 1 ch 158 SLA 1978)

Sec. 31.05.010. Application. [Repealed, § 4 ch 158 SLA 1978.]

Sec. 31.05.011. Quorum. Two members of the commission constitute a quorum for the transaction of business, for the performance of a duty, or for the exercise of a power of the commission. (§ 1 ch 158 SLA 1978)

Sec. 31.05.013. Oath of office. Each commissioner, before entering upon the duties of office, shall take and subscribe to the oath prescribed for principal officers of the state. (§ 1 ch 158 SLA 1978)

Sec. 31.05.015. Compensation of members of the commission. Members of the commission are in the exempt service and shall receive an annual salary. (§ 1 ch 158 SLA 1978)

Sec. 31.05.017. Principal office; seal. (a) The commission shall establish a principal office and branch offices necessary to discharge its business efficiently. For the convenience of the public or of parties to a proceeding the commission may hold meetings, hearings or other proceedings at other locations.

(b) The commission shall have an official seal. (§ 1 ch 158 SLA 1978)

Sec. 31.05.020. [Renumbered as AS 31.05.095.]

Sec. 31.05.021. Legal counsel. (a) The Department of Law shall provide full-time legal counsel to the commission. The legal counsel provided by the Department of Law is subject to the approval of the commission.

(b) The commission may, subject to the approval of the attorney general, contract for the services of additional specialized legal counsel or legal consultants. (§ 1 ch 158 SLA 1978)

Sec. 31.05.023. Commission staff. (a) The commission shall employ such staff as it considers necessary to carry out its responsibilities.

(b) The professional staff of the commission and the personal secretary of each commissioner are in the exempt service under AS 39.25.110.

(c) The secretarial and clerical staff of the commission, except the personal secretary of each commissioner, are in the classified service.

(d) In addition to its staff of regular employees, the commission may contract for and engage the services of consultants and experts the commission considers necessary. (§ 1 ch 158 SLA 1978)

Sec. 31.05.025. Conflict of interest. (a) Members and employees of the commission, except clerical and secretarial staff, are subject to AS 39.50.

(b) A member of the commission is disqualified from voting upon any matter before the commission in which the member has a conflict of interest. (§ 1 ch 158 SLA 1978)

Sec. 31.05.026. Relationship to Department of Natural Resources. (a) The Department of Natural Resources shall have standing before the commission to raise all issues relating to state-owned land without regard to the type of proprietary interest held by the state in that land.

(b) With respect to federal land from which the state or any subdivision of the state is entitled under federal law to receive a share of the federal royalty interest, the Department of Natural Resources shall have the same standing before the commission as if it were the holder of the equivalent royalty interest.

(c) When both the Department of Natural Resources and the commission have the authority to require, and do require, the submission of substantially the same information from persons subject to this chapter, the commission, in order to alleviate the administrative burdens placed on those persons, may by regulation enter into an agreement with the Department of Natural Resources whereby either the commission or the Department of Natural Resources shall have the responsibility to collect the information lawfully required by both.

(d) For budget and audit procedures and considerations, the commission shall have the same standing as any other major state agency. Whenever practicable the commission may enter into state interagency agreements concerning administrative, employee relations, and fiscal duties.

(e) The Department of Natural Resources shall have the same standing (no more or less) before the commission as granted by law to any other proprietary interest. (§ 1 ch 158 SLA 1978)

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Sec. 31.05.027. Land subject to commission's authority. The authority of the commission applies to all land in the state lawfully subject to its police powers. It applies to land of the United States or to land subject to the jurisdiction of the United States only to the extent that control and supervision of conservation of oil and gas and prevention of waste by the United States on its land fails to carry out the intent and purposes of this chapter, and otherwise applies to federal land so far as an officer of the United States having jurisdiction, or an authorized representative, shall approve any of the provisions of this chapter or orders of the commission which affect

~~land. The authority of the commission further applies to all land included in a voluntary cooperative or unit plan of development or operation entered into in accordance with AS 38.05.180(p).~~ (§ 1 ch 158 ~~SLA 1978~~; am § 32 ch 94 SLA 1980)

Sec. 31.05.030. Powers and duties of commission. (a) The commission has jurisdiction and authority over all persons and property, public and private, necessary to carry out the purposes and intent of this chapter.

(b) The commission shall investigate to determine whether or not waste exists or is imminent, or whether or not other facts exist which justify or require action by it.

(c) The commission shall adopt regulations and orders and take other appropriate action to carry out the purposes of this chapter.

(d) The commission may require

(1) identification of ownership of wells, producing leases, tanks, plants and drilling structures;

(2) the making and filing of reports, well logs. drilling logs, electric logs, lithologic logs, directional surveys, and all other subsurface information on a well drilled for oil or gas, or for the discovery of oil or gas, or for geologic information, and the required reports and information shall be filed within 30 days after the completion, abandonment, or suspension of the well;

(3) the drilling, casing and plugging of wells in a manner that will prevent the escape of oil or gas out of one stratum into another, the intrusion of water into an oil or gas stratum, the pollution of fresh water supplies by oil, gas or salt water, and prevent blowouts, cavings, seepages and fires;

(4) the furnishing of a reasonable bond with sufficient surety conditions for the performance of the duty to plug each dry or abandoned well or the repair of wells causing waste;

(5) the operation of wells with efficient gas-oil and water-oil ratios, and may fix these ratios;

(6) the gauging or other measuring of oil and gas to determine the quality and quantity of oil and gas;

(7) every person who produces oil or gas in the state to keep and maintain for a period of five years in the state complete and accurate records of the quantities of oil and gas produced, which shall be available for examination by the Department of Natural Resources or its agents at all reasonable times;

(8) the measuring and monitoring of oil and gas pool pressures;

(9) the filing and approval of a plan of development and operation for a field or pool in order to prevent waste, insure a greater ultimate recovery of oil and gas, and protect the correlative rights of persons owning interests in the tracts of land affected.

(e) The commission may regulate, for conservation purposes

(1) the drilling, producing and plugging of wells;

(2) the shooting and chemical treatment of wells;

(3) the spacing of wells;

(4) the disposal of salt water, nonpotable water and oil field wastes;

(5) the contamination or waste of underground water;

(6) the quantity and rate of the production of oil and gas from a well or property; this authority shall also apply to a well or property in a voluntary cooperative or unit plan of development or operation entered into in accordance with AS 38.05.180(p).

(f) The commission may classify wells as oil or gas wells for purposes material to the interpretation or enforcement of this chapter.

(g) When the commission finds sufficient likelihood of an unexpected encounter of oil, gas, or other hazardous substance as a result of well drilling in an area of the state, the commission may, by regulation, designate the area and specify a depth in the area as one in which wells or any boring into the soil in excess of the specified depth but not otherwise subject to this chapter are subject to the regulations and requirements adopted under this section. The designation of an area or specification of a depth under this subsection does not constitute a certification that no hazardous substance will be encountered in another area or at a lesser depth, and the state is not liable for any damages arising from such an unexpected encounter of a hazardous substance.

(h) The commission may take all actions necessary to allow the state to acquire primary enforcement responsibility under 42 U.S.C. 300h-4 (Safe Drinking Water Act of 1974, as amended, 42 U.S.C. 300f-300j), for the control of underground injection related to the recovery and production of oil and natural gas. (§ 4 ch 40 SLA 1955; am § 2 ch 75 SLA 1960; am § 1 ch 209 SLA 1970; am § 1 ch 87 SLA 1977; am §§ 1, 2 ch 160 SLA 1978; am § 1 ch 91 SLA 1984)

Effect of amendments. — The 1984 amendment added subsection (h).

Sec. 31.05.035. Confidential reports. (a) For all wells for which a permit to drill has been issued by the commission since January 3, 1959, the commission may require:

(1) the making and filing of reports, well logs, drilling logs, electric logs, lithologic logs, directional surveys, and all other subsurface information on a well drilled for oil or gas, or for the discovery of oil or gas, or for geologic information; and

(2) the filing of flow test information and all logs, except experimental logs and velocity surveys run on a well and not required by (1) of this subsection;

(3) the operator to make available for copying the digitized log information, if it is available, on any log required to be filed under (1) or (2) of this subsection.

(b) Reports and information required under (a)(1) and (2) of this section shall be filed within 30 days after the completion, abandonment, or suspension of a well. However, under (a)(1) of this section, the commission may not require the making of a log on a well completed, abandoned or suspended before June 19, 1970.

(c) The reports and information required in (a) of this section shall be kept confidential for 24 months following the 30-day filing period unless the owner of the well gives written permission to release the reports and information at an earlier date. If the commissioner of natural resources finds that the required reports and information contain significant information relating to the valuation of unleased land in the same vicinity, the commissioner shall keep the reports and information confidential for a reasonable time after the disposition of all affected unleased land, unless the owner of the well gives written permission to release the reports and information at an earlier date. Well location, depth, status and production data and production reports required by the commission to be filed subsequent to the 30-day filing period shall be considered public information and shall not be classified confidential. Production data, as used in this subsection, means volume, gravity and gas-oil ratio of all production of oil or gas after the well begins regular production.

(d) Engineering, geological, and other information not required by (a) of this section but voluntarily filed with the commission shall be kept confidential if the person filing the information so requests.

(e) Notwithstanding (c) of this section, claims of confidentiality will be denied for information disclosed to the commission under AS 31.05.030(h) that is required to be disclosed under 42 U.S.C. 300h-4. (§ 2 ch 209 SLA 1970; am §§ 3 — 6 ch 160 SLA 1978; am § 86 ch 6 SLA 1984; am § 2 ch 91 SLA 1984)

Effect of amendments. — The first 1984 amendment, in the second sentence in subsection (c), inserted "of natural resources" and substituted "the commissioner" for "he" near the middle of the sentence.

The second 1984 amendment added subsection (e).

NOTES TO DECISIONS

Cited in Hammond v. North Slope Borough, Sup. Ct. Op. No. 2499 (File Nos. 5550, 5558), 645 P.2d 750 (1982).

Sec. 31.05.040. Regulations and orders. (a) The commission shall adopt regulations governing practice and procedure before it under this chapter.

(b) All orders issued by the commission shall be in writing, shall be entered in full and indexed in books kept by the commission for that purpose, and shall be public records open for inspection at all times during reasonable office hours. A copy of an order certified by the commission, under its seal, shall be received in evidence in all courts of the state with the same effect as the original. (§ 9(1) and (5) ch 40 SLA 1955)

Cross references. — For administrative procedures generally, see AS 44.62.

Sec. 31.05.050. Notice. (a) A notice required by this chapter shall be given in accordance with the Administrative Procedure Act (AS 44.62).

(b) Procedures to be followed under (a) of this section do not apply if the nature of the notice is not of a statewide or general application but is concerned only with operations on a single well or within a single field and the modification of procedure is within the authority delegated to the commission under AS 31.05.030. A notice required by this chapter shall be given by one publication in a newspaper published in the borough in which the hearing is to be held, or if none is published in the borough, in a newspaper published in this state and circulating within the borough, and posted in at least one public place within the borough, at least 10 days before the date of the hearing. The notice shall be issued in the name of the state, shall be signed by the commission, and shall specify the style and number of the proceeding, the time and place of the hearing, and shall briefly state the purpose of the proceeding. The commission may also give, or require the giving of, additional notice in a proceeding, or class of proceeding, which it considers necessary or desirable. (§ 9(4) ch 40 SLA 1955; am § 1 ch 190 SLA 1968; am § 1 ch 87 SLA 1969)

Sec. 31.05.060. Action by commission. (a) The commission may act upon its own motion, or upon the petition of an interested person. On the filing of a petition concerning a matter within the jurisdiction of the commission under this chapter, the commission shall promptly fix a date for a hearing, and shall cause notice of the hearing to be given. The hearing shall be held without undue delay after the filing of the petition. The commission shall enter its order within 30 days after the hearing.

(b) Except as provided in this subsection, any action by the

commission under this chapter that has statewide or general application shall be performed in accordance with the Administrative Procedure Act (AS 44.62). Any action by the commission under this chapter that has application to a single well or single field need not comply with the provisions of AS 44.62.330 — 44.62.630, but shall be performed in accordance with regulations of the commission designed to afford persons affected by the action notice and an opportunity to be heard. (§ 9(6) ch 40 SLA 1955; am § 7 ch 160 SLA 1978)

Collateral references. — 58 C.J.S., Mines and Minerals, § 242.

Sec. 31.05.070. Attendance and testimony of witnesses. (a) The commission may summon witnesses, administer oaths, and require the production of records, books and documents for examination at a hearing or investigation conducted by it. A person may not be excused from attending and testifying, or from producing books, papers and records before the commission or a court, or from obedience to the subpoena of the commission or a court, on the ground or for the reason that the testimony or evidence, documentary or otherwise, required of that person may tend to incriminate or subject that person to a penalty or forfeiture. This section does not require a person to produce books, papers or records, or to testify in response to an inquiry not pertinent to some question lawfully before the commission or court for determination. A natural person is not subject to criminal prosecution or to a penalty or forfeiture for or on account of any transaction, matter or thing concerning which, in spite of objection, that person may be required to testify or produce evidence, documentary or otherwise, before the commission or court, or in obedience to its subpoena. However, a person testifying is not exempt from prosecution and punishment for perjury committed in so testifying.

(b) If a person fails or refuses to comply with the subpoena issued by the commission, or refuses to testify as to any matter regarding which the person may be interrogated, any court of record in the state, upon application of the commission, may issue an attachment for the person and compel that person to comply with the subpoena, and attend before the commission and produce the records, books, and documents for examination, and give testimony. The court may punish for contempt as in the case of disobedience to a subpoena issued by the court, or for refusal to testify in court. (§ 10 ch 40 SLA 1955)

Sec. 31.05.080. Rehearings and appeals. (a) Within 20 days after written notice of the entry of an order or decision of the commission, or such further time as the commission grants for good cause shown, a person affected by it may file with the commission an application for the rehearing in respect of the matter determined by the order or decision, setting forth the respect in which the order or decision is believed to be erroneous. The commission shall grant or refuse the application in whole or in part within 10 days after it is filed, and failure to act on it within this period is a refusal of it and a final disposition of the application. If the hearing is granted, the commission may enter a new order or decision after rehearing as may be required under the circumstances.

(b) A party to the rehearing proceeding, dissatisfied with the disposition of the application for rehearing, may appeal from it to the superior court in the judicial district in which any property affected by the decision of the commission is located, by filing a petition for the review of the action of the commission within 20 days after the entry of the order following rehearing or after the refusal of rehearing as the case may be. The petition shall state briefly the nature of the proceedings before the commission and shall set out the order or decision of the commission complained of and the grounds of invalidity of it upon which the applicant will rely. However, the questions reviewed on appeal shall be only questions presented to the commission by the application for rehearing. Notice of appeal shall be served upon the adverse parties and the commission in the manner provided for the service of summons in civil proceedings. The trial upon appeal shall be without a jury, and the transcript of proceedings before the commission, including the evidence taken in hearings by the commission, shall be received in evidence by the court in whole or in part upon offer by either party, subject to legal objections to evidence, in the same manner as if the evidence was originally offered in the superior court. The commission's action complained of is prima facie valid and the burden is upon the party seeking review to establish the invalidity of the action of the commission. The court shall determine the issues of fact and of law and shall, upon a preponderance of the evidence introduced before the court, which may include evidence in addition to the transcript of proceedings before the commission, and the applicable law, enter its order either affirming or vacating the order of the commission. Appeals may be taken from the judgment or decision of the superior court in the same manner as provided for appeals from any other final judgment entered by a superior court.

(c) The pendency of proceedings to review does not of itself stay or suspend operation of the order or decision being reviewed, but during the pendency of the proceedings, the superior court may, upon its own motion or upon proper application of a party, stay or suspend, in whole or in part, operation of the order or decision pending review, on the

terms the court considers just and proper and in accordance with the rules of civil procedure. The court, as a condition to staying or suspension of operation of an order or decision, may require that one or more parties secure, in the form and amount as the court considers just and proper, one or more other parties against loss or damage due to the staying or suspension of the commission's order or decision, if the action of the commission is affirmed.

(d) The rules of practice and procedure in civil cases govern the proceedings for review and appeal to the extent they are consistent with this chapter. (§ 11 ch 40 SLA 1955)

Revisor's notes. — The procedures for appeal set out in this section are superseded by the rules of court. See App. R. 607, adopted Nov. 15, 1980.

Cross references. — For rules of court governing appeals from administrative agencies, see App. R. 601-611.

Article 2. Regulation of Operations.

Sec. 31.05.090. Permits and fees to drill wells. A person desiring to drill a well in search of oil or gas shall notify the commission of the person's intent on a form prescribed by the commission and shall pay a fee of $100 for a permit for each well sought to be drilled. Upon receipt of notification and fee, the commission shall promptly issue a permit to drill, unless the drilling of the well is contrary to law or a regulation or order of the commission, or unless the person is in violation of a commission regulation, order or stipulation pertaining to drilling, plugging or abandonment of a well. The drilling of a well is prohibited until a permit to drill is obtained in accordance with this chapter. (§ 5 ch 40 SLA 1955; am § 1 ch 120 SLA 1970)

Sec. 31.05.095. Waste prohibited. The waste of oil and gas in the state is prohibited. (§ 1 ch 40 SLA 1955)

Revisor's notes. — Formerly AS 31.05.020. Renumbered in 1985.

Collateral references. — 58 C.J.S., Mines and Minerals, § 234.

Constitutionality of statute controlling exploitation or waste of oil and gas. 24 ALR 307; 78 ALR 834.

Constitutionality of statute, ordinance, or regulation limiting rights of surface owner in respect of oil or gas. 67 ALR 1346; 99 ALR 1119.

Construction and effect of statutes regulating production of oil or gas in a manner or under conditions constituting waste. 86 ALR 431.

Sec. 31.05.100. Establishment of drilling units for pools. (a) For the prevention of waste, to protect and enforce the correlative rights of lessees in a pool, and to avoid the augmenting and accumulation of risks arising from the drilling of an excessive number of wells, or the reduced recovery which might result from too small a number of wells, the commission shall, after a hearing, establish a drilling unit or units for each pool. The establishment of a unit for gas shall be limited to the production of gas.

