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The Joint Pipeline Office







1998 Annual Report

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Completion of this report fulfills annual reporting requirements. The State of Alaska Administrative Order 134 requires the State Pipeline Coordinator to submit an annual progress report to the Governor. Section 28 of the Federal Mineral Leasing Act requires the Secretary of Interior to submit an annual report to the House and Senate Committees of Interior and Insular Affairs.

June 1999

Letter to Readers:

The Joint Pipeline Office (JPO) implemented a new work plan in 1998 to identify and measure work outputs and to tie costs to those work outputs for budgetary purposes. The work plan added more substance to the existing Comprehensive Monitoring Program (CMP) by including a wider range of products with specific deliverable time tables in quarterly increments. This annual report provides the reader a step by step review of JPO accomplishments as outlined in the work plan.

There are a few items of interest we would like to specifically bring to your attention.

CMP Consolidation: The CMP used twelve focus areas to evaluate overall Trans-Alaska Pipeline System (TAPS) performance in 1998. JPO has consolidated these 12 areas to four: Culture, Maintenance, Construction, and Operations. Original CMP focus areas such as Environment, Safety, Quality, Project Performance, Project Design, and Configuration Management will be incorporated into the four areas. The upcoming Risk Management CMP Report will be the last published under the 1998 work plan which used the original focus areas.

Alaska Native Utilization Agreement: This year the Alaska Native Utilization Agreement was renewed by the Department of Interior and Alyeska with some interesting improvements. In particular, a "Gateway" or process Alyeska will use to assist qualified Alaska Native employees and trainees in finding oil and gas industry work when an Alyeska position cannot be found. Other improvements are expansion of coverage to more TAPS contractors and subcontractors and linkage of scholarship expenditures directly to TAPS or other oil and gas industry jobs. We believe Alyeska is administering this program very well and we congratulate them on a job well done.

Audit Action Items (AAIs): We are happy to report that of the original 4,920 audit action items, only five remain open. It has taken Alyeska a long time to resolve all of these items which JPO has verified for closure. Revisiting audit action items is a major function included in the CMP to ensure that the items are not recurring.

TAPS Oil Spill Response Plan: The TAPS Oil Spill Response Plan was renewed in 1998 after completing major revisions to the plan which resulted from dramatic changes to TAPS. Oil flow has reduced to around 1.2 million barrels, operation of four of the eleven pump stations has been shut down in the last two years, and Alyeska has changed from an Anchorage-based organization to one centered in Valdez and Fairbanks.

Employee concerns: JPO's objective is to achieve a work culture that does not hinder TAPS workers from reporting concerns about pipeline integrity, safety, or environmental protection for fear of harassment, intimidation, or reprisal. This objective has not been achieved. JPO acknowledges that Alyeska has expended considerable effort in improving their work place culture. However, the results of employee surveys conducted by JPO and Alyeska within the past year have not reflected success with this effort. Many factors contribute to this continuing problem: 1) past Alyeska missteps in concern handling, 2) delays in bringing concerns to closure, 3) Alyeska's reorganization and downsizing, and 4) employee apprehensions about future cost-cutting. Because of these continuing concerns, JPO's employee concerns group will have two additional staff in 1999 to identify root causes of problems as they relate to environment, safety, and integrity issues, and to incorporate those trends into JPO's Comprehensive Monitoring Program.

North Slope Pipelines: The State Pipeline Coordinator's Office continues to process rights-of-way applications for several proposed North Slope pipelines. Due to the extremely low price of crude oil during past months, some current projects will be affected by the prices.

Long-range Planning: In addition to the challenges facing us in 1999, our long range planning challenges to be accomplished by year end of 2003 include Grant and Lease renewal. The consolidated CMP process will be applied to 1) document JPO's efforts to verify compliance with the Grant and Lease, 2) evaluate condition and safety of critical TAPS systems, and 3) demonstrate that TAPS culture allows free and open reporting of problems without harassment or intimidation of employees.

Thank you for taking the time to look through our annual report. If you have any questions or would like to have copies of any reports referenced herein, please call Rhea DoBosh, Public Affairs (907) 271-4338.

Sincerely,

Jerry Brossia
Authorized Officer

William Britt, Jr.
State Pipeline Coordinator

Joint Pipeline Office 1998 Work Plan.

In 1998 JPO implemented a work plan outlining and scheduling commitments for the year in quarterly increments. Most of these commitments stem from the 1998 goals identified in last year's annual report including implementation of a work plan. The work plan included staff responsibilities and agency deliverables and considered responsiveness to unscheduled events and responding to the concerns of stakeholders. JPO's 10 major 1998 commitments follow:

1. Publish six CMP Reports and complete assessments in other CMP areas.

2. Complete the staff work necessary for the renewal of the Alaska Native Utilization Agreement.

3. Evaluate and revise the Oil Spill Response Plan to provide for timely oil spill response capability for TAPS.

4. Issue the required permits and authorizations to Alyeska to operate and maintain TAPS.

5. Monitor high-risk projects and activities to ensure that pipeline integrity, environmental protection, and public safety are achieved and maintained on TAPS.