(b) Each well permitted to be drilled on a drilling unit shall be drilled under the rules and regulations and in accordance with the spacing pattern as the commission prescribes for the pool in which the well is located. Exceptions to the rules and spacing pattern may be granted where it is shown, after notice and hearing, that the unit is partly outside the pool, or for some other reason a well so located on the unit would be nonproductive, or topographical conditions are such as to make the drilling at such a location unduly burdensome. If an exception is granted, the commission shall take such action as will offset any advantage which the person securing the exception may have over other producers by reason of the drilling of the well as an exception, and so that drainage from developed units to the tract with respect to which the exception is granted will be prevented or minimized, and the producer of the well drilled as an exception will be allowed to produce no more than a just and equitable share of the oil and gas in the pool.

(c) When two or more separately owned tracts of land are embraced within an established drilling unit, persons owning the drilling rights in it and the right to share in the production from it may agree to pool their interests and develop their lands as a drilling unit. If the persons do not agree to pool their interests, the commission may enter an order pooling and integrating their interests for the development of their lands as a drilling unit for the prevention of waste, for the protection of correlative rights, or to avoid the drilling of unnecessary wells. Orders effectuating such pooling shall be made after notice and hearing, and shall be upon terms and conditions which will afford to the owner of each tract the opportunity to recover or receive the owner's just and equitable share of the oil and gas in the pool without unnecessary expense. Operations incident to the drilling of a well upon a portion of a unit covered by a pooling order shall be considered for all purposes to be the conduct of the operation upon each separately owned tract in the unit by the several lessees of it. The portion of the production allocated to the lessee of each tract included in a drilling unit formed by a pooling order shall, when produced, be considered as if it had been produced from the tract by a well drilled on it. If pooling is effectuated, the cost of development and operation of the pooled unit chargeable by the operator to the other interested lessee is limited to the actual and reasonable expenditures for this

purpose, including a reasonable charge for supervision. As to lessees who refuse to agree upon pooling, the order shall provide for reimbursement for costs chargeable to each lessee out of, and only out of, production from the unit belonging to such lessee. In the event of a dispute relative to the costs, the commission shall determine the proper costs upon notice to all interested parties and hearing. Appeals may be taken from the determination as from any other order of the commission. If a lessee drills and operates, or pays the expense of drilling and operating the well for the benefit of others, then in addition to any other right conferred by the pooling order, the lessee drilling or operating has a lien on the share of production from the unit accruing to the interest of each of the other lessees for the payment of the proportionate share of such expenses. All the oil and gas subject to the lien, or so much of the oil and gas subject to the lien as is necessary shall be marketed and sold by the creditor, and the proceeds applied in payment of the expenses secured by the lien, with the balance, if any, payable to the debtor.

(d) The commission shall, in all instances where a unit has been formed out of lands or areas of more than one ownership, require the operator, upon request of a lessee, but subject to the right of the operator to market production and collect the proceeds with respect to a lessee in default, as provided in (c) of this section, to deliver to the lessee or assigns the lessee's proportionate share of the production from the well common to the drilling unit. The lessee receiving a share shall provide at the lessee's own expense proper receptacles for the receipt and storage of it.

(e) If persons owning the drilling or other rights in separate tracts embraced within a drilling unit fail to agree upon the pooling of the tracts and the drilling of the well on the unit, and if the commission is without authority to require pooling as provided by this section, then, subject to all other applicable provisions of this chapter, the lessee of each tract embraced within the drilling unit may drill on the lessee's tract, but the allowable production from the tract shall be the proportion of the allowable production for the full drilling unit as the area of the separately owned tract bears to the full drilling unit. (§ 6 ch 40 SLA 1955)

Cross references. — For oil and gas leasing, see AS 38.05.180.

Collateral references. — Respective rights of adjoining owners as to pumping oil. 5 ALR 421.

Sec. 31.05.110. Unitization and unitized operation of pools and integration of interests by agreement. (a) To prevent, or to assist in preventing waste, to insure a greater ultimate recovery of oil and gas, and to protect the correlative rights of persons owning interests in the tracts of land affected, these persons may validly integrate their interests to provide for the unitized management, development, and operation of such tracts of land as a unit. Where, however, they have not agreed to integrate their interests, the commission, upon proper petition, after notice and hearing, has jurisdiction, power and authority, and it is its duty to make and enforce orders and do the things necessary or proper to carry out the purposes of this section.

(b) If upon the filing of a petition by or with the commission and after notice and hearing, all in the form and manner and in accordance with the procedure and requirements provided in this section, the commission finds that (1) the unitized management, operation and further development of a pool or portion of a pool is reasonably necessary in order to effectively carry on pressure control, pressure-maintenance or repressuring operations, cycling operations, water flooding operations, or any combination of these, or any other form of joint effort calculated to substantially increase the ultimate recovery of oil and gas from the pool; (2) one or more of the unitized methods of operation as applied to the pool or portion of it is feasible, and will prevent waste and will with reasonable probability result in the increased recovery of substantially more oil and gas from the pool than would otherwise be recovered; (3) the estimated additional cost, if any, of conducting such operations will not exceed the value of the additional oil and gas so recovered; and (4) the unitization and adoption of one or more of the unitized methods of operation is for the common good, it shall make a finding to that effect and make an order creating the unit and providing for the unitization and unitized operation of the pool or portion of it described in the order, upon the terms and conditions, as may be shown by the evidence to be fair, reasonable, equitable, and which are necessary or proper to protect, safeguard and adjust the respective rights and obligations of the several persons affected, including royalty owner, owners of overriding royalties, oil and gas payments, carried interests, mortgages, lien claimants and others, as well as the lessees. The petition shall set out a description of the proposed unit area with a map or plat of it attached, shall allege the existence of the facts required to be found by the commission as provided in this subsection and shall have attached to it a recommended plan of unitization applicable to the proposed unit area and which the petitioner considers to be fair, reasonable and equitable.

(c) The order of the commission shall define the boundary of the area to be included within the unit area and prescribe with reasonable

detail the plan of unitization applicable to it. Each unit and unit area may be limited to all or a portion of a single pool. Only so much of a pool or pools as has been defined and determined to be productive on the basis of information available to the commission may be so included within the unit area. A unit may be created to embrace less than the whole of a pool only where it is shown by the evidence that the area to be so included within the unit area is of a size and shape as may be reasonably required for the successful and efficient conduct of the unitized method of operation for which the unit is created, and that the conduct of it will have no material adverse effect upon the remainder of the pool. The plan of unitization for each unit and unit area shall be one suited to the needs and requirements of the particular unit dependent upon the facts and conditions found to exist with respect to it. In addition to other terms, provisions, conditions and requirements found by the commission to be reasonably necessary or proper to carry out the purpose of this chapter, and subject to the further requirements of this section, each plan of unitization shall contain fair, reasonable and equitable provisions for

(1) the efficient unitized management or control of the further development and operation of the unit area for the recovery of oil and gas from the pool affected; under such a plan the actual operations within the unit area may be carried on in whole or in part by the unit itself, or by one or more of the lessees within the unit area as the unit operator subject to the supervision and direction of the unit, dependent upon what is most beneficial or expedient; the designation of the unit operator shall be by vote of the lessees in the unit in a manner provided in the plan of unitization and not by the commission;

(2) the division of interest or formula for the apportionment and allocation of the unit production, among and to the several separately owned tracts within the unit area such as will reasonably permit persons otherwise entitled to share in or benefit by the production from such separately owned tracts to produce and receive, instead thereof, their fair, equitable and reasonable share of the unit production or other benefits of it; a separately owned tract's fair, equitable, and reasonable share of the unit production shall be measured by the value of each such tract for oil and gas purposes and its contributing value to the unit in relation to like values of other tracts in the unit, taking into account acreage, the quantity of oil and gas recoverable from it, location on the structure, its probable productivity of oil and gas in the absence of unit operations, the burden of operations to which the tract will or is likely to be subjected, or so many of these factors, or such other pertinent engineering, geological or operating factors as may be reasonably susceptible of determination; "unit production" as that term is used in this chapter means all oil and gas produced from a unit area from the effective date of the order of the commission creating the unit regardless of the well or tract within the unit area from which the same is produced;

(3) the manner in which the unit and the further development and operation of the unit area shall or may be financed and the basis, terms and conditions on which the cost and expense of it shall be apportioned among and assessed against the tracts and interests made chargeable with it, including a detailed accounting procedure governing all charges and credits incident to such operations; upon terms and conditions as to time and rate of interest as may be fair to all concerned, reasonable provision shall be made in the plan of unitization for carrying or otherwise financing lessees who are unable to promptly meet their financial obligations in connection with the unit;

(4) the procedure and basis upon which wells, equipment and other properties of the several lessees within the unit area are to be taken over and used for unit operations, including the method of arriving at the compensation for it, or of otherwise proportionately equalizing or adjusting the investment of the several lessees in the project as of the effective date of unit operation;

(5) the creation of an operating committee to have general overall management and control of the unit and the conduct of its business and affairs and the operations carried on by it, together with the creation or designation of other subcommittees, boards or officers to function under the authority of the operating committee as may be necessary, proper or convenient in the efficient management of the unit, defining the powers and duties of all the committees, boards and officers, and prescribing their tenure and time and method for their selection;

(6) the time when the plan of unitization becomes effective;

(7) the time when and the conditions under which and the method by which the unit shall or may be dissolved and its affairs wound up.

(d) *[Repealed, § 17 ch 160 SLA 1978.]*

(e) Except as otherwise expressly provided in this section, all proceedings held under this chapter, including the filing of petitions, the giving of notices, the conduct of hearings and other action taken by the commission shall be in the form and manner and in accordance with the procedure provided in AS 31.05.040 — 31.05.060. Additional notice shall be given as the commission requires.

(f) From the effective date of an order of the commission creating a unit and prescribing the plan of unitization applicable to it, the operation of a well producing from the pool or portion of it within the unit area defined in the order by persons other than the unit or persons acting under its authority or except in the manner and to the extent provided in the plan of unitization is unlawful and is prohibited.

(g) The obligation or liability of the lessees or other owners of the oil and gas rights in the several separately owned tracts for the payment of unit expense shall at all times be several and not joint or

collective and in no event shall a lessee or other owner of the oil and gas rights in the separately owned tract be chargeable with, obligated or liable, directly or indirectly, for more than the amount apportioned, assessed or otherwise charged to that lessee's or owner's interest in the separately owned tract under the plan of unitization and then only to the extent of the lien provided for in this chapter.

(h) Subject to such reasonable limitations as may be set out in the plan of unitization, the unit has a first and prior lien upon the leasehold estate and all other oil and gas rights (exclusive of a landowners' royalty interest) in and to each separately owned tract, the interest of the owners in and to the unit production and all equipment in the possession of the unit, to secure the payment of the amount of the unit expense charged to and assessed against such separately owned tract. The interest of the lessee or other persons who by lease, contract or otherwise are obligated or responsible for the cost and expense of developing and operating a separately owned tract for oil and gas in the absence of unitization shall, however, be primarily responsible for and charged with any assessment for unit expense made against the tract and resort may be had to overriding royalties, oil and gas payments, or other interests, except royalty interests, which otherwise are not chargeable with these costs, only in the event the owner of interest primarily responsible fails to pay the assessment of the production to the credit thereof, or production is insufficient for that purpose. If the owner of any royalty interest, overriding royalty, oil or gas payment, or any other interest which under the plan of unitization is not primarily responsible for it pays in whole or in part the amount of an assessment for unit expense for the purpose of protecting such interest, or the amount of the assessment in whole or in part is deducted from the unit production to the credit of such interest, the owner of it is to the extent of the payment or deduction subrogated to all the rights of the unit with respect to the interest or interests primarily responsible for the assessment. The landowners' royalty share of the unit production allocated to each separately owned tract shall be regarded as royalty to be distributed to and among, or the proceeds of it paid to, the landowners, free and clear of all unit expense and free of any lien for it.

(i) Property rights, leases, contracts and all other rights and obligations shall be regarded as amended and modified to the extent necessary to conform to the provisions and requirements of this chapter, and to any valid and applicable plan of unitization or order of the commission made and adopted under this chapter, but otherwise remain in effect.

(j) Nothing contained in this chapter shall be construed to require a transfer to or vesting in the unit of title to the separately owned tracts or leases on them within the unit area, other than the right to use and operate them to the extent set out in the plan of unitization; nor shall

the unit be regarded as owning the unit production. The unit production and the proceeds from the sale of it shall be owned by the several persons to whom it is allocated under the plan of unitization. All property, whether real or personal, which the unit may in any way acquire, hold or possess, shall not be acquired, held or possessed by the unit for its own account but shall be acquired, held and possessed by the unit for the account and as agent of the several lessees and shall be the property of the lessees as their interests appear under the plan of unitization, subject, however, to the right of the unit to the possession, management, use or disposal of the same in the proper conduct of its affairs, and subject to any lien the unit may have on it to secure the payment of unit expense. Neither the unit production or proceeds of the sale of it, nor the other receipts shall be treated, regarded, or taxed as income or profits of the unit; but instead, all such receipts shall be the income of the several persons to whom or to whose credit the same are payable under the plan of unitization. To the extent the unit may receive or disburse the receipts it shall only do so as a common administrative agent of the persons to whom the receipts are payable.

(k) The amount of the unit production allocated to each separately owned tract within the unit, and only that amount, regardless of the well or wells in the unit area from which it may be produced and regardless of whether it is more or less than the amount of the production from the well or wells, if any, on any such separately owned tract, shall for all intents, uses and purposes be regarded and considered as production from the separately owned tract, and, except as may be otherwise authorized in this chapter, or in the plan of unitization approved by the commission, shall be distributed among or the proceeds of it paid to the persons entitled to share in the production from the separately owned tract in the same manner, in the same proportions, and upon the same condition that they would have participated and shared in the production or proceeds of it from such separately owned tract had not the unit been organized, and with the same legal effect. If adequate provisions are made for the receipt of it, the share of the unit production allocated to each separately owned tract shall be delivered in kind to the persons entitled to it by virtue of ownership of oil and gas rights in it or by purchase from the owners subject to the rights of the unit to withhold and sell the same in payment of unit expense under the plan of unitization, and subject further to the call of the unit on such portions of the gas for operating purposes as may be provided in the plan of unitization.

(*l*) An agreement or plan for the development and operation of a field or pool of oil or gas as a unit, if approved by the commission for the purpose of conserving oil or gas, does not violate a statute of the state prohibiting monopolies or acts, arrangements, agreements, contracts, combinations or conspiracies in restraint of trade or commerce.

(m) Operations carried on under and in accordance with the plan of unitization shall be regarded and considered as a fulfillment of a compliance with all of the provisions, covenants and conditions, express or implied, of the several oil and gas leases upon lands included within the unit area, or other contracts pertaining to the development of it insofar as the leases or other contracts may relate to the pool or portion of it included in the unit area. Wells drilled or operated on any part of the unit area no matter where located shall for all purposes be regarded as wells drilled on each separately owned tract within the unit area.

(n) Nothing in this section or in any plan of unitization shall be construed as increasing or decreasing the implied covenants of a lease in respect to a common source of supply or lands not included within the unit area of a unit.

(o) The unit area of a unit may be enlarged to include adjoining portions of the same pool, including the unit area of another unit, and a new unit created for the unitized management, operation and further development of the enlarged unit area, or the plan of unitization may be otherwise amended, or the unit area contracted, all in the same manner, upon the same conditions and subject to the same limitations as provided with respect to the creation of a unit in the first instance.

(p) An aliquot of unit production may be underlifted or overlifted from a unit established under this chapter or AS 38.05.180(p) only when it does not create waste, except the commissioner may permit underlifting or overlifting for temporary periods for the purpose of accommodating extraordinary disruptions to an interest owner's production disposal system. Underlifted oil may be recovered by an interest owner at a daily rate not to exceed 10 percent of the owner's working or royalty interest share of daily production at the time of underlift recovery. This subsection applies to all units created after June 30, 1978.

(q) This section applies to all involuntary units formed in the state. Subsections (a) and (g) — (p) of this section apply to all voluntary units formed in the state and to a voluntary cooperative or unit plan of development or operation entered into in accordance with AS 38.05.180(p). (§ 7 ch 40 SLA 1955; am §§ 8 — 13, 17 ch 160 SLA 1978; am § 33 ch 94 SLA 1980)

Cross references. — For provisions regarding oil and gas leasing, see AS 38.05.180.

Legislative history reports. — For conference committee letter of intent relating to the 1978 repeal of subsection (d) (sec. 17, ch. 160, SLA 1978 — HB 815), see 1978 House Journal, p. 1720.

Collateral references. — Operator's or lessee's responsibility for production of oil

or gas in excess of allowance as affected by his ignorance of excess production or his failure to profit thereby. 150 ALR 1149.

Sec. 31.05.120. Use of gas from well to manufacture carbon products without permit is prima facie waste. The use of gas from a well producing gas only, or from a well which is primarily a gas well for the manufacture of carbon black or similar products predominantly carbon is declared to constitute waste prima facie, and the gas well shall not be used for this purpose unless it is clearly shown at a public hearing held by the commission, on application of the person desiring to use the gas, that waste would not take place by the use of the gas for the purpose applied for, and that gas which would otherwise be lost is now available for such purpose, and that the gas to be used cannot be used for a more beneficial purpose, such as for light or fuel purposes, except at prohibitive cost, and that it would be in the public interest to grant the permit. If the commission finds that the applicant has clearly shown a right to use the gas for the purpose applied for, it shall issue a permit upon terms and conditions it finds necessary in order to permit the use of the gas and at the same time require compliance with the intent of this section. (§ 8 ch 40 SLA 1955)

Secs. 31.05.130 — 31.05.140. Levy of Tax and Disposition of Funds. [Repealed, § 2 ch 247 SLA 1970.]

Article 3. General Provisions.

Sec. 31.05.150. Penalties. (a) A person who wilfully violates a provision of this chapter, or a regulation or order of the commission adopted under this chapter is subject to a penalty of not more than $1,000 for each act of violation and for each day that the violation continues, unless the penalty for violation is otherwise provided for and made exclusive in this chapter.

SEE Chpt. 86 SLA 1990

(b) If a person, for the purpose of evading this chapter, or any regulation or order of the commission adopted under this chapter, wilfully makes or has made a false entry in a record, account or memorandum required by this chapter, or by a regulation or order, or wilfully omits, or causes to be omitted, from a record, account or memorandum, full, true and correct entries as required by this chapter, or by a regulation or order, or removes from the state or destroys, mutilates, alters or falsifies such record, account or memo-

~~randum, the person is guilty of a misdemeanor, and upon conviction is punishable by a fine of not more than $5,000, or by imprisonment in jail for not more than six months, or by both.~~

(c) A person who knowingly aids or abets another person in the violation of any provision of this chapter, or a regulation or order of the commission adopted under this chapter is subject to the same penalty as that prescribed by this chapter for the violation by the other person.

(d) The penalties provided in this section are recoverable by suit filed by the attorney general in the name and on behalf of the commission in the superior court of the judicial district in which the defendant resides or in which any defendant resides, if there is more than one defendant, or in the superior court of the judicial district in which the violation occurs. The payment of a penalty does not relieve a person on whom the penalty is imposed from liability to any other person for damages arising out of the violation.

(e) The commission may impose a penalty payment on every 1,000 cubic feet of natural gas flared, vented or otherwise determined to be waste as defined in AS 31.05.170. The penalty shall be the fair market value of the natural gas at the point of waste. (§ 12 ch 40 SLA 1955; am § 1 ch 195 SLA 1968)

(f) SEE ChpT. 86 SLA 1990

Collateral references. — 58 C.J.S. Mines and Minerals § 241.

Sec. 31.05.160. Injunctive relief. (a) Whenever it appears that a person is violating or threatening to violate any provision of this chapter, or any regulation or order of the commission, the commission shall bring suit against that person in the superior court of the judicial district where the violation occurs or is threatened, to restrain the person from continuing the violation or from carrying out the threat of violation. In the suit, the court shall have jurisdiction to grant to the commission, without bond or otherwise undertaking, such prohibitory and mandatory injunctions as the facts warrant.

(b) If the commission fails to bring suit to enjoin a violation or threatened violation within 10 days after receipt of written request to do so by a person who is or will be adversely affected by the violation, the person making the request may bring suit to restrain the violation or threatened violation in the court in which the commission may bring suit. If the court finds that injunctive relief should be granted, the commission shall be made a party and shall be substituted for the person who brought the suit, and the injunction shall be issued as if the commission had at all times been the plaintiff. (§ 13 ch 40 SLA 1955)

Sec. 31.05.170. Definitions. In this chapter, unless the context otherwise requires

(1) "and" includes "or" and "or" includes "and";

(2) "correlative rights" mean the opportunity afforded, so far as it is practicable to do so, to the owner of each property in a pool to produce without waste the owner's just and equitable share of the oil or gas, or both, in the pool; being an amount, so far as can be practically determined, and so far as can practicably be obtained without waste, substantially in the proportion that the quantity of recoverable oil or gas, or both under the property bears to the total recoverable oil or gas or both in the pool, and for such purposes to use the owner's just and equitable share of the reservoir energy;

(3) "commission" means the Alaska Oil and Gas Conservation Commission;

(4) "cubic foot" of natural gas means the volume of gas contained in one cubic foot of space measured at a pressure base of 14.65 pounds per square inch absolute and a temperature base of 60 degrees Fahrenheit;

(5) "field" means a general area which is underlain or appears to be underlain by at least one pool, and includes the underground reservoir containing oil or gas; and the words "pool" and "field" mean the same thing when only one underground reservoir is involved, but "field" unlike "pool" may relate to two or more pools;

(6) "gas" includes all natural gas and all hydrocarbons produced at the wellhead not defined as oil;

(7) "landowner" means the owner of the subsurface estate of the tract affected;

(8) "oil" includes crude petroleum oil and other hydrocarbons regardless of gravity which are produced at the wellhead in liquid form and the liquid hydrocarbons known as distillate or condensate recovered or extracted from gas, other than gas produced in association with oil and commonly known as casinghead gas;

(9) "owner" means the person who has the right to drill into and produce from a pool and to appropriate the oil and gas the person produces from a pool for that person and others;

(10) "person" includes a natural person, corporation, association, partnership, receiver, trustee, executor, administrator, guardian, fiduciary or other representative of any kind, and includes a department, agency or instrumentality of the state or a governmental subdivision of the state;

(11) "pool" means an underground reservoir containing, or appearing to contain, a common accumulation of oil or gas. Each zone of a general structure which is completely separated from any other zone in the structure is covered by the term "pool";

(12) "producer" means the owner of a well or wells capable of producing oil or gas or both;

(13) "regular production" means continuing production of oil or gas from a well into production facilities and transportation to market, but does not include short term testing, evaluation, or experimental pilot production activities that have been approved by permit or order of the commission;

(14) "waste" means, in addition to its ordinary meaning, "physical waste" and includes

(A) the inefficient, excessive, or improper use of, or unnecessary dissipation of, reservoir energy; and the locating, spacing, drilling, equipping, operating or producing of any oil or gas well in a manner which results or tends to result in reducing the quantity of oil or gas to be recovered from a pool in this state under operations conducted in accordance with good oil field engineering practices;

(B) the inefficient above-ground storage of oil; and the locating, spacing, drilling, equipping, operating or producing of an oil or gas well in a manner causing, or tending to cause, unnecessary or excessive surface loss or destruction of oil or gas;

(C) producing oil or gas in a manner causing unnecessary water channeling or coning;

(D) the operation of an oil well with an inefficient gas-oil ratio;

(E) the drowning with water of a pool or part of a pool capable of producing oil or gas, except insofar as and to the extent authorized by the commission;

(F) underground waste;

(G) the creation of unnecessary fire hazards;

(H) the release, burning, or escape into the open air of gas, from a well producing oil or gas, except to the extent authorized by the commission;

(I) the use of gas for the manufacture of carbon black, except as provided in this chapter;

(J) the drilling of wells unnecessary to carry out the purpose or intent of this chapter. (§ 2 ch 40 SLA 1955; am §§ 2, 3 ch 195 SLA 1968; am §§ 14, 15 ch 160 SLA 1978; am § 3 ch 91 SLA 1984)

Revisor's notes. — Reorganized in 1984 to alphabetize the defined terms.

Effect of amendments. — The 1984 amendment inserted paragraph (13).

Chapter 168

28.40.100(a)(1)

(1) "cancel" means to annul or terminate, [THE ANNULMENT OR TERMINATION] by formal action of the department, [OF] a certification, registration, license, permit or privilege issued or allowed under this title or regulations adopted under this title, because of an error or defect in the document issued or the application for issuance or because the person holding the document is no longer entitled to it;

* Sec. 10. AS 31.05.007(a) is amended to read:

31.05.007(a)

(a) The term of office of each member is six years. [THE GOVERNOR SHALL DESIGNATE WHO AMONG THE INITIAL APPOINTEES SHALL SERVE RESPECTIVELY FOR TERMS OF TWO YEARS, FOUR YEARS AND SIX YEARS.] A commissioner, upon the expiration of a term, shall continue to hold office until a successor is appointed and qualified.

* Sec. 11. AS 36.30.015(e) is amended to read:

36.30.015(e)

(e) The boards of directors of the Alaska Railroad Corporation and the Alaska State Housing Authority shall adopt procedures to govern the procurement of supplies, services, professional services, and construction [BY THE CORPORATION]. The procedures must be substantially equivalent to the procedures prescribed in this chapter and in regulations adopted under this chapter.

* Sec. 12. AS 39.20.190 is amended to read:

39.20.190

Sec. 39.20.190. DEFINITIONS. In AS 39.20.110 - 39.20.190 [AS 39.20.110 - 39.20.170]

(1) "employee" or "state employee" means a person employed by a state agency;

(2) "official" or "state official" means the appointive head of a state agency;

(3) "official travel" means travel inside or outside the state on official business of the state, for which payment or

Chapter 86

AN ACT

Relating to the Alaska Oil and Gas Conservation Commission.

* Section 1. AS 31.05.027 is amended to read:

Sec. 31.05.027. LAND SUBJECT TO COMMISSION'S AUTHORITY. The authority of the commission applies to all land in the state lawfully subject to its police powers, including [. IT APPLIES TO] land of the United States and [OR TO] land subject to the jurisdiction of the United States [ONLY TO THE EXTENT THAT CONTROL AND SUPERVISION OF CONSERVATION OF OIL AND GAS AND PREVENTION OF WASTE BY THE UNITED STATES ON ITS LAND FAILS TO CARRY OUT THE INTENT AND PURPOSES OF THIS CHAPTER, AND OTHERWISE APPLIES TO FEDERAL LAND SO FAR AS AN OFFICER OF THE UNITED STATES HAVING JURISDICTION, OR AN AUTHORIZED REPRESENTATIVE, SHALL APPROVE ANY OF THE PROVISIONS OF THIS CHAPTER OR ORDERS OF THE COMMISSION WHICH AFFECT LAND]. The authority of the commission further applies to all land included in a voluntary cooperative or unit plan of development or operation entered into in accordance with AS 38.05.180(p). 31.05.027

* Sec. 2. AS 31.05.150(a) is amended to read:

(a) A person who negligently [WILFULLY] violates a provision of this chapter, or a regulation or order of the commission adopted under this chapter, is liable for [SUBJECT TO] a civil penalty of no [NOT] more than $5,000 a day [$1,000] for each day [ACT] of violation [AND FOR EACH DAY THAT THE VIOLATION CONTINUES], unless the penalty for 31.05.150(a)

violation is otherwise provided for and made exclusive in this chapter.

* Sec. 3. AS 31.05.150(b) is amended to read:

31.05.150(b)

(b) A [IF A] person who, for the purpose of evading this chapter [,] or any regulation or order of the commission adopted under this chapter, knowingly commits an act specified in AS 11.46.630(a) is guilty of a class A misdemeanor [WILFULLY MAKES OR HAS MADE A FALSE ENTRY IN A RECORD, ACCOUNT OR MEMORANDUM REQUIRED BY THIS CHAPTER, OR BY A REGULATION OR ORDER, OR WILFULLY OMITS, OR CAUSES TO BE OMITTED, FROM A RECORD, ACCOUNT OR MEMORANDUM, FULL, TRUE AND CORRECT ENTRIES AS REQUIRED BY THIS CHAPTER, OR BY A REGULATION OR ORDER, OR REMOVES FROM THE STATE OR DESTROYS, MUTILATES, ALTERS OR FALSIFIES SUCH RECORD, ACCOUNT OR MEMORANDUM, THE PERSON IS GUILTY OF A MISDEMEANOR, AND UPON CONVICTION IS PUNISHABLE BY A FINE OF NOT MORE THAN $5,000, OR BY IMPRISONMENT IN JAIL FOR NOT MORE THAN SIX MONTHS, OR BY BOTH].

* Sec. 4. AS 31.05.150 is amended by adding a new subsection to read:

31.05.150(f)

(f) A person who knowingly violates a regulation or order of the commission is guilty of a misdemeanor punishable by a fine of no more than $5,000 a day for each day of violation.

Eff. 9/2/90

Sec. 38.05.036. Audit of royalty and net profit payments. (a) The Department of Revenue shall audit reports, payments, and payments due relating to royalty and net profits under oil and gas contracts, agreements, or leases under this chapter.

(b) The Department of Revenue may inspect all reports and other information filed in support of or relating to royalty and net profits payments, whether or not that information is confidential, and shall hold that information confidential to the extent required under oil and gas agreements, contracts, or leases, or by this chapter or AS 43.05.230.

(c) All information obtained by the Department of Revenue relating to royalty and net profits payments, including information obtained under AS 43, may be made available to the department, in the form of summaries and, when in furtherance of the department's royalty and net profits functions, relevant portions of the audits. Information made available to the department that was obtained under AS 43 is confidential and subject to the provisions of AS 43.05.230.

(d) The Department of Revenue may conduct audits under this section concurrently with audits or investigations under AS 43, and may use information obtained from the department in tax audits, investigations, or proceedings under AS 43.

(e) In this section, "audit" means the process of obtaining sufficient competent evidentiary matter through inspection, observation, inquiry, and confirmation to afford a reasonable basis for ascertaining the compliance by the subject of the audit with the applicable law, regulation, lease, agreement, and contract terms; it does not include any other actions necessary to administer this chapter pertaining to oil and gas royalty and net profits payments, including daily accounting functions, certification procedures associated with those accounting functions, and enforcement of payments of royalties and net profits. (§ 2 ch 61 SLA 1980)

Article 2. Department of Environmental Conservation.

Collateral references. — 61A Am. Jur. 2d, Pollution Control, § 6.

39A C.J.S., Health and Environment, §§ 5, 9-15, 125-145.

Power of state to prohibit or restrict exportation of natural resources. 32 ALR 331.

Preservation or protection of animals or birds as subject of charitable trust. 66 ALR 465.

Constitutionality of reforestation or forest conservation legislation. 13 ALR2d 1095.

Right to maintain action to enjoin public nuisance as affected by existence of pollution control agency. 60 ALR3d 665.

Sec. 46.03.020. Powers of the department. The department may

(1) enter into contracts necessary or convenient to carry out the functions, powers and duties of the department;

(2) review and appraise programs and activities of state departments and agencies in light of the policy set out in AS 46.03.010 for the purpose of determining the extent to which the programs and activities are contributing to the achievement of that policy and to make recommendations to the departments and agencies, including but not limited to, environmental guidelines;

(3) consult with and cooperate with

(A) officials and representatives of any nonprofit corporation or organization in the state;

(B) persons, organizations and groups, public and private, using, served by, interested in or concerned with the environment of the state;

(4) appear and participate in proceedings before any state or federal regulatory agency involving or affecting the purposes of the department;

(5) undertake studies, inquiries, surveys or analyses it may consider essential to the accomplishment of the purposes of the department; these activities may be carried out by the personnel of the department or in cooperation with public or private agencies, including educational, civic and research organizations, colleges, universities, institutes and foundations;

(6) at reasonable times enter and inspect with the consent of the owner or occupier any property or premises to investigate either actual or suspected sources of pollution or contamination or to ascertain compliance or noncompliance with a regulation which may be adopted under AS 46.03.020 — 46.03.040; information relating to secret pro-

cesses or methods of manufacture discovered during investigation is confidential;

(7) conduct investigations and hold hearings and compel the attendance of witnesses and the production of accounts, books and documents by the issuance of a subpoena;

(8) advise and cooperate with municipal, regional and other local agencies and officials in the state, to carry out the purposes of this chapter;

(9) act as the official agency of the state in all matters affecting the purposes of the department under federal laws now or hereafter enacted;

(10) adopt regulations necessary to effectuate the purposes of this chapter, including, by way of example and not limitation, regulations providing for

(A) control, prevention and abatement of air, water, or land or subsurface land pollution;

(B) safeguard standards for petroleum and natural gas pipeline construction, operation, modification or alteration;

(C) protection of public water supplies by establishing minimum drinking water standards, and standards for the construction, improvement, and maintenance of public water supply systems;

(D) collection and disposal of sewage and industrial waste;

(E) collection and disposal of garbage, refuse, and other discarded solid materials from industrial, commercial, agricultural and community activities or operations;

(F) *[Repealed, § 12 ch 172 SLA 1978.]*

(G) control of pesticides;

(H) other purposes as may be required for the implementation of the policy declared in AS 46.03.010;

(I) handling, transportation, treatment, storage, and disposal of hazardous wastes;

(11) after consultation with other state agencies and local government officials, identify and propose for additional or deletion, by regulation, other licenses, permits or authorizations for which the provisions of AS 46.35 are applicable, and report annually to the legislature the permits which have been included or deleted;

Repealed CH. 36 SLA 1990

~~(12) deposit environmental service fees into an account in the general fund;~~

(13) inspect the premises of sellers and suppliers of paint, vessels, and marine and boating supplies, and take other actions necessary to enforce AS 46.03.715. (§ 3 ch 120 SLA 1971; am § 1 ch 220 SLA 1976; am § 2 ch 60 SLA 1977; am § 12 ch 172 SLA 1978; am § 8 ch 93 SLA 1981; am § 86 ch 138 SLA 1986; am § 1 ch 67 SLA 1987)

under AS 47.25.120 - 47.25.300 (general relief), AS 47.25.310 - 47.25.420 (aid to families with dependent children), AS 47.25.430 - 47.25.615 (adult public assistance), and AS 47.25.975 - 47.25.990 (food stamps) shall be remitted to the Department of Revenue under AS 37.10.050(a).

Repealer

* Sec. 92. AS 10.15.535, 10.15.540; AS 14.56.035; AS 14.57.015; AS 16.05.053; AS 37.05.500(a)(1), 37.05.500(a)(4), 37.05.500(a)(6); AS 44.42.025; AS 44.83.195(c); and AS 46.03.020(12) and 46.03.025 are repealed.

* Sec. 93. Notwithstanding AS 37.10.050(a), as amended by sec. 1, ch. 138, SLA 1986, a fee charged by an agency under a regulation that was adopted before July 1, 1987, under authority of a statute that does not expressly authorize a charge for a service, is valid if it would have been valid before the 1986 amendment of AS 37.10.050(a). The regulation and fee remain in effect, and the agency may charge for the service, until the regulation is repealed or amended by the agency. To amend the regulation to change the fee, the agency shall meet the standard of AS 37.10.050(a) as amended by sec. 2 of this Act.

* Sec. 94. Notwithstanding AS 37.10.050(a), as amended by sec. 2 of this Act, a fee charged under a regulation that was adopted before the effective date of this Act that establishes a fee or other charge that exceeds the estimated actual cost to a state agency in administering the activity or providing the service for which the fee or charge is imposed is valid if it would have been valid before the effective date of this Act. The regulation and fee or charge remain in effect, and the agency may collect the fee or charge for the activity or service, until (1) the regulation is repealed or amended, or (2) two years after the effective date of this Act, whichever is sooner. If the regulation is amended to change the fee or charge, AS 37.10.050(a), as amended by sec. 7 of this Act, applies to the fee or charge.

[CONFORMED COPY]

AGREEMENT
FOR THE OPERATION AND MAINTENANCE
OF THE
TRANS ALASKA PIPELINE SYSTEM

BY AND AMONG

AMERADA HESS PIPELINE CORPORATION

ARCO PIPE LINE COMPANY

BP PIPELINES INC.