6. Oversee Alyeska's employee concern case handling to assess whether concerns are being resolved and the harassment culture is being eliminated. Repeat 1997 survey of workers.

7. Verify closure of remaining open audit action items.

8. Develop the first phase of a TAPS geographic information system (GIS).

9. Secure permanent JPO offices and adopt an electronic records and mail distribution system.

10. Work with Alyeska to enhance oil leak detection.

JPO met these 1998 work plan objectives and delivered most products within planned time frames. Continuing goals include working with Alyeska to enhance oil leak detection; issuing the required permits and authorizations to Alyeska to operate and maintain TAPS; monitoring high-risk projects and activities; and conducting the Employee Concerns Program surveys annually well into the future. JPO accomplishments and the status of JPO's 10 major commitments for 1998 are documented in this annual report.

Commitment 1.

Publish six CMP Reports and complete assessments in other CMP areas.

JPO Comprehensive Monitoring Program

To date, JPO has released seven Comprehensive Monitoring Program Reports. Two CMP reports covering Alaska Native Utilization and Employee Concerns were released in 1997. Environmental, Safety, and Project Performance CMP reports were released in 1998 and Maintenance and Operations in 1999. The Risk Management CMP report should be released in the summer of July 1999.

Some of the issues incorporated into the Project Performance, Operations, and Maintenance CMP reports belong as much to other CMP focus areas of Configuration Management and Quality as the topic reported. As the later CMP reports became broader, the concept of 12 discrete reports made less sense. In fact, the originally planned 1999 Configuration Management CMP report would have been little more than a repeat of the change management findings contained prior CMP reports. After Risk Management, the CMP and subsequent reports will be consolidated into four summary areas:

Original CMP Focus Areas		Consolidated Focus Areas
Maintenance Quality *Safety* *Environment* *Project Performance* *Operations* Configuration Management *Italics indicate published CMP reports*	Risk Management Project Design *Native Employment and Training* (Section 29 of the Grant) *Employee Concerns Program* Equal Employment Opportunity (Section 28 of the Grant)	Culture (Section 29, Section 28 and employee concerns) Maintenance Operations Construction (project design and project performance) *Safety, environment, configuration management and quality will be incorporated in Maintenance, Operations and Construction*

Executive summaries of the seven published reports follow the next section on CMP background. Beyond the executive summaries, considerable CMP monitoring was done in the area of corrosion, Valdez Marine Terminal Tanker Vapor Control operations and maintenance, and the valve repair/replacement project. These activities are summarized later in this report (Commitment 5).

Background on the CMP

JPO's approach to monitoring Alyeska activities and the way it conducts its' business with Alyeska is referred to as compliance partnership. This involves clearly defining objectives, frequent communication, proactive problem resolution, and a "no surprises" approach to achieve

JPO objectives. The CMP process was explained in detail in last year's annual report, however, a brief summary is provided below.

CMP Process: The CMP is a layered or three-tiered approach to oversight. Surveillances comprise the first tier or level where the most basic monitoring occurs by verifying compliance with Grant and Lease Stipulations and Alyeska's established procedures for specific TAPS activities. A checklist is produced in advance of the activity to cover all necessary attributes of that activity. For example, a checklist is developed for material sites. There are 76 active material sites along the TAPS corridor and all are monitored annually, therefore, there would be one surveillance conducted at each site. This information, in addition to other surveillances conducted on the same focus area, would provide the basis for capturing trends and a foundation for an assessment which is tier two of the CMP.

Tier two involves capturing trends and identifying findings from related JPO surveillances and engineering reports through assessments. Assessments are the primary tool used to issue findings to Alyeska for corrective action. These reports are more technical in nature and are designed primarily to communicate findings to Alyeska.

CMP Reports make up tier three. Assessments findings are included as well as Alyeska's responses to findings, trends, and conditions. These reports are designed for stakeholders as they provide a bigger and more informative picture of a particular focus area.

7 Published CMP Executive Summaries

EMPLOYEE CONCERNS CMP Executive Summary

March 1997

The Management Evaluation Team thanks the Alyeska Pipeline Service Company (APSC) and the Joint Pipeline Office (JPO) for their hospitality and professional cooperation throughout the conduct of the APSC's Employee Concerns Program evaluation. During site visits the team received outstanding safety and orientation briefings and was made welcome by facility managers and employees. Personnel were open and gave generously of their time to explain facility operations and provide input to the team. The APSC and JPO can be proud of the dedicated professionals within their respective organizations.