EXXON PIPELINE COMPANY

MOBIL ALASKA PIPELINE COMPANY

PHILLIPS PETROLEUM COMPANY

SOHIO PIPE LINE COMPANY

AND

UNION ALASKA PIPELINE COMPANY

6.7 Other Plans of Operation. Nothing in Section 6.2 hereof shall be deemed to prohibit Owners from participating in any plan of operation required, approved, or permitted by any governmental authority having jurisdiction in accordance with any valid and applicable order, rule, regulation and/or law, and which is not inconsistent with any other provision hereof or the TAPS Agreement.

SECTION 7

Operating Procedures

7.1 Quality and Intermixing of Petroleum.

(a) Only Petroleum will be accepted for transportation in the System. All Petroleum transported through the System will be intermixed with other Petroleum shipments and shall be subject to such changes in gravity, quality and other characteristics as may result from such intermixing. No person shall be entitled to receive the identical Petroleum delivered into the System. Delivery shall be out of the commingled stream or common stock. In order to insure that no shipper will be materially damaged or benefited by changes in gravity, quality or other characteristics due to intermixing in the System, each Owner will require shippers tendering it Petroleum for transportation in its undivided interest in the System to participate in just and nondiscriminatory adjustments among all shippers in the System for changes in gravity, quality and certain other characteristics which materially affect the value of Petroleum transported in the System. The Owners by agreement will establish, or cause to be established, a system for such adjustments (herein referred to as Quality Bank).

(b) Petroleum will not be accepted for transportation in the System unless (i) it is suitable for refining or use as a fuel and contains no more than one-half of 1% (0.5%) by volume of basic sediment and water [with the water being limited to two-tenths of 1% (0.2%)], (ii) its temperature does not exceed 140°F, (iii) its hydrogen sulfide (H_2S) content in solution does not exceed 50 parts per million by weight, and (iv) it will not result in the calculated combined stream of Petroleum in the System under the custody of each Owner at any given entry point in the System at any given time exceeding ten (10) parts per million hydrogen sulfide (H_2S) content in solution by weight, or the vapor pressure of such combined stream exceeding the greater of atmospheric pressure or 14.7 psia at receipt temperature. In calculating the above specified characteristics of the combined stream of Petroleum at any given entry point in the System under the custody of each Owner only Petroleum delivered into the System by that Owner at the point and all points upstream shall be considered. In no event will Petroleum be accepted for transportation in the System unless its gravity, viscosity, pour point, vapor pressure and other characteristics are such that it is readily susceptible to safe and efficient transportation through the System and will not materially affect the characteristics of other Petroleum shipments for which adjustments are not or will not be available through the Quality Bank.

(c) Before any Petroleum will be accepted for transportation through the System which is from any producing reservoir or processing plant from which Petroleum has not previously been accepted for transportation, the Owner to whom such Petroleum is tendered shall give the Operator and all other Owners written notice thereof at least thirty (30) days prior to its actual acceptance. Such notice shall include a suitable assay of the tendered Petroleum and Operator's advice as to the ability of the System to handle and transport such Petroleum safely and efficiently. During such thirty (30) day period each Owner shall advise Operator of any objections to the acceptance of such Petroleum solely on the basis of anticipated damage to the System or damage to the commingled stream of a kind for which just and reasonable compensation cannot be obtained through the Quality Bank. If any Owner so objects, the matter shall be referred to the Owners through the Owners Committee for resolution.

7.2 Measurements of Receipts and Deliveries of Petroleum. Operator shall ascertain and record the quantity and quality of Petroleum received into and delivered out of the System as follows:

(a) *Quantity Measurements.*

(i) *Meters.* Custody transfer measurement of all receipts into and deliveries out of the System shall be by meters except in instances where meters may not be operable or otherwise available in which case an alternate method provided for in the Oil Measurements Manual shall be used.

(ii) *Calibration of Meters.* Operator shall calibrate or cause to be calibrated, in accordance with the Oil Measurements Manual, all tanks, meters, and meter provers to be used in the operation of the System, and at the reasonable request of any Owner, Operator will confirm the accuracy of existing meter prover base volumes and tank tables used in connection with the System.

(b) *Quality and Characteristic Analysis.* Basic sediment and water (BS&W), temperature, gravity, and other Petroleum quality tests shall be made by Operator in accordance with the Oil Measurements Manual.

(c) *Reporting to Owners.* Operator shall report to each Owner for all Petroleum received into and delivered out of the System for the account of such Owner on the basis of standards set forth in the Oil Measurements Manual.

7.3 Petroleum Losses and Gains. All losses and gains of Petroleum from or in the System shall be allocated by Operator among the Owners as hereinafter set forth:

(a) The total amount of any loss of Petroleum in the Pipeline exceeding 4,000 Barrels occasioned by or resulting from any single identifiable event shall be allocated among all Owners based on their Percentage of Ownership in the Pipeline at the time the loss occurs.

(b) The total amount of any loss of Petroleum in Terminal Tankage exceeding 4,000 Barrels occasioned by or resulting from any single identifiable event shall be allocated among all Owners in the proportion that the Petroleum in the custody of each Owner in Terminal Tankage at the beginning of the Day on which the loss occurs bears to total Petroleum held in Terminal Tankage at the beginning of that Day.

(c) All gains and all other losses of Petroleum in the System or extractions from Petroleum in topping plants shall be allocated among all Owners in the proportion that the total 100 Barrel-Mile Deliveries for each Owner's account bears to the total of all 100 Barrel-Mile Deliveries. Operator shall make such allocations monthly, but the cumulative net amount of such gains, losses or extractions shall be adjusted monthly on a Calendar-Year-to-Date basis within a Calendar Year.

7.4 Scheduling and Use of the System. Each Owner's right to transport Petroleum through the System shall be in accordance with its Percentage of Ownership in the Pipeline. No Owner may receive into or transport through the System a Volume of Petroleum in excess of its Actual Daily Pipeline Capacity. No Owner may deliver out of the System a Volume of Petroleum in excess of the amount of Petroleum held in that Owner's Working Inventory and Owner's Base Inventory. Each Owner shall first deliver out of the System Petroleum held in its Owner's Working Inventory and may thereafter deliver Petroleum held in its Owner's Base Inventory provided:

(i) the lifting was included in the Lifting Schedule, or will not adversely affect the scheduled lifting of any other Owner.

(ii) the lifting will not impair the minimum required inventory operating levels as determined by Operator.

(iii) the lifting Owner's Base Inventory at the commencement of each such lifting is equal to the Volume of Base Inventory such Owner is obligated to provide under Section 7.6 hereof.

The throughput capacity of the System will vary from time to time because of variations in the gravity, viscosity and other characteristics of the Petroleum handled, deviations from full operability at design rates of all System facilities including but not limited to equipment failure, unplanned shutdown and other factors which may cause the actual throughput capacity of the System to deviate from design capacity. In order to insure that each Owner has the opportunity to schedule and use its Actual Daily Pipeline Capacity, Owners agree that the scheduling and use of the System shall be in accordance with the following provisions:

(a) *Scheduling and Use of the Pipeline.* By notice no later than two (2) Weeks prior to the Week of the anticipated Date of Commissioning and Weekly after such first notice, Operator will advise each Owner of the Estimated Daily Pipeline Capacity for each Owner for the six-Week period commencing two Weeks after the date of such notice. By notice no later than one (1) Week prior to the commencement of such six-Week period and Weekly after such first notice, each Owner will advise Operator of its throughput schedule for the six-Week period, commencing one Week after the date of such notice. Any Owner may at any time revise its schedule provided that no Owner shall schedule or deliver into the System more Petroleum than can be transported in such Owner's Estimated Daily Pipeline Capacity. Any Owner's failure for any reason to use fully its Estimated Daily Pipeline Capacity shall not thereafter entitle it to schedule or use capacity in excess of its Estimated Daily Pipeline Capacity.

(b) *Scheduling and Use of Terminal.*

(i) *Scheduling of Liftings and Vessels.* By notice no later than one (1) Week prior to the Week that any Owner expects to commence lifting Petroleum at the Terminal and Weekly after such first notice, each Owner will advise Operator of the schedule of Vessels it expects to call at the Terminal during the six-Week period commencing one (1) Week after such notice specifying for each Vessel scheduled during the first Week of such six-Week schedule and to the extent possible for the last five Weeks, the Volume to be lifted, name, size, place of registry, Scheduled Arrival Day, and such other information as required by the Port Information Manual. All Vessels scheduled by each Owner must be able to comply, and the party responsible for its operation shall comply, with the Port Information Manual.

(ii) *Preparation of Lifting Schedule.* Within twenty-four (24) hours from the time Owners are required to provide the above Vessel and lifting schedule information, Operator shall prepare and submit to each Owner a preliminary composite schedule of such information together with projected daily Working Inventory for the applicable six-Week period. If there are more proposed liftings on any Day during the first Week of such six-Week period than can be accommodated by the Terminal and such conflicts cannot be resolved voluntarily between the conflicting Owners, Operator shall resolve such conflicts by giving priority to Vessels whose Scheduled Arrival Day has been included in the Lifting Schedule the longest. If after applying the above rule there are still more such proposed liftings on any Day than can be accommodated, Operator will resolve remaining conflicts based on the following rules:

A. when Working Inventory is projected by Operator to exceed seventy-five percent (75%) of Working Capacity on the Day of such conflicts, Operator will give priority to Vessels scheduling the largest lifting,

B. when Working Inventory is projected Operator to be below twenty percent (20%) of Working Capacity on the Day of such conflicts, Operator will give priority to the Vessels scheduled by the Owner with the highest Volume of Working Inventory,

C. when Working Inventory is projected by Operator to be between twenty percent (20%) and seventy-five percent (75%) inclusive of Working Capacity on the Day of such conflicts, Operator will give priority to Vessels scheduled by the Owner with the highest percent of Owner's Working Capacity utilization.

After resolution of all conflicts in accordance with the above rules, the Lifting Schedule then established shall be issued to each Owner.

(iii) *Revision of Lifting Schedule.* Any changes may be made to the Lifting Schedule established in 7.4(b)(ii) by any Owner upon written notice to Operator at least seven (7) days in advance of a scheduled lifting subject to the scheduling priority rules provided for in Section 7.4(b)(ii). Changes with less than such seven (7) days notice may be made only in accordance with the following rules.

A. Vessel substitutions may be made at any time by notice to the Operator provided such substitution will not adversely affect any other Owner's scheduled liftings and the substituted Vessel complies with the Port Information Manual.

B. Any other changes and revisions may be made at any time provided,

1. the requested change or revision will not affect a lifting scheduled by any other Owner unless such other Owner's prior written consent is obtained, and

2. the requested change or revision will not, based on the Lifting Schedule, result in a projected Working Inventory in excess of seventy-five percent (75%) of Working Capacity within the next seven (7) Days or aggravate a Working Capacity condition which is already above such inventory level.

(iv) *Notice of Revised Lifting Schedule.* When a revision or change is made to the Lifting Schedule in accordance with 7.4(b)(iii) above, the Operator will promptly notify all the Owners of the revised Lifting Schedule and the effective date of the revision.

(c) *Failure to Comply with Lifting Schedule.*

(i) If a Vessel has not established an Actual Arrival Time within one (1) Day after such Vessel's Scheduled Arrival Day, the Owner scheduling such Vessel shall be charged (by way of a debit to its Operating Expense account) a penalty of five cents (5¢) per Barrel on ninety percent (90%) of the Volume scheduled to be lifted by such Vessel for each Day after the expiration of the time provided for above, when, at the beginning of that Day;

A. Working Inventory exceeds seventy-five percent (75%) of Working Capacity, and

B. such scheduled Vessel, a substitute Vessel or any other scheduled Vessel nominated to lift the scheduled Volume has not established an Actual Arrival Time.

(ii) If a vessel which has established an Actual Arrival Time does not lift at least ninety percent (90%) of the Volume scheduled to be lifted by such Vessel, the Owner scheduling such Vessel shall be charged (by way of a debit to its Operating Expense account) a penalty of five cents (5¢) on each Barrel less than ninety percent (90%) of the Volume scheduled to be lifted by such Vessel which remains unlifted at the beginning of each Day after the Day the Vessel completes its lifting, when, at the beginning of such Day;

A. Working Inventory exceeds seventy-five percent (75%) of Working Capacity, and

B. a substitute Vessel or any scheduled Vessel nominated to lift the unlifted Volume has not established an Actual Arrival Time.

(iii) Any penalty charged to an Owner under (i) or (ii) above shall be allocated to the other Owners (by way of a credit to their Operating Expense accounts) in the proportion that each such other Owner's Working Capacity not being used by each such Owner at the beginning of the Day the penalty is applied bears to the total Working Capacity not being used by all such Owners at the beginning of that Day.

(iv) Any delays in establishing an Actual Arrival Time due to:

A. any act or omission of Operator, or

B. any local event or condition of general application not within the control of Operator, the Owner scheduling such Vessel or any other person responsible for the operation or control of such Vessel

which act, event or condition does or would prevent all Vessels from establishing an Actual Arrival Time shall be subtracted from a Vessel's Actual Arrival Time in determining the time a Vessel would have but for such delay established an Actual Arrival Time under (i) or (ii) above.

(v) In addition, the penalty for failure to lift ninety percent (90%) of scheduled Volume provided for in (ii) above shall not be applied when such failure is due to

A. any act or omission of Operator, or

B. any local event or condition of general application (except mechanical equipment malfunction on the Vessel) not with the control of Operator, the Owner scheduling the Vessel or any other person responsible for the operation or control of such Vessel

which act, event or condition prevents that Vessel from lifting ninety percent (90%) of the Vessel's scheduled lifting.

(d) *Docks.*

(i) *Assignment of Dock Space.* Vessels shall be assigned dock space by Operator in the order of Actual Arrival Time. Provided, however, that Vessels establishing an Actual Arrival Time more than one Day prior to their Scheduled Arrival Day shall be assigned dock space by Operator earlier than one Day prior to their Scheduled Arrival Day only if such earlier assignment will not interfere with the docking of Vessels establishing an Actual Arrival Time on or one Day prior to their Scheduled Arrival Day. Each Vessel shall dock when and as instructed by Operator. If any Vessel is unable to dock when instructed, Operator shall dock the next Vessels waiting to be docked based on the order of dock assignment until the Vessel that was unable to dock is able to dock.

(ii) *Lifting Time.* After a Vessel has been docked, it shall be allowed twenty-four (24) hours from the time that Operator gives notice of readiness to commence either loading or deballasting within which to complete its lifting and to release its last line from a mooring point at the dock. If any Vessel fails to release its last mooring line before a specified departure time contained in a notice from Operator (which specified departure time shall not be earlier than the end of such twenty-four (24) hour period, nor earlier than four (4) hours after Operator transmits such notice to the Vessel), the Owner scheduling such Vessel shall thereafter pay a penalty of Two Thousand Dollars ($2,000) for each hour or part thereof such Vessel remains at the dock, while such dock is required to load another Vessel which has established an Actual Arrival Time. The Operating Expense account of the Owner incurring the penalty shall be debited with the full amount of any such penalty and the Operating Expense accounts of all other Owners shall be credited with a pro rata share of such penalty prorated on the basis of the Percentages of Ownership of the Pipeline of such other Owners.

Any delay due to:

A. any act or omission of Operator, or

B. a local event or condition of general application (except mechanical equipment malfunction on the Vessel) not within the control of Operator, the Owner scheduling the Vessel or any other person responsible for the operation or control of such Vessel

which act, event or condition prevents the Vessel from vacating the docks shall be added to the time until a Vessel is required to vacate the dock.

(e) *Working Capacity.* If, at the beginning of any Day, Working Inventory equals or exceeds seventy-five percent (75%) of Working Capacity and any Owner's Working Inventory is in excess of such Owner's Working Capacity, such Owner shall be charged a penalty of Twenty Cents (20¢) per Day per Barrel for each Barrel in such Owner's Working Inventory in excess of such Owner's Working Capacity. The Operating Expense account of the Owner incurring the penalty shall be debited with the full amount of any such penalty and the Operating Expense accounts of the other Owners shall be credited with an amount determined by multiplying the total amount of the penalty for any Day by a percentage determined for each Owner by dividing the amount of that Owner's Working Capacity at the beginning of that Day not being used by it by the aggregate of all Owner's Working Capacity at the beginning of that Day not being used by its Owner. In calculating the penalty under this Section 7.4(e), the number of excess Barrels at the beginning of any Day shall be reduced by

(i) the number of Barrels scheduled to be lifted by a Vessel which has established an Actual Arrival Time at the beginning of any Day the penalty is applied but is unable to dock because the passage through Prince William Sound or Valdez Arm is closed to shipping due to an event or condition not within the control of the Owner incurring the penalty, and

(ii) the number of Barrels scheduled to be lifted by a Vessel which has docked but is unable to lift at the beginning of any Day due to any act or omission of Operator or due to any local event or condition of general application not within the control of Operator, the Owner scheduling such Vessel or any person responsible for the operation or control of such Vessel which does or would prevent all Vessels from loading.

7.5 Manuals. Owners will arrange for the preparation of all manuals referred to in this Operating Agreement and such other manuals as are required for the safe and efficient operation of the System, or the administration of this Operating Agreement or which are required by any applicable law, regulation or agreement. Any such manuals or changes thereto shall be approved by the Owners through the Owners Committee. If there are any conflicts between the provisions of such manuals and the terms of this Operating Agreement, this Operating Agreement shall control.

7.6 Base Inventory. Each Owner shall provide or cause to be provided a Volume of Petroleum for Pipeline Base Inventory as required to begin and maintain the operation of the System equivalent to its Percentage of Ownership in the Pipeline multiplied by the total Volume of Petroleum required for Pipeline Base Inventory. Each Owner shall also provide or cause to be provided a Volume of Petroleum for Terminal Tankage Base Inventory as required to begin and maintain the operation of the System equivalent to its Percentage of Ownership in the Terminal Tankage multiplied by the total Volume of Petroleum required for Terminal Tankage Base Inventory. Operator shall give written notice to each Owner specifying the time or times after such notice that each Owner will be required to provide its share of Base Inventory required to commence operations. Subject to the lifting of Base Inventory as provided in Section 7.4 each Owner shall provide Base Inventory required to maintain its share when and as requested by Operator. If any Owner fails to provide its share of Base Inventory when and as requested by Operator, Operator may acquire the same and charge the cost thereof to the account of such Owner.

7.7 Transfers of Petroleum Within the System. Except as may result from a sale, transfer or assignment of an Owners interest in the System covered in Section 13 hereof, no Owner shall transfer its custodial responsibility for Petroleum within the System. Operator shall only account for transfers of Petroleum as a ticket transaction at receipt and delivery points.

7.8 Connections to the Pipeline. All connections made to the Pipeline shall be owned by the Owners in accordance with their Percentages of Ownership in the Pipeline. Connections shall be made to the Pipeline in accordance with all applicable laws and regulations and in accordance with standards and procedures which may be adopted by the Owners through the Owners Committee from time to time for the safe and efficient operation of the Pipeline.

FIRST AMENDMENT
TO
AGREEMENT FOR THE
OPERATION AND MAINTENANCE OF
THE TRANS ALASKA PIPELINE SYSTEM

THIS FIRST AMENDMENT to the Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System, entered into as of September 1, 1978 by and among Amerada Hess Pipeline Corporation, a Delaware corporation, ARCO Pipe Line Company, a Delaware corporation, BP Pipelines Inc., a Delaware corporation, Exxon Pipeline Company, a Delaware corporation, Mobil Alaska Pipeline Corporation, a Delaware corporation, Phillips Alaska Pipeline Corporation, a Delaware corporation, Sohio Pipe Line Company, a Delaware corporation, and Union Alaska Pipeline Company, a California corporation, herein called "Owners":

W I T N E S S E T H :

WHEREAS Owners or their predecessors in interest in the Trans Alaska Pipeline System entered into that certain agreement entitled "Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System" as of May 20, 1977, which said agreement governs the operation and maintenance of the Trans Alaska Pipeline System and the employment of an operator to perform on behalf of Owners certain services related to operating and maintaining the said System, and

WHEREAS Owners now desire to amend the said Agreement as provided hereinbelow:

NOW THEREFORE, in consideration of the mutual covenants herein contained and other good and valuable consideration, Owners hereby agree and covenant as follows:

1. Subparagraph (ii) of Paragraph (b) of Section 7.1 of the said Agreement for Operation and Maintenance of the Trans Alaska Pipeline System be and is hereby amended to read "(ii) its temperature does not exceed 142° F,".

2. In all other respects, the said Agreement for Operation and Maintenance of the Trans Alaska Pipeline System shall remain in full force and effect.

3. This First Amendment to the Agreement for Operation and Maintenance of the Trans Alaska Pipeline System may be executed in counterparts, each of which shall

SECOND AMENDMENT
TO
AGREEMENT FOR THE
OPERATION AND MAINTENANCE OF
THE TRANS ALASKA PIPELINE SYSTEM

THIS SECOND AMENDMENT to the Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System, entered into as of January 2, 1979 by and among Amerada Hess Pipeline Corporation, a Delaware corporation, ARCO Pipe Line Company, a Delaware corporation, BP Pipelines Inc., a Delaware corporation, Exxon Pipeline Company, a Delaware corporation, Mobil Alaska Pipeline Company, a Delaware corporation, Phillips Alaska Pipeline Corporation, a Delaware corporation, Sohio Pipe Line Company, a Delaware corporation, and Union Alaska Pipeline Company, a California corporation, herein called "Owners":

W I T N E S S E T H :

WHEREAS Owners or their predecessors in interest in the Trans Alaska Pipeline System entered into that certain agreement entitled "Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System" as of May 20, 1977, which said agreement governs the operation and maintenance of the Trans Alaska Pipeline System and the employment of an operator to perform on behalf of Owners certain services related to operating and maintaining the said System, and

WHEREAS said Agreement was heretofore amended by the provisions of the First Amendment thereto entered into by Owners as of August 1, 1978, and

WHEREAS Owners now desire to amend further the said Agreement as provided hereinbelow;

NOW THEREFORE, in consideration of the mutual covenants herein contained and other good and valuable consideration, Owners hereby agree and covenant as follows:

1. Subparagraph (ii) of Paragraph (b) of Section 7.1 of the said Agreement for Operation and Maintenance of the Trans Alaska Pipeline System be and is hereby amended to read:

> (ii) its temperature does not exceed 142° F, provided that petroleum may be accepted for transportation at any point in the System at a temperature in excess of 142° F but only under such circumstances and during such times as Operator hereunder determines, with approval of the Owners acting through the Owners Committee under Section 4.2 hereof, will not result in violation of any design or operating requirement for the System at any point in the System or result in inequities or discrimination as between Owners or shippers,

FIFTH AMENDMENT
TO
AGREEMENT FOR THE
OPERATION AND MAINTENANCE OF
THE TRANS ALASKA PIPELINE SYSTEM

THIS FIFTH AMENDMENT to the Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System, entered into as of the 15th day of April, 1982, by and among Amerada Hess Pipeline Corporation, a Delaware corporation, ARCO Pipe Line Company, a Delaware corporation, BP Pipelines Inc., a Delaware corporation, Exxon Pipeline Company, a Delaware corporation, Mobil Alaska Pipeline Company, a Delaware corporation, Phillips Alaska Pipeline Corporation, a Delaware corporation, Sohio Pipe Line Company, a Delaware corporation, and Union Alaska Pipeline Company, a California corporation, herein called "Owners";

WITNESSETH:

WHEREAS Owners or their predecessors in interest in the Trans Alaska Pipeline System entered into that certain agreement entitled "Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System" as of May 20, 1977, (which said agreement, as amended, is herein called "Agreement") which governs the operation and maintenance of the Trans Alaska Pipeline System and the employment of an operator to perform on behalf of Owners certain services related to operating and maintaining the said System, and

WHEREAS said Agreement was heretofore amended by the provisions of the First, Second, Third and Fourth Amendments thereto entered into among the Owners as of September 1, 1978, January 2, 1979, July 1, 1980 and September 1, 1980, respectively, and

WHEREAS Owners now desire to amend further the said Agreement as provided herein below;

NOW, THEREFORE, in consideration of the mutual covenants herein contained and other good and valuable consideration, Owners hereby agree and covenant that the Agreement shall be and hereby is amended as follows:

A new Subsection 7.9 shall be added to Section 7 to read:

7.9 Operation of Standby Pumping Units. Standby pumping units may be operated from time to time in the discretion of the Operator. In the event Owners, or any of them, construct facilities qualifying as an Expansion or Substage, as those

terms are used in the TAPS Agreement, and if the use of standby pumps as hereinabove authorized without the use of a drag reducing agent adds an increment of Design Capacity to that achieved by the defined Expansion facilities, the Design Capacity of the System shall include such increment attained by operating standby pumps.

IN TESTIMONY WHEREOF, this Fifth Amendment to the Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System is executed by Owners in counterparts, each of which shall be considered an original, effective as of the day and date first appearing above.

AMERADA HESS PIPELINE CORPORATION

By______________________

MOBIL ALASKA PIPELINE COMPANY

By______________________

ARCO PIPE LINE COMPANY

By______________________

PHILLIPS ALASKA PIPELINE CORPORATION

By______________________

BP PIPELINES INC.

By______________________

SOHIO PIPE LINE COMPANY

By L. C. Thomas

EXXON PIPELINE COMPANY

Form Ap. LPJ By [signature]

UNION ALASKA PIPELINE COMPANY

By______________________

WHEREAS said Agreement was heretofore amended by the provisions of the First, Second, Third, Fourth, Fifth, Sixth and Seventh Amendments thereto entered into among the Owners as of September 1, 1978, January 2, 1979, July 1, 1980, September 1, 1980, April 15, 1982, September 18, 1982 and August 1, 1983, respectively, and

WHEREAS Owners now desire to amend further the said Agreement as provided herein below;

NOW, THEREFORE, in consideration of the mutual covenants herein contained and other good and valuable consideration, Owners hereby agree and covenant that the Agreement shall be and hereby is amended as follows:

1. The first sentence of Paragraph (b) of Subsection 7.1 is hereby amended to read:

(b) Petroleum will not be accepted for transportation in the System unless (i) it is suitable for refining or use as a fuel and contains no more than thirty-five one hundreths of 1% (0.35%) by volume of basic sediment and water, (ii) its temperature does not exceed 142° F, provided that petroleum may be accepted for transportation at any point in the System at a temperature in excess of 142° F but only under such circumstances and during such times as Operator hereunder determines, with approval of the

Owners acting through the Owners Committee under Section 4.2 hereof, will not result in violation of any design or operating requirement for the System at any point in the System or result in inequities or discrimination as between Owners or shippers, (iii) its hydrogen sulfide (H_2S) content in solution does not exceed 50 parts per million by weight, and (iv) it will not result in the calculated combined stream of Petroleum in the System under the custody of each Owner at any given entry point in the System at any given time exceeding ten (10) parts per million hydrogen sulfide (H_2S) content in solution by weight or the vapor pressure of such combined stream exceeding the greater of atmospheric pressure or 14.7 psia at receipt temperature.

IN TESTIMONY WHEREOF, this Eighth Amendment to the Agreement for the Operation and Maintenance of the Trans Alaska Pipeline System is executed by Owners in counterparts, each of which shall be considered an original, effective as of the day and date first appearing above.

AMERADA HESS PIPELINE CORPORATION

By _____

MOBIL ALASKA PIPELINE COMPANY

By _____

BEFORE THE STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STATE OF ALASKA, DEPARTMENT OF ENVIRONMENTAL CONSERVATION, Complainant, vs. ALYESKA PIPELINE SERVICE COMPANY, Respondent.	COMPLIANCE ORDER BY CONSENT AND AGREEMENT SETTLING LIABILITY

This Compliance Order By Consent and Agreement Settling Liability is entered into by and between the Alaska Department of Environmental Conservation ("ADEC") and Alyeska Pipeline Service Company ("Alyeska") to settle all currently pending air quality disputes relating to permits for the construction, modification, operations, or any physical or operational changes to the trans-Alaska pipeline system ("TAPS"), including its pump stations and the Valdez Marine Terminal.

Allegations.

1. By letter to Alyeska's President James B. Hermiller dated June 18, 1990 (copy attached hereto as Exhibit A) ADEC has alleged that Alyeska has illegally failed to obtain prevention of significant deterioration ("PSD") and state emission permits pursuant to 18 Alaska Administrative Code ("AAC") 50.300 - .400 for changes made to TAPS since the time of its original construction. The United States Environmental Protection Agency ("EPA") in a Notice of Violation issued June 19, 1990 has made similar allegations under the federal Clean Air

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Act. ADEC's allegations, if true, may subject Alyeska to civil and criminal liability under, inter alia, AS 46.03.760 and 46.03.790. ADEC therefore alleges that the initiation of compliance order proceedings under AS 46.03.850 is justified.

2. Alyeska denies ADEC's allegations, and contends that it has obtained all required permits for its operations, has constructed and operated TAPS as originally permitted, and has not made any changes requiring PSD or state emission permits without obtaining such permits. Alyeska denies that compliance order proceedings are justified. However, Alyeska wishes to avoid the expense and uncertainty of litigation and further compliance order proceedings. Therefore, Alyeska voluntarily enters into this Compliance Order By Consent and Agreement Settling Liability ("Agreement") with ADEC.

Purpose.

3. The purpose of this Compliance Order by Consent and Agreement Settling Liability is to resolve all pending claims of ADEC with respect to the need for PSD or state permits for construction, modification, operation, or any physical or operational changes to TAPS from the time of its original permitting and construction through current operations, and to assure full compliance with all existing air quality permitting requirements.

Covenant Not To Sue.

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4. ADEC agrees not to bring any action, civil or criminal, against Alyeska, its officers and directors, the TAPS owner companies, or their officers and directors, for any penalties or sanctions for failure to obtain PSD or state emission permits for any action or event from the construction of TAPS through the date of this Agreement. ADEC will not encourage, directly or indirectly, any such action by EPA or others, but may take such action as is needed to fulfill its statutory responsibilities, such as by responding to public information inquiries or records requests under state law.

PSD Permit Application(s).

5. Not later than December 1, 1990 Alyeska will file pursuant to 18 AAC 50.300(c)(3) a best available control technology analysis ("BACT") of tank venting, as BACT is defined in 18 AAC 50.900(9), for the volatile organic compound ("VOC") emissions vented from the 18 crude oil storage tanks located at the Valdez Marine Terminal. The analysis will include a proposed schedule for application of each proposal for BACT Alyeska makes. Thereafter,

(a.) in the event that ADEC agrees with Alyeska's BACT analysis, then Alyeska shall take such installation or other action as might be required to apply the proposed BACT to tank venting in accordance with a schedule approved by ADEC; or

(b.) in the event ADEC disagrees with Alyeska's BACT analysis, it shall so notify Alyeska. If thereafter ADEC

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and Alyeska cannot come to an agreement with respect to the appropriate BACT, ADEC will make its selection of BACT for tank venting provided that in no event will Alyeska be required to spend more in costs of control than $3,000.00 per ton of VOCs. Alyeska may appeal pursuant to 18 AAC 15.200 - .310 ADEC's selection of BACT only on the grounds the BACT chosen by ADEC is unsafe, mechanically impossible to apply, or exceeds costs of control of $3,000.00 per ton of VOCs. If Alyeska does not appeal it will take such installation or other action as might be required to apply ADEC's choice of BACT. If Alyeska does appeal, absent a stay granted pursuant to 18 AAC 15.210 or an injunction granted by the Superior Court, it shall abide by ADEC's decision selecting BACT and install or take such other action according to the timetable set out in the decision pending completion of the appeal.

6. With respect to the three subjects enumerated in ADEC's letter of June 18, 1990, other than tank venting which is covered by paragraph 5 above, Alyeska may:

(a.) file PSD permit applications for any one or a combination of the three subjects, or

(b.) continue to operate in accordance with the applicable "allowable emissions" limitations set out in paragraph 7 below.

If Alyeska files a PSD permit application or applications under subparagraph (a) above but thereafter elects not to construct or to operate under the terms and conditions of

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any final PSD permit issued [after any appeals that may be taken of ADEC's best available control technology ("BACT") determination under 18 AAC 50.400(c) are finally resolved], it may instead continue to operate in accordance with the applicable allowable emissions limitations set out in paragraph 7 below with respect to the subject matter of the application or applications. If a final PSD permit is issued and Alyeska elects under the preceding sentence not to operate under it, it shall so notify ADEC and ask that the PSD permit be rescinded.

Allowable Emissions.

7. The allowable emissions for the three subjects, other than tank venting covered by paragraph 5 above, enumerated in ADEC's June 18, 1990 letter are as follows:

(a.) The sulfur content of the liquid fuel used to power the Avon gas generators at pump stations #6 - 10, and 12, may be no higher than .17 percent.

(b.) The Avon gas generators at the pump stations may be operated under the maximum fuel consumption rates and subject to the limitations in the attached Exhibit B for liquid fuel-fired generators and the attached Exhibit C for gas fired generators.

(c.) Each of the waste gas incinerators at the Valdez Marine Terminal may be operated at a maximum incineration rate of 184 million british thermal units ("MMBTU") per hour, or a maximum monthly average of 522 MMBTU per hour total for all

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three waste gas incinerators, and within design limits for minimum and maximum operation of any individual incinerator.

Emission Limitations Pending New PSD Permits.

8. For any source subject to a PSD application or applications filed under paragraph 6 above, Alyeska will comply with the allowable emissions limitations set out in paragraph 7 while such PSD application or applications are pending ADEC's review and at all times in the future unless and until such limitations are altered by a PSD permit issued by ADEC pursuant to 18 AAC 50.300 - .400 or otherwise altered under the provisions of this paragraph 8. Alyeska may petition the ADEC's Director of the Division of Environmental Quality for permission to burn fuel in the Avon gas generators with a higher sulfur content than specified in subparagraph 7(a) above, or to operate such generators at greater fuel consumption rates than those specified in subparagraph 7(b) above for such periods of time as may be determined by ADEC during PSD permit processing. If Alyeska files such a petition with the Director, it shall include an adequate description explaining why the allowable emission limitation(s) impose unreasonable economic burdens or limits pipeline throughput without significant environmental benefit. The Director's decision to allow or not allow any such periods of operation will be at his or her sole discretion and subject to conditions imposed by the Director, and will not be subject to appeal to the ADEC Commissioner or to any court.

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9. Pending completion of BACT review for the VOC emissions from the crude oil storage tanks at the Valdez Marine Terminal, and any additional time required for appeals or construction and installation of equipment necessary to bring Alyeska into compliance with the requirements of any permit, Alyeska shall limit venting time from the 18 crude oil storage tanks at the Valdez Marine Terminal to .5% of the time based on a monthly average. For the purposes of determining compliance with this .5% limitation, venting time will not include:

(a.) downtime due to scheduled maintenance ("scheduled maintenance" as defined in paragraph 15 below) or emergency repair of the vapor recovery system. ADEC will be notified in advance of any of these activities;

(b.) venting due to unavoidable operational upsets and/or equipment malfunctions ("malfunctions" as defined in paragraph 15 below).

Alyeska will submit to ADEC a best operations management plan for the 18 crude oil storage tanks and the vapor recovery system not later than October 1, 1990. The plan will include a proposed definition of "operational upsets" and a justification for the definition, detailing the likely operational upsets that would produce tank venting. To the extent the provisions of this paragraph are inconsistent with the provisions of paragraph 15 below, pending implementation of BACT under paragraph 5 above the provisions of this paragraph shall govern.

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Waiver of Judicial Review Rights.

10. As between it and ADEC, Alyeska will not contest PSD applicability for the four subjects enumerated in ADEC's June 18, 1990 letter, or challenge the allowable emissions limitations set out in paragraph 7 above. However, nothing herein shall bar Alyeska from contesting PSD applicability as between it and EPA or other third parties should they seek penalties or sanctions based upon such PSD applicability under the federal Clean Air Act or any approved section(s) of the State of Alaska Air Quality Control Plan.

Permit Renewal Applications.

11. Ordinarily an ADEC air quality control permit applicant must file the application 30 days before the proposed effective date of the permit or permit renewal. ADEC and Alyeska agree that this 30 day period is often too short a time for careful consideration of a requested permit, particularly when the permit renewal involves revisions to the expiring permit or involves consideration of physical or operational changes at a facility. Accordingly, Alyeska agrees that henceforth it will file applications for air quality control permit renewals for the pump stations and Valdez Marine Terminal at least 90 calendar days before the expiration date on the then existing permit. ADEC agrees that it will release to Alyeska a draft permit renewal or permit denial, for review, at least 30 calendar days

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prior to the expiration date of the existing permit, or at the time any notice is published under 18 AAC 50.400(a)(1), which ever event occurs first. Within 15 days of receiving the draft, Alyeska may request that ADEC meet with its representatives to discuss the draft permit or denial. Should Alyeska not file a permit renewal application at least 90 days before the expiration date of an existing permit, ADEC will be relieved of any obligation under this paragraph. Accordingly, a breach of this paragraph by either Alyeska or ADEC will not be considered a material breach of this Agreement, nor subject Alyeska to any penalty, and this paragraph will not otherwise be enforceable under AS 46.03.760 or 46.03.790 or other applicable law against either party.

Advisory Working Group.

12. ADEC, in consultation and cooperation with Alyeska, will create an advisory working group of technically qualified and competent individuals for the purposes set out below. The group shall consist of 3 representatives each from Alyeska and ADEC, which representatives may not be attorneys and need not be employees of either party, and may be replaced from time to time as the need arises. Alyeska will provide consultants and other support as necessary, and will provide the group with such information as the group may require. Alyeska and ADEC will designate their respective 3 representatives in writing to the other within 10 working days of the effective date

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of this Agreement, which representatives may be replaced by other qualified individuals as the need arises. The group will conduct its work and any studies in a cost-efficient and objective manner. The group will be co-chaired by an ADEC and Alyeska representative. The group will advise and make written recommendations, including majority and minority reports, to ADEC not later than March 1, 1991 (except as an earlier date is otherwise noted below) on:

(a.) proposed BACT selections for venting from the 18 crude oil storage tanks at the Valdez Marine Terminal and for any PSD permit application filed under paragraph 6 above. The group's written recommendations for BACT selection(s) for venting from the 18 crude oil storage tanks shall be delivered to ADEC not later than January 15, 1991;

(b.) any additional emissions data that the group determines to be necessary to evaluate any significant emission sources operated by Alyeska at the pumps stations or Valdez Marine Terminal for compliance with applicable emission limitations;

(c.) best management practices for inclusion in future Valdez Marine Terminal permits governing the operation and routine maintenance of the Valdez Marine Terminal vapor recovery system, including waste gas incinerators and crude oil storage tanks, so as to reduce venting of VOCs from the crude oil storage tanks to the maximum extent possible and to maintain the maximum combustion efficiency of the waste gas incinerators;

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(d.) appropriate routine data collection and monitoring requirements for inclusion in future permits including, but not limited to, recommendations as to the potential for installation of continuous emission monitors, for existing significant emission sources operated by Alyeska;

(e.) reasonable measures to avoid the occurrence of excessive emissions which might otherwise occur during malfunctions, startups, shutdowns and necessary maintenance of existing significant emission sources operated by Alyeska;

(f.) the feasibility of establishing emission limits, operating parameters and methods for monitoring such limits and parameters for the ballast water treatment system.

For the purpose of only this paragraph 12, "significant emission sources" includes any source listed in 18 AAC 50.300(a)(5) with annual emissions, excluding fugitive emissions as defined in 18 AAC 50.900(49), of an air pollutant regulated under the federal Clean Air Act of more than 100 tons per year, or any other source with annual emissions, excluding fugitive emissions as defined in 18 AAC 50.900(49), of an air pollutant regulated under the federal Clean Air Act of 250 tons per year or more.

Reimbursement of ADEC's Costs Of Working Group.

13. Alyeska will reimburse ADEC for its reasonable costs incurred after the date of this Agreement in participating in the advisory working group created pursuant to paragraph 12

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above and in processing the PSD permit applications and BACT analyses submitted pursuant to paragraphs 5 and 6 above. Reasonable costs will include costs such as any ADEC consultant fees, ADEC staff time at $35.00 per hour, and incidental administrative costs and expenses, such as for travel and photocopying. Such costs will be billed to Alyeska on a monthly basis; total costs which ADEC may bill Alyeska for ADEC's participation in the working group after the date of this Agreement shall not exceed $100,000.00. ADEC will provide adequate documentation to Alyeska of all costs claimed as reimbursable under this paragraph to Alyeska.

Reimbursement of Past Costs.

14. Alyeska will pay to the State of Alaska not later than 10 working days from the effective date of this Agreement the sum of $250,000.00. This sum shall reimburse ADEC for its costs of investigating PSD and permit matters and issuing interim permits to Alyeska for the period from December 1987 to the date of this Agreement.

Upset, Malfunction and Scheduled Maintenance.

15. The pump station and Valdez Marine Terminal air quality control permits are hereby amended to include the following condition governing upsets, malfunctions and scheduled maintenance:

"DEFINITIONS

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'Excess emissions' means the emission of air contaminants in excess of applicable emission limitations or requirements in this permit or in any applicable regulation in 18 AAC 50.

'Malfunction' means any sudden and unavoidable failure of a source, including air pollution control equipment, process equipment or process to operate in an expected manner; failures caused entirely or in part by poor maintenance, careless operation or any other preventable equipment breakdown shall not be considered a 'malfunction'.

'Scheduled maintenance' means maintenance of a source which occurs during a period established by a term of this permit, or which begins 7 working days after the permittee provides written notice to the Department, or for which the Department has otherwise provided written permission.

'Shutdown' means the cessation of operation of any source, including pollution control equipment, process equipment or process for any purpose.

'Startup' means the setting into operation of any source, including pollution control equipment, process equipment or process.

TREATMENT OF EXCESS EMISSION INCIDENTS.

Excess emissions caused because of a startup, shutdown, malfunction or period of scheduled maintenance of a source (including pollution control equipment, process equipment

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or process) shall not be considered a violation of this permit or the emission limitations of 18 AAC 50, or counted as an increase in emissions for purposes of 18 AAC 50.300(6)(B) and (C) provided that:

1. the excess emissions do not occur with such frequency that careless, marginal or unsafe operation is indicated, or are not part of a recurring pattern indicative of inadequate design, operation or maintenance;

2. the emission of air contaminants is reduced as much as practicable during the period of excess emissions;

3. during scheduled maintenance, repairs to the equipment causing the excess emissions are made with maximum reasonable effort, including the use of off-shift and overtime labor as needed and as available;

4. when startup or shutdowns are a frequent part of routine operations, the permittee takes maximum effort to reduce excess emissions during such startup or shutdown;

5. to the maximum extent practicable, permittee maintained and operated the source of the excess emissions in a manner consistent with good practice for minimizing emissions and otherwise consistent with the manufacturer's suggested operation and maintenance practices; and

6. permittee notified the Department of the excess emissions incident by telephone not later than 24 hours after the permittee knows or reasonably should have known of the event, and included in the notification a description of the nature of the

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occurrence, of its duration, of the steps taken consistent with 1) through 5) immediately above, as applicable, and permittee timely provided a written report of the excess emissions incident consistent with the reporting requirements of the permit."

The foregoing condition replaces paragraphs 22 and 23 of the existing Valdez Marine Terminal permit, paragraphs 13 and 14 of the existing pump station 1 through 4 permits, and paragraphs 14 and 15 of the existing pump station 12 permit, and will be deemed to be included as a condition in the upcoming permits for pump stations 6 through 10. For each permitted facility, Alyeska will notify ADEC of any excess emissions incident in compliance with paragraph 6 of the above quoted condition governing upsets, malfunctions and scheduled maintenance.

Withdrawal of Appeals and Motions for Stay.

16. Alyeska hereby withdraws its requests for adjudicatory hearings and motions for stay filed with ADEC for pump stations #1 through 4 and 12, and for the Valdez Marine Terminal, without prejudice to its right to file such requests or motions for future permits. Alyeska agrees that it will not file such requests or motions for the pump station #6 through 10 permits when issued on or before October 1, 1990, provided that such permits are no more stringent than the draft permits received by letter dated September 7, 1990, without prejudice to its right to file such requests or motions for future permits.

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The purpose of this provision is to give the advisory working group time to perform the analyses and make the recommendations required by paragraph 12 above for the purpose of longer term pump station and Valdez Marine Terminal permits.

Valdez Marine Terminal Vapor Recovery System.

17. For the purposes of this Agreement and future permits Alyeska agrees that ADEC currently has statutory and regulatory authority to require as a permit condition that Alyeska operate and maintain in good working order the existing vapor recovery system, including the waste gas incinerators and associated piping and equipment, at the Valdez Marine Terminal.

Delays.

18. If any event occurs which Alyeska believes will or may cause delay in or prevent the achievement of any provision of this Agreement, Alyeska shall notify ADEC in writing within 7 calendar days of becoming aware of the anticipated delay or inability to comply and describe the expected length of the delay, the precise cause or causes of the delay or the reasons for its inability to comply, and any measures it intends to take to minimize the delay or attempt to avoid noncompliance. Alyeska may request within the 7 day period a meeting with ADEC to explain the anticipated delay or inability to comply. For events causing delay or inability to comply that could not have reasonably been foreseen or anticipated, such as an earthquake,

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Alyeska shall notify ADEC in writing within 7 days of the occurrence of the event.

If ADEC finds that (a) Alyeska has complied with the notice requirements of the preceding paragraph, and (b) that any delay or inability to comply has or will be caused by engineering, design or installation problems which could not reasonably have been foreseen and prevented, or by labor strife, a natural disaster (such as an earthquake) or by other circumstances beyond the reasonable control of Alyeska, ADEC shall extend the time for performance for a period no longer than the delay resulting from those circumstances.

If the ADEC determines that Alyeska has not complied with the notice requirements of the preceding paragraph, or that the event causing the delay or inability to comply is not beyond the reasonable control of Alyeska, failure to comply with the provisions of this Agreement shall constitute a breach of its requirements. ADEC shall notify Alyeska in writing of its reasons or findings in the event ADEC denies Alyeska's request for an extension of time or denies waiver of the performance required hereunder. The burden of proving the delay or inability to comply is caused by circumstances beyond the control of Alyeska, and, if applicable, the length of any such delay attributable to those circumstances, shall rest with Alyeska. Increases in cost or expenses incurred by Alyeska in fulfilling the requirements of this Agreement shall not be a basis for any extension of time or excuse for inability to comply. Any

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approved delay in or waiver of interim requirements shall not automatically justify or excuse delay in the attainment of subsequent requirements. Alyeska's submission of a request for an extension of time does not toll any time specified in this paragraph unless ADEC provides a written extension.

ADEC's decision under this paragraph shall constitute final agency action for purposes of judicial review under Alaska Rule of Appellate Procedure 602(a)(2). However, ADEC's decision shall remain in effect pending resolution of the appeal unless a stay is granted by the court. Unless stayed by the court, any stipulated penalties imposed under paragraph 19 of this Agreement shall continue to accrue during any appeal unless a final decision on appeal is rendered in Alyeska's favor, in which case Alyeska shall not be liable to pay the stipulated penalties.

Stipulated Penalties.

19. Should Alyeska fail to meet the BACT analysis deadline set out in paragraph 5 above, it shall pay to the State of Alaska $100,000.00 for the first day the deadline is missed, and an additional $5,000.00 penalty for each day thereafter that the deadline is missed, subject to the provisions of paragraph 18 above governing excused delays.

Reservation Of Rights.

20. Except as otherwise expressly provided in this Agreement, the State of Alaska reserves the right, and this

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Agreement does not waive any such right, to investigate, pursue or bring any claim, civil or criminal, legal or equitable, including but not limited to claims under AS 46 of any kind, or issue any order against Alyeska for any future violation of any statute, regulation, permit, approval, order (including but not limited to this Agreement) or acceptance, including but not limited to any violation of any permit, order, statute or regulation governing the emission of air contaminants, and Alyeska reserves all rights and defenses against all such claims that may be asserted by the State of Alaska.

Nothing in this Agreement is a waiver by ADEC of its rights under AS 46.03.820 (governing emergencies).

Enforceability Under AS 46.03.760, 46.03.765 and 46.03.790

21. Except for paragraph 11 above, the provisions of this Agreement shall be considered an enforceable order against Alyeska for the purposes of AS 46.03.760, 46.03.765 and 46.03.790.

18 AAC 95 Waiver.

22. In partial consideration for this Agreement, Alyeska knowingly and voluntarily waives all its rights and the procedures which would otherwise attach to the issuance of a compliance order under 18 AAC 95.

Amendment.

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23. No amendment to this Agreement is valid unless approved in writing by the undersigned representative of ADEC (or a duly authorized designee) and by a duly authorized representative of Alyeska.

Effective Date.

24. The effective date of this Agreement is the date it is signed by the authorized ADEC official below.

Dated: September 15, 1990.

ALYESKA PIPELINE SERVICE COMPANY

James Hermiller ATS

By: James Hermiller
Title: President

Dated: September 19, 1990

ALASKA DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Michele Brown

By: Michele Brown
Title: Regional Administrator

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STATE OF ALASKA

STEVE COWPER, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF ENVIRONMENTAL QUALITY
P.O. BOX 0, JUNEAU, ALASKA 99811-1800

Telephone
(907) 465-2640

June 18, 1990

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RETURN RECEIPT
REQUESTED
No. P 085 965 067

RECEIVED
JUN 18 1990
J. B. HERMILLER

Mr. James B. Hermiller, President
Alyeska Pipeline Service Company
1835 South Bragaw Street
Anchorage, AK 99512

cc: L.E. Volma
K.L. Kelley

Dear Mr. Hermiller:

As you know, the Alaska Department of Environmental Conservation (the Department, ADEC) has been concerned for several years that Alyeska Pipeline Service Co. (Alyeska, APSCo.) made modifications to trans-Alaska pipeline facilities without the review and approval of the Department as required by Title 18 of the Alaska Administrative Code (AAC) Section 50.300(a). The Department's concern arose initially because the visible air quality at Valdez appeared to be deteriorating, and because of concerns about the impact of the transporation and storage of natural gas liquids. Since 1988 ADEC has conducted an extensive investigation of these and other issues, based in part on information submitted to ADEC and the Environmental Protection Agency (EPA) over the last two years.

Based on this review, ADEC believes that Alyeska Pipeline Service Co. has made the following modifications of facilities as described in 18 AAC 50.300(a)(5)(C) and .300(a)(6)(C) and as defined in 18 AAC 50.900(28):

1. An increase in maximum fuel consumption at each main gas turbine located at Pump Stations 1-4, 6-10, and 12, associated with the addition of rim cooling to these sources. This modification has resulted in an increase in oxides of nitrogen (NOx) emissions at Pump Stations 1-4, 6-10, and 12 greater than the 40 tons/yr quantity set out in 18 AAC 50.300(a)(6)(C)(ii).

2. An increase in the maximum fuel sulfur content from 0.17 percent to 0.4 percent in the fuel oil used for the main gas turbines located at Pump Stations 6-10 and 12. This modification has resulted in an increase in sulfur dioxide (SO_2) emissions at Pump Stations 6-10 and 12 greater than the 40 tons/yr quantity set out in 18 AAC 50.300(a)(6)(C)(iii).

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Exhibit A

3. The release of volatile organic compounds (VOC) on an intermittent basis from crude oil storage tank vents without collection by a vapor recovery system at the Valdez Marine Terminal. These intermittent releases have resulted in an increase in VOC emissions at the Valdez Marine Terminal greater than the 40 tons/yr quantity set out in 18 AAC 50.300(a)(6)(C)(v).

4. An increase in the maximum rated capacity of the waste gas incinerators located at the Valdez Marine Terminal. This modification has resulted in an increase in NOx and SO_3 emissions at the Valdez Marine Terminal greater than the 40 tons/yr quantities set out in 18 AAC 50.300(a)(6)(C)(ii) and (iii).

These and other changes at the Alyeska Pipeline Service Co. facilities fall within the purview of 18 AAC 15.100(c), which forbids the owner of an existing facility from expanding, modifying, or making any other change in a facility process or operation which might result in an increase in emissions of any size without first securing a new permit. The Department has not aggregated the smaller increases in emissions from each of the other sources modified or added to a particular facility for the purposes of determining the applicability of 18 AAC 50.300(a)(6)(C). Review of the accumulation of increases in emissions from a series of modifications at the same facility is required under the regulations. The Department reserves the right to pursue the other modification and accumulation issues; however, in order to address the most serious of the outstanding issues, ADEC has elected for now to discuss in detail only the four items identified above.

Increase in Maximum Fuel Usage at Pump Stations

In the 1974 air quality control permit applications for the main gas turbines at Pump Stations 1-4, 6-10, and 12 (December 15, 1988, Sec. 114 response, Vol. I, exh. 1), Alyeska listed the maximum fuel usage for each main gas turbine as 167 thousand standard cubic feet per hour (MSCF/hr) for natural gas firing, and 6,000 pounds per hour (lbs/hr) for turbine fuel oil firing.

In the December 15, 1988, Sec. 114 response to the EPA (page 35, Table 3), Alyeska quantified the maximum fuel usage for each main gas turbine as 168 MSCF/hr for natural gas firing and 1,116 gals/hr for liquid fuel firing before the addition of rim cooling, and 207 MSCF/hr for natural gas and 1,373 gals/hr for liquid fuel after the addition of rim cooling.

When the NOx emissions from the gas turbines at the 1974 fuel rate are compared with the NOx emissions at the 1988 fuel rate, the increase in NOx emissions due to the increase in fuel usage resulting from the addition of rim cooling is approximately 48 tons/yr per turbine for Pump Stations 1-4, and approximately 174 tons/yr per turbine for Pump Stations 6-10, and 12 (see Attachment A for calculations).

The increase in emissions of NOx at each pump station is greater than the 40 tons/yr quantity listed in 18 AAC 50.300(a)(6)(C)(iii). Therefore, the addition of rim cooling to each main gas turbine represents a modification, as defined by 18 AAC 50.900(28) of a "major" facility described in 18 AAC 50.300(a)(6)(C), and a permit application and review is required in accordance with 18 AAC 50.300(b) and (c) and 50.400(c)(3), as well as by the federal prevention of significant deterioration (PSD) regulations at 40 CFR 52.21(b)(2).

Increase in Maximum Sulfur Content of Fuel

In the 1974 air quality control permit applications for the main gas turbines at Pump Stations 10 and 12 (December 15, 1988, Sec. 114 response, Vol. I exh. 1), Alyeska listed the maximum sulfur content of the fuel burned in the main gas turbines as 0.17 percent and identified the grade of fuel as "ASTM No.1 - GT fuel." Furthermore, in an October 19, 1974, letter from Mr. Frank Therrell of Alyeska to Dr. Max Brewer of ADEC, Alyeska amended the 1974 permit applications for the main gas turbines at Pump Stations 6-9 to lower the maximum sulfur content from 0.94 percent to 0.17 percent for the fuel burned in these main gas turbines, saying:

> Since submission of the permit applications for Pump Station 5, 6, 7, 8, 9, and 11, it has been decided not to use Prudhoe Bay crude oil as a fuel source for the Turbine Drivers - Mainline Pumps. These pump stations will use the same fuel (ASTM No. 1 -GT fuel) as is planned for Pump Stations 10 and 12. This change will result in a lower SO2 emission from these stations by a factor of four times.

(See page 1 of the October 19, 1974, Therrell letter.)

In a May 1, 1990, letter from Mr. Oscar E. Dickason of Alyeska to Mr. William D. McGee of ADEC, Alyeska states that the sulfur content of the turbine fuel produced at Pump Station 10 and used at Pump Stations 10 and 12 averaged 0.33 percent and ranged from 0.29 percent to 0.4 percent (page 8). Alyeska goes on to say that this range in turbine fuel sulfur content is generally representative of the sulfur content of the turbine fuel produced at Pump Stations 6 and 8, which is used at Pump Stations 5, 6, 7, 8 and 9.

When the SO_2 emissions from the main gas turbines at the 1974 maximum fuel sulfur content of 0.17 percent are compared with the SO_2 emissions at the 1990 maximum fuel sulfur content of 0.4 percent, the increase in SO_2 emissions due to the increase in the fuel sulfur content is approximately 243 tons/yr per turbine for Pump Stations 6-10 and 12 (see Attachment A for calculations).

The net increase in emissions of SO_2 at each pump station is greater than the 40 tons/yr quantity listed in 18 AAC 50.300 (a)(6)(C)(iii). Therefore, the increase in the sulfur content of the fuel burned in the main gas turbines at Pump Stations 6-10 and 12

represents a modification, as defined by 18 ACC 50.900(28), of a facility described in 18 AAC 50.300(a)(6)(C), and a permit application and review is required in accordance with 18 AAC 50.300(b) and (c) and 50.400(c)(3).

Volatile Organic Compounds from Crude Oil Storage Tanks

In the 1974 air quality control permit application for the Valdez Marine Loading Terminal (VMT), there is no description or quantification of venting from crude oil storage tanks (December 15, 1988, Sec. 114 response, Vol.I, exh. 1). Furthermore, in the November 19, 1974, Air Quality Control Permit to Operate (Permit # AQC-228), there are no permit conditions allowing the venting of the crude oil storage tanks.

According to the April 1974 Air Quality Summary Report for the VMT (December 15, 1988, Sec. 114 response, Vol. II, exh. 3), hydrocarbon emissions from the crude oil storage tanks would be "virtually eliminated" by the use of an elaborate vapor recovery system which confines and interchanges vapors among the tanks and incinerates any surplus vapor (page 2-1). In the report's summary of miscellaneous sources of hydrocarbon emissions that would be uncontrolled, no mention of crude oil storage tank venting is made (pages 6-7 to 6-8).

After reviewing Alyeska's crude oil storage tank reports for the time period from January 1, 1990, to April 25, 1990, the Department estimates the annual VOC emissions from tank venting to be approximately 350 tons/yr (see attachment B for calculations). This estimate is conservative because it does not account for the lack of venting data for the time period from March 19 to March 25, 1990, when the vapor recovery system was shut down for piping replacements.

Alyeska has changed its method of operation of the crude oil storage tank and vapor recovery system, which is a modification as defined by 18 AAC 50.900(28) of a facility described in 18 AAC 50.300(a)(5)(C), and a permit application and review is required in accordance with 18 AAC 50.300 and (c) and 50.400(c)(3).

When questioned if State or federal permits were issued allowing crude oil storage tank venting, Alyeska responded in a May 1, 1990, letter from Mr. Oscar E. Dickason of APSCo to Mr. Bill Lamoreaux of ADEC that minor venting has occurred since terminal operations first began in 1977 to relieve overpressure and during emergency situations, upsets, breakdowns, and malfunctions. Alyeska's May 1, 1990, letter goes on to say that the fact that ADEC permitted each crude oil storage tank with breather valves indicates that ADEC anticipated some tank venting would occur as early as 1974.

The Department disagrees with this position for a number of reasons, including the following:

- The conservative estimate of 350 tons/yr of VOC emissions due to crude oil tank venting is not a "minor" source of VOC emissions by any standard or definition.

- The Department's permitting of storage tanks with overpressure vents can only be reasonably construed to indicate that some occasional venting during a true emergency episode was anticipated.

- It is clear that ADEC did not anticipate that "emergency" venting would become Alyeska's routine, day-to-day operating practice for the crude oil storage and vapor recovery system, and nothing in Alyeska's permit application and supporting documents suggests anything but that all excess vapors would be incinerated.

Based on that information, the Air Quality Control Permits to Operate issued to Alyeska have never allowed venting of VOC vapors from the crude oil storage tanks. According to Alyeska's venting reports, crude oil storage tank venting has been routine, particularly before the recent repairs to the waste gas incinerators.

Increase in Fuel Usage and Capacity of Waste Gas Incinerators

A. In the 1974 air quality control permit application for the waste gas incinerators at the VMT, Alyeska listed the maximum combined waste gas usage for three waste gas incinerators as 1,800 thousand standard cubic feet per hour (December 15, 1988, Sec. 114 response, Vol. I, exh. 1). According to the results of the January 24-25, 1990, source tests conducted on the waste gas incinerators, the maximum combined waste gas flow rate for the three recently modified waste gas incinerators is equal to 2,160 thousand standard cubic feet per hour.

When the NOx emissions from the waste incinerators using the 1974 fuel flow rate are compared with the NOx emissions at the 1990 waste gas fuel flow rate, the resulting NOx emissions increase due to the higher waste gas flow rate is equal to approximately 71 tons/yr per incinerator (see Attachment C for calculations).

The increase in emissions of NOx per incinerator is greater than the 40 tons per year quantity listed in 18 AAC 50.300(a)(6)(C)(ii). Therefore, the increase in the waste gas flow rate to each incinerator due to recent modifications represents a modification as defined by 18 AAC 50.900(28), of a facility described in 18 AAC 50.300(a)(6)(C), and a permit application and review are required in accordance with 18 AAC 50.300(C) and .400(e)(3).

B. The original design specifications for the waste gas incinerators state that the maximum heat rate of each incinerator is equal to 174 MMBtu/hr per incinerator with a maximum waste gas flow rate to each incinerator equal to 600 MSCF/hr (John Zink incinerator spec. sheet, May 6, 1974, Case III). This waste gas flow

rate corresponds to the waste gas flow rates listed in the 1974 air quality permit application for the waste gas incinerators. Therefore, the original 1974 permit application and Air Quality Control Permit to Operate were for waste gas incinerators with a maximum rated heat capacity of 174 MMBtu/hr per incinerator.

When questioned about the maximum rated capacity of the original incinerators installed at the VMT, Alyeska responded in the May 1, 1990, letter from Mr. Oscar E. Dickason of Alyeska to Mr. Bill H. Lamoreaux of ADEC that the waste gas incinerators originally built at the VMT were rated at 400 MMBtu/hr per incinerator and the maximum rated capacity of the recently modified incinerators has not changed from this original capacity. Furthermore, Alyeska argues that the operating parameter which remains constant and should be used to measure the rated capacity of the incinerators is the maximum heat rate of each incinerator in terms of MMBtu/hr and not the maximum waste gas flow rate to each incinerator. As a result, Alyeska goes on to argue that the recent modifications to the incinerators have not increased capacity. Alyeska claims that this is because the maximum waste gas flow rate to each incinerator will vary according to the heat content of the waste gas. According to Alyeska's May 1, 1990, letter, between 1985 and 1989, the quarterly average heat content of the waste gas has ranged from 307 BTU/scf to 910 BTU/scf.

When the NOx and SO_2 emissions from the waste incinerators using the permitted heat rate of 174 MMBtu/hr are compared with the NOx and SO_2 emissions at the heat rate of 400 MMBtu/hr actually installed, the resulting increase in NOx emissions from each incinerator due to the higher heat rate is equal to approximately 247 tons/yr per incinerator. The resulting increase in emissions of SO_2 from the three incinerators is equal to a total of 63 tons/yr (see Attachment D for calculations).

The increases in emissions of NOx and SO_2 from the three incinerators are greater than the corresponding 40 tons/yr quantities modification as listed in 18 AAC 50.300(a)(6)(c)(ii) and (iii). The increased capacity of the waste gas incinerators represents a modification, as defined by 18 AAC 50.900(28), and a permit application review is required by 18 AAC 50.300(b) and (c) and 50.400(c)(3).

SUMMARY AND CONCLUSION

The Department of Environmental Conservation believes that the Alyeska Pipeline Service Co. made the modifications described in the preceding paragraphs without the prior review and approval required by 18 AAC 50.300(b) and (c) and 50.400(c), and applicable federal regulations. Therefore, Alyeska should, not later than September 1,

1990, file applications for the Department's review and approval, for each of the modifications described in this letter, in accordance with the provisions of 18 AAC 50.300(b) and (c), or otherwise reach an agreement with ADEC on resolution of these issues.

If Alyeska does not submit the required applications, or if an agreement cannot be reached resolving these matters before September 1, 1990, the Department will refer these issues to Attorney General Douglas B. Baily for appropriate enforcement action.

The applications must include the following elements, in addition to all other elements required under 18 AAC 50.300(b) and 50.300(c):

- A determination of the net emissions increases at each facility due to the modifications, including any other change in emissions occurring during the five years prior to each modification.

- An assessment of best available control technology for each modified source including:

  For rim cooling to combustion gas turbines

  - dry NO_x (combustion) controls
  - water or steam injection
  - selective catalytic reduction

  For increase in fuel sulfur content

  - use of lower sulfur content fuels

  For storage tank venting operations

  - operating practices to minimize the occurrence and magnitude of tank venting operations
  - installation of a vapor recovery system to collect and control the vapors from all pressure relief valves
  - installation of activated carbon canisters at each pressure relief valve

  For increased capacity of waste gas incinerators

- ammonia or urea injection
- selective catalytic reduction
- SO_2 scrubbing technology

- An air quality impact analysis for each air contaminant and appropriate averaging periods: for SO_2, 3-hour, 24-hour and annual; for particulate matter (PM-10), 24-hour and annual; for oxides of nitrogen, annual.

Applications required pursuant to this letter should be submitted to the appropriate ADEC Regional Office: the Northern Regional Office, 1001 Noble Street, Suite 350, Fairbanks AK 99701 for all the pump stations, and the Southcentral Regional Office, 3601 C Street, Suite 1350, Anchorage AK 99503 for the Valdez Marine Terminal. A copy of each application should also be sent to Mr. S. W. Hungerford at the air program's central office, P.O. Box O, Juneau, AK 99811-1800.

I would appreciate your prompt review of these critical issues and a timely response. If you have any questions, please call Ms. Michele Brown at 563-6529.

Sincerely,

Larry Dietrick
Director

cc: Attorney General Douglas B. Baily
Commissioner Dennis Kelso
Ann Pontius, EPA Region X

ATTACHMENT A

CALCULATIONS FOR MAIN GAS TURBINES AT PUMP STATIONS

NOx EMISSION FACTORS FOR [illegible] GAS TURBINES USING SOURCE TEST DATA

F FACTOR CALCULATION(1)

$$E = (Cd \cdot 1.194 \cdot 10^{-7}) \cdot Fd \cdot (20.9/(20.9-\%O2))$$

Cd = pollutant concentration measured, dry (ppmv)
Fd = F factor for fuel, dry (dscf/MMBtu)
%O2 = percent O2 in exhaust measured
E = emission factor (lb/MMBtu)

NATURAL GAS NOx EMISSION FACTOR

	Cd(2) (ppmv)	Fd(3) (dscf/MMBtu)	%O2(2)	E (lb/MMBtu)
NOx	32.8	[illegible]49.80	15	0.1[illegible]

$$Fd = 10^6[3.64(\%H)+1.53(\%C)+0.57(\%S)+0.14(\%N)-0.46(\%O)]/GCV$$

%H =	[illegible].67
%C =	[illegible].64
%S =	0
%N =	[illegible].7
%O =	2[illegible].97
GCV =	[illegible] Btu/lb

Fd = [illegible]49.80 dscf/MMBtu

FUEL OIL NOx EMISSION FACTOR

	Cd(4) (ppmv)	Fd(5) (dscf/MMBtu)	%O2(4)	E (lb/MMBtu)
NOx:	150.9	9190	15	0.5[illegible]

FOOTNOTES:

(1) F FACTOR CALCULATIONS FROM 40 CFR, Part 60, APPENDIX A, METHOD 20, EQUATION 20-6
(2) FROM TABLE 5, 9/05/89 SOURCE TEST ON MAIN GAS TURBINE WITH TRIPLE [illegible] COMBUSTOR, PUMP STATION 3, TURBINE @ 7,050 RPM
(3) CALCULATED FROM NATURAL GAS ANALYSIS INCLUDED IN 9/05/89 SOURCE TEST, ASSUMED NATURAL GAS HEAT CONTENT OF [illegible] BTU/CF FROM EXHIBIT 47, 10/25/89 114 LETTER RESPONSE
(4) FROM TABLE 6, OF 9/05/89 SOURCE TEST ON MAIN GAS TURBINE WITH TRIPLE [illegible] COMBUSTOR, PUMP STATION 3, TURBINE @ 7,7[illegible] RPM
(5) FROM TABLE 19-1, 40 CFR, Part 60, APPENDIX A, F-FACTOR FOR FUEL OIL

EMISSION CALCULATIONS FOR PUMP STATIONS 1-4 (For 1976 Main Gas Turbines)

EQUIP. NAME	FUEL TYPE	FUEL USE(1) MMCF/HR	FUEL HEAT(2) CONTENT BTU/CF	FIRING RATE MMBTU/HR	EMISSION FACTORS(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
Gas Turbine	Natural Gas	0.167	863	143.8	0.016	0.011	0.310	0.060	0.133	10.22	6.86	200.97	30.46	83.95
Gas Turbine	Natural Gas	0.167	863	143.8	0.016	0.011	0.310	0.060	0.133	10.22	6.86	200.97	30.46	83.95
Gas Turbine	Natural Gas	0.167	863	143.8	0.016	0.011	0.310	0.060	0.133	10.22	6.86	200.97	30.46	83.95

EMISSION CALCULATIONS FOR PUMP STATIONS 1-4 (For [illegible] Main Gas Turbines)

EQUIP. NAME	FUEL TYPE	FUEL USE(5) MMCF/HR	FUEL HEAT(2) CONTENT BTU/CF	FIRING RATE MMBTU/HR	EMISSION FACTORS(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
Gas Turbine	Natural Gas	0.207	863	178.6	0.016	0.011	0.310	0.060	0.133	12.60	8.52	240.60	38.08	104.27
Gas Turbine	Natural Gas	0.207	863	178.6	0.016	0.011	0.310	0.060	0.133	12.60	8.52	240.60	38.08	104.27
Gas Turbine	Natural Gas	0.207	863	178.6	0.016	0.011	0.310	0.060	0.133	12.60	8.52	240.60	38.08	104.27

NET EMISSIONS CHANGE DUE TO MODIFICATION

EQUIP. NAME	NET EMISSIONS CHANGE (TONS/YR) PM	SO2	NOx	HC	CO
Gas Turbine	2.47	1.66	40.63	7.42	20.32
Gas Turbine	2.47	1.66	40.63	7.42	20.32
Gas Turbine	2.47	1.66	40.63	7.42	20.32

FOOTNOTES:

(1) GAS FLOW RATE EQUALS 500 MCF/HR DIVIDED BY THREE GAS TURBINES, FROM 1976 PERMIT APPLICATION FOR PUMP STATION 1
(2) HEAT CONTENT OF NATURAL GAS FROM EXHIBIT 67, 10/23/80 TIC LETTER RESPONSE
(3) PM, SO2, CO, AND [illegible] EMISSION FACTORS FROM AP-42 FOR NATURAL GAS FIRED TURBINES, TABLE 3.1-2, ASSUMED 863 BTU/CF
NOX EMISSION FACTOR CALCULATED FROM 9/08/80 SOURCE TEST ON MAIN GAS TURBINE AT PUMP STATION NUMBER 3, SEE EXHIBIT 6[illegible], 10/23/80 TIC LETTER RESPONSE
(4) TONS PER YEAR EMISSION RATES CALCULATED BY ASSUMING 24 HRS PER DAY, 365 DAYS PER YEAR OPERATION PER TURBINE
(5) GAS FLOW RATE FROM 12/15/80 TIC LETTER RESPONSE, PAGE 35, TABLE 3 FUEL CONSUMPTION AFTER [illegible] COOLING

EMISSION CALCULATIONS FOR PUMP STATIONS 8-10 AND 12 (For 1976 Main Gas Turbines)

EQUIP. NAME	FUEL TYPE	FUEL USE(1) LB/HR	FUEL HEAT(2) CONTENT BTU/LB	FIRING RATE MMBTU/HR	EMISSION FACTOR(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
Gas Turbine	GS Fuel	6000.000	18430	110.6	0.038	0.183	0.587	0.043	0.119	18.64	88.72	284.31	20.76	57.40
Gas Turbine	GS Fuel	6000.000	18430	110.6	0.038	0.183	0.587	0.043	0.119	18.64	88.72	284.31	20.76	57.40
Gas Turbine	GS Fuel	6000.000	18430	110.6	0.038	0.183	0.587	0.043	0.119	18.64	88.72	284.31	20.76	57.40

EMISSION CALCULATIONS FOR PUMP STATIONS 8-10 AND 12 (For 1990 Main Gas Turbines)

EQUIP. NAME	FUEL TYPE	FUEL USE(5) MGAL/HR	FUEL HEAT(6) CONTENT BTU/GAL	FIRING RATE MMBTU/HR	EMISSION FACTOR(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
Gas Turbine	Dist. Oil	1.373	129932	178.4	0.038	0.428	0.587	0.043	0.119	30.07	334.77	458.67	33.50	92.61
Gas Turbine	Dist. Oil	1.373	129932	178.4	0.038	0.428	0.587	0.043	0.119	30.07	334.77	458.67	33.50	92.61
Gas Turbine	Dist. Oil	1.373	129932	178.4	0.038	0.428	0.587	0.043	0.119	30.07	334.77	458.67	33.50	92.61

NET EMISSIONS CHANGE DUE TO MODIFICATION

EQUIP. NAME	NET EMISSIONS CHANGE (TONS/YR) PM	SO2	NOx	HC	CO
Gas Turbine	11.43	246.05	174.36	12.73	35.21
Gas Turbine	11.43	246.05	174.36	12.73	35.21
Gas Turbine	11.43	246.05	174.36	12.73	35.21

FOOTNOTES:

(1) GS FUEL FLOW RATE CALCULATED BY DIVIDING 18,000 LB/HR BY 3 TURBINES, SEE 1976 PERMIT APPLICATION FOR PUMP STATION 10
(2) HEAT CONTENT OF GS FUEL FROM 1976 PERMIT APPLICATION FOR PUMP STATION 10
(3) PM, CO, SO2, AND NMHC EMISSION FACTORS FROM AP-42 FOR OIL FIRED TURBINES, TABLE 3.1-2, ASSUMED 129932 BTU/GAL
(FOR 1976 SO2 EMISSIONS ASSUMED SULFUR CONTENT OF CRUDE OIL EQUALS 0.17%, FROM 1976 PERMIT APPLICATION FOR PUMP STATION 10)
(FOR 1990 SO2 EMISSIONS ASSUMED SULFUR CONTENT OF DIST. OIL EQUALS 0.4%, FROM [illegible] 8, [illegible] LETTER FROM [illegible] TO WILLIAM [illegible])
NOx EMISSION FACTOR CALCULATED FROM 5/08/89 SOURCE TEST ON MAIN GAS TURBINE AT PUMP STATION 3, SEE EXHIBIT 43, 10/23/89 114 LETTER RESPONSE
(4) TONS PER YEAR EMISSION RATES CALCULATED BY ASSUMING 24 HRS PER DAY, 365 DAYS PER YEAR OPERATION PER TURBINE
(5) DIST. OIL FLOW RATE FROM 12/15/89 114 LETTER RESPONSE, PAGE 35, TABLE 3 FUEL CONSUMPTION AFTER [illegible] COOLING
(6) HEAT CONTENT OF DIST. OIL FROM EXHIBIT 47, 10/23/89 114 LETTER RESPONSE

ATTACHMENT B

CALCULATIONS FOR CRUDE OIL STORAGE TANK VENTING

EMISSION CALCULATIONS FOR [illegible] (1990 Venting of Crude Oil Storage Tanks)

DATE OF VENTING INCIDENT	DURATION OF VENTING (Minutes)	VOC EMISSIONS (Pounds)	TANKS VENTED (Tank No.)	PIPELINE INCOMING RATE @ START OF VENTING (BBL/HR)	PIPELINE INCOMING RATE @ END OF VENTING (BBL/HR)	SHIP LOADING RATE @ START OF VENTING (BBL/HR)	SHIP LOADING RATE @ END OF VENTING (BBL/HR)
01/14/90	1	306	15, 16	70000	70000	120000	60000
01/28/90	15	8	2	70202	70202	60000	60000
02/07/90	10	2098	11-16	72000	72000	0	0
02/07/90	12	2400	15, 16	74000	74000	81000	80000
02/26/90	90	4040	3	76126	76126	0	0
02/27/90	202	[illegible]	1-16	74000	74000	100000	100000
3/19/90	?(1)						
to	?(1)						
3/25/90	?(1)						
04/17/90	540	45047	1, 4, 16-18	74000	73000	243000	64000
04/17/90	270	14542	2, 7, 14	74000	73000	200000	64000
04/17/90	60	35	5, 6, 8	74000	73000	102000	64000
04/17/90	30	0	13	74000	73000	85000	64000
04/20/90	105	23506	1, 2, 6-10	75000	75000	60000	60000
04/25/90	70	4300	13	77600	77700	0	0
04/25/90	25	?(2)	17	77600	77700	0	0
04/25/90	25	?(2)	18	77600	77700	0	0
04/25/90	3	1.2	8	77600	77700	0	0
04/25/90	3	?(2)	4	77600	77700	0	0
04/25/90	15	20	4	77600	77700	0	0
04/25/90	5	108	10	77600	77700	0	0
04/25/90	5	50	2	77600	77700	0	0

	TOTAL =	210863.2					

VENTING EMISSION FACTOR

Venting Emission Factor = (lbs of HC/time period)

lbs of HC = 210863.2 lbs   time period = 115 days

Emission Factor = 1800.00 lbs of HC/day

ANNUAL HC EMISSIONS FROM TANK VENTING

Annual HC Emissions = (Emission factor)*(365 days/yr)*(ton/2000 lbs)

Annual HC Emissions = 346.53 tons/yr

FOOTNOTES:

(1) No venting emissions data yet available from Alyeska for this time period when the vapor recovery system was shutdown for piping replacements.

(2) For these venting incidents, Alyeska venting reports only show VOC emissions from tank venting as "greater than 1 lb/hr".

ATTACHMENT C

CALCULATIONS FOR VMT WASTE GAS INCINERATORS
(Using Waste Gas Flow Rate as Capacity Limiting Factor)

EMISSION CALCULATIONS FOR [illegible] (For 100% Incinerators)

EQUIP. NAME	FUEL TYPE	FUEL USE(1) MSCF/HR	FUEL HEAT(2) CONTENT BTU/CF	FIRING RATE MMBTU/HR	EMISSION FACTOR(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
WASTE GAS INCINERATORS														
Gas Incinerator	Waste Gas	0.600	575.5	345.3	0.005	0.020	0.234	0.001	0.003	7.56	30.51	354.24	1.79	6.16
Gas Incinerator	Waste Gas	0.600	575.5	345.3	0.005	0.020	0.234	0.001	0.003	7.56	30.51	354.24	1.79	6.16
Gas Incinerator	Waste Gas	0.600	575.5	345.3	0.005	0.020	0.234	0.001	0.003	7.56	30.51	354.24	1.79	6.16

EMISSION CALCULATIONS FOR TERMINAL (For 100% Incinerators)

EQUIP. NAME	EQUIP. NUMBER	FUEL TYPE	FUEL USE(1) MSCF/HR	FUEL HEAT(2) CONTENT BTU/CF	FIRING RATE MMBTU/HR	EMISSION FACTOR(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
WASTE GAS INCINERATORS															
Gas Incinerator	53-IN-1A	Waste Gas	0.720	575.5	414.6	0.005	0.020	0.234	0.001	0.003	9.07	36.62	427.40	2.15	4.99
Gas Incinerator	53-IN-1B	Waste Gas	0.720	575.5	414.6	0.005	0.020	0.234	0.001	0.003	9.07	36.62	427.40	2.15	4.99
Gas Incinerator	53-IN-1C	Waste Gas	0.720	575.5	414.6	0.005	0.020	0.234	0.001	0.003	9.07	36.62	427.40	2.15	4.99

NET EMISSIONS CHANGE DUE TO [illegible]

EQUIP. NAME	EQUIP. NUMBER	NET EMISSIONS CHANGE (TONS/YR) PM	SO2	NOx	HC	CO
WASTE GAS INCINERATORS						
Gas Incinerator	53-IN-1A	1.51	6.10	73.25	0.36	0.83
Gas Incinerator	53-IN-1B	1.51	6.10	73.25	0.36	0.83
Gas Incinerator	53-IN-1C	1.51	6.10	73.25	0.36	0.83

FOOTNOTES:

(1) GAS FLOW RATE EQUALS 1,[illegible] MCF/DAY DIVIDED BY THREE INCINERATORS, FROM [illegible] PERMIT APPLICATION FOR TERMINAL
(2) HEAT CONTENT OF WASTE GAS EQUAL TO AVERAGE OF ALL HEAT CONTENTS MEASURED DURING 1/22/[illegible] to 1/24/[illegible] INCINERATOR SOURCE TESTS
(3) NOX, SO2, CO, AND [illegible] EMISSION FACTORS CALCULATED BY AVERAGING 3 SOURCE TEST RESULTS FROM INCINERATOR "A" @ [illegible] DEG. F
PM EMISSION FACTOR TAKEN FROM AP-42 FOR NATURAL GAS COMBUSTION FOR BOILERS > 100 MMBTU/HR, TABLE 1.4-1, ASSUMED [illegible] BTU/CF
(4) TONS PER YEAR EMISSION RATES CALCULATED BY ASSUMING 24 HRS PER DAY, 365 DAYS PER YEAR OPERATION PER INCINERATOR

ATTACHMENT D

CALCULATIONS FOR VMT WASTE GAS INCINERATORS
(Using Heat Rate as Capacity Limiting Factor)

EMISSION CALCULATIONS FOR TERMINAL (For 1976 Incinerators)

EQUIP. NAME	FUEL TYPE	FUEL USE(1) MMSCF/HR	FUEL HEAT(2) CONTENT BTU/CF	FIRING RATE MMBTU/HR	EMISSION FACTOR(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
WASTE GAS INCINERATORS														
Gas Incinerator	Waste Gas	0.480	280	176.0	0.005	0.020	0.236	0.001	0.005	3.81	15.38	179.51	0.90	2.10
Gas Incinerator	Waste Gas	0.480	280	176.0	0.005	0.020	0.236	0.001	0.005	3.81	15.38	179.51	0.90	2.10
Gas Incinerator	Waste Gas	0.480	280	176.0	0.005	0.020	0.236	0.001	0.005	3.81	15.38	179.51	0.90	2.10

EMISSION CALCULATIONS FOR TERMINAL (For 1990 Incinerators)

EQUIP. NAME	EQUIP NUMBER	FUEL TYPE	FUEL USE(5) MMCF/HR	FUEL HEAT(6) CONTENT BTU/CF	FIRING RATE MMBTU/HR	EMISSION FACTOR(3) (LB/MMBTU) PM	SO2	NOx	HC	CO	EMISSION RATE(4) (TONS/YR) PM	SO2	NOx	HC	CO
WASTE GAS INCINERATORS															
Gas Incinerator	53-M-1A	Waste Gas	0.720	575.5	414.4	0.005	0.020	0.236	0.001	0.005	9.07	36.62	427.40	2.15	4.99
Gas Incinerator	53-M-1B	Waste Gas	0.720	575.5	414.4	0.005	0.020	0.236	0.001	0.005	9.07	36.62	427.40	2.15	4.99
Gas Incinerator	53-M-1C	Waste Gas	0.720	575.5	414.4	0.005	0.020	0.236	0.001	0.005	9.07	36.62	427.40	2.15	4.99

NET EMISSIONS CHANGE DUE TO MODIFICATION

EQUIP. NAME	EQUIP. NUMBER	NET EMISSIONS CHANGE (TONS/YR) PM	SO2	NOx	HC	CO
WASTE GAS INCINERATORS						
Gas Incinerator	53-M-1A	5.26	21.24	247.88	1.25	2.90
Gas Incinerator	53-M-1B	5.26	21.24	247.88	1.25	2.90
Gas Incinerator	53-M-1C	5.26	21.24	247.88	1.25	2.90

FOOTNOTES:

(1) GAS FLOW RATE EQUALS 1,[illegible] MCF/HR DIVIDED BY THREE INCINERATORS, FROM 1976 PERMIT APPLICATION FOR [illegible]

(2) HEAT CONTENT OF WASTE GAS CALCULATED FROM WASTE INCINERATOR DESIGN SPEC. [illegible], JANUARY [illegible], 1973, TABLE NUMBER 1, CASE 3

(3) NOx, SO2, CO, AND [illegible] EMISSION FACTORS CALCULATED BY AVERAGING 3 [illegible] TEST RESULTS FROM INCINERATOR 'A' @ 1950 DEG. F. [illegible] EMISSION FACTOR TAKEN FROM AP-42 FOR NATURAL GAS COMBUSTION FOR BOILERS > 100 MMBTU/HR, TABLE 1.4-1, ASSUMED 1000 BTU/CF

(4) TONS PER YEAR EMISSION RATES CALCULATED BY ASSUMING 24 HRS PER DAY, 365 DAYS PER YEAR OPERATION PER INCINERATOR

(5) GAS FLOW RATE EQUALS AVERAGE OF 3 SOURCE TEST RESULTS FROM INCINERATOR 'A' @ 1950 DEG. F TESTED ON [illegible]

EXHIBIT B TO COMPLIANCE ORDER BY CONSENT - LIQUID FUEL FIRED GENERATORS

1) Pump station # 6

Based on a lower heating value of 126,125 British Thermal Units per gallon of fuel oil, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Gallons total per day
greater than 59 deg F	26,800
40 - 59 deg F	28,400
20 - 39 deg F	29,800
0 - 19 deg F	31,200
-20 - -1 deg F	32,400
-40 - -21 deg F	33,600
less than -40 deg F	greater than 33,600

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and quantity of fuel burned for the date with the highest fuel burning rate during the month.

2) Pump station # 7

Based on a lower heating value of 126,125 British Thermal Units per gallon of fuel oil, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Gallons total per day
greater than 59 deg F	26,800
40 - 59 deg F	28,400
20 - 39 deg F	29,800
0 - 19 deg F	31,200
-20 - -1 deg F	32,400
-40 - -21 deg F	33,600
less than -40 deg F	greater than 33,600

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to

DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and quantity of fuel burned for the date with the highest fuel burning rate during the month.

3) Pump station # 8

Based on a lower heating value of 126,125 British Thermal Units per gallon of fuel oil, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Gallons total per day
greater than 59 deg F	26,800
40 - 59 deg F	28,200
20 - 39 deg F	29,600
0 - 19 deg F	31,000
-20 - -1 deg F	32,200
-40 - -21 deg F	33,400
less than -40 deg F	greater than 33,400

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and quantity of fuel burned for the date with the highest fuel burning rate during the month.

4) Pump station # 9

Based on a lower heating value of 126,125 British Thermal Units per gallon of fuel oil, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Gallons total per day
greater than 59 deg F	26,200
40 - 59 deg F	27,800
20 - 39 deg F	29,100
0 - 19 deg F	30,400
-20 - -1 deg F	31,700
-40 - -21 deg F	32,800
less than -40 deg F	greater than 32,800

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to

DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and quantity of fuel burned for the date with the highest fuel burning rate during the month.

5) Pump station # 10

Based on a lower heating value of 126,125 British Thermal Units per gallon of fuel oil, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Gallons total per day
greater than 59 deg F	25,500
40 - 59 deg F	26,800
20 - 39 deg F	28,200
0 - 19 deg F	29,400
-20 - -1 deg F	30,700
-40 - -21 deg F	31,800
less than -40 deg F	greater than 31,800

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and quantity of fuel burned for the date with the highest fuel burning rate during the month.

6) Pump station # 12

Based on a lower heating value of 126,125 British Thermal Units per gallon of fuel oil, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Gallons total per day
greater than 59 deg F	26,000
40 - 59 deg F	27,800
20 - 39 deg F	28,800
0 - 19 deg F	30,100
-20 - -1 deg F	31,300
-40 - -21 deg F	32,400
less than -40 deg F	greater than 32,400

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total

quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and quantity of fuel burned for the date with the highest fuel burning rate during the month.

EXHIBIT C TO COMPLIANCE ORDER BY CONSENT - GAS FUELED GENERATORS

1) Pump station # 1

Based on a lower heating value of 863 British Thermal Units per cubic foot of gas, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Thousands of cubic feet total per day
greater than 59 deg F	4,056
40 - 59 deg F	4,296
20 - 39 deg F	4,512
0 - 19 deg F	4,704
-20 - -1 deg F	4,896
-40 - -21 deg F	5,040
less than -40 deg F	greater than 5,040

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator, the previous month's total fuel consumption, and the date, temperature and fuel burned for the date with the highest fuel burning rate during the month.

2) Pump station # 2

Based on a lower heating value of 863 British Thermal Units per cubic foot of gas, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Thousands of cubic feet total per day
greater than 59 deg F	3,984
40 - 59 deg F	4,200
20 - 39 deg F	4,392
0 - 19 deg F	4,608
-20 - -1 deg F	4,800
-40 - -21 deg F	4,944
less than -40 deg F	greater than 4,944

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator, the previous month's total fuel

consumption, and the date, temperature and fuel burned for the date with the highest fuel burning rate during the month.

3) Pump station # 3

Based on a lower heating value of 863 British Thermal Units per cubic foot of gas, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Thousands of cubic feet total per day
greater than 59 deg F	3,840
40 - 59 deg F	4,080
20 - 39 deg F	4,296
0 - 19 deg F	4,488
-20 - -1 deg F	4,656
-40 - -21 deg F	4,800
less than -40 deg F	greater than 4,800

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the 10th day of each month, Alyeska shall report to DEC, for each gas generator the previous month's total fuel consumption, and the date, temperature and fuel burned for the date with the highest fuel burning rate during the month.

4) Pump station # 4

Based on a lower heating value of 863 British Thermal Units per cubic foot of gas, Alyeska shall burn as fuel in any Avon gas generator not more than the indicated total quantity of fuel on any day for which the average ambient temperature is within the indicated temperature range:

Ambient Temperature daily average	Thousands of cubic feet total per day
greater than 59 deg F	3,672
40 - 59 deg F	3,840
20 - 39 deg F	4,056
0 - 19 deg F	4,248
-20 - -1 deg F	4,416
-40 - -21 deg F	4,584
less than -40 deg F	greater than 4,584

Alyeska shall record, and maintain the record at the office of the pump station, the average daily ambient temperature and the total quantity of fuel burned in each Avon gas generator for each day. On or before the tenth day of each month, Alyeska shall report to DEC, for each gas generator the previous month's total fuel

consumption, and the date, temperature and fuel burned for the date with the highest fuel burning rate during the month.