The APSC's Employee Concerns Program is a relatively young and developing program. The basic operating procedures documentation for the Employee Concerns Program is fundamentally sound. Several aspects of APSC's Employee Concerns Program implementation were identified where suggestions for improvement are provided. One key responsibility of the Employee Concerns Program, support to corporate culture change, was identified as needing priority attention. It is noteworthy that the Employee Concerns Program Manager recognizes this important function and has a sound vision for the future of APSC's corporate culture relative to employee concerns and the Employee Concerns Program's role in achieving the vision.

The APSC is commended for utilizing the corporate "Code of Conduct," policy statements, and oral communications to encourage employees to raise concerns and for emphasizing intolerance of intimidation, harassment, and retaliation. However, there is a need to emphasize consistent

actions to reinforce and validate these positive policies and priorities. Employees see actions as the true barometer of corporate leadership commitment to support concerned employees and ensure a positive work environment. Failure to "walk the talk" compromises the value of written policies and verbal endorsement by top management.

Improvement of corporate culture is the key to quality and the successful handling of concerns. Several basic recommendations are provided, which serve to facilitate positive cultural change. The ultimate goal is a corporate value system that values employees who raise concerns, is free of retaliation, and achieves quality improvement by involving all employees.

Although the JPO oversight and "800 Hotline" (hotline) program lack approved policy direction, the Management Evaluation Team believes the hotline is currently operating with the appropriate level of direct involvement by the JPO in the concerns process. Most employees properly recognize the hotline as a backup to resolving concerns through the management chain and APSC's Employee Concerns Program. It remains for JPO to establish operating procedures and clearly define expectations for both its direct role in employee concerns and its oversight responsibility regarding APSC's Employee Concerns Program.

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ALASKA NATIVE UTILIZATION Executive Summary

September 1997

The 1974 Federal Grant of Right-of-Way contains a provision (Section 29) requiring the Trans-Alaska Pipeline System (TAPS) permittees to enter into an Agreement with the Secretary of Interior **"...regarding recruitment, testing, training, placement, employment, and job counseling of Alaska Natives."** This was designed to secure full participation by Alaska Natives in Alaska's burgeoning oil and gas industry. This Agreement helped secure a route for the pipeline unencumbered by Alaska Native land selections.

The Plan of Action approved by the Department of Interior required Alyeska to provide 3,500 training or employment opportunities to Alaska Natives during the TAPS construction period. Alyeska further committed that a minimum of 2,470 individual Alaska Natives would be utilized in fulfulling the overall 3,500 training or employment opportunities.

During the operational phase of the pipeline, Alyeska stated that their objective was to train and employ Alaska Natives so that within two years of start-up Alaska Natives would occupy a percentage of jobs at least equivalent to their proportionate share of the total population of the State of Alaska. That percentage was then estimated to be 20 percent. That Plan of Action was subsequently revised by Alyeska in 1976 to reduce the Alaska Native employment goal to 16 percent, however, this revision was never approved by the Department of Interior.

Over 5,770 individual Alaska Natives were ultimately hired to work on TAPS during construction. These individuals worked on 15,047 different jobs. In the years following construction from 1978 through 1994, Alaska Native employment on TAPS slipped to less than five percent.

On October 20, 1995 Alyeska Pipeline Service Company and the U.S. Department of Interior signed an agreement designed to remedy past under-employment of Alaska Natives on the Trans-Alaska Pipeline System. The Agreement calls for specific actions by Alyeska and its contractors to enhance training, education, employment and related activities to increase the number of Alaska Natives able to more fully participate in TAPS-related employment in Alaska.

On September 30, 1997 the Joint Pipeline Office (JPO) completed an audit of the Alyeska Pipeline Service Company Section 29 Program. The audit was conducted to determine if Alyeska's Program is in compliance with the October 1995 Agreement and to assess its effectiveness in achieving the goals and intent of the Agreement. The audit also identifies potential measures to improve Alyeska's performance related to Alaska Native training and hiring.

The results of JPO's evaluation provides an early assessment of Alyeska's progress and will serve as a baseline against which future efforts by Alyeska and its contractors can be compared. The audit was conducted now so that issues or concerns of importance could be identified by the JPO and acted upon by Alyeska before December 1998, the end of the first formal three-year review period described in the Agreement.

The audit yielded 42 Findings which indicate compliance or require corrective action by Alyeska. Most of the **Findings** relate to areas which could be improved. **Major Findings** include:

- Alyeska is in compliance with the major terms of the Agreement. Overall Alyeska leadership and management policies have markedly changed to reflect acceptance of the Section 29 commitments in the Federal Grant.

- Alaska Native hiring during the current Alyeska reorganization reflects a strong commitment by current Alyeska leadership to the goals of the program. By the second quarter of this year, Alaska Native employment in every job category (except Technician) had increased, in the face of down-sizing efforts. However, Alyeska's goal of 20 percent Native participation by the year 2004 will require nearly tripling the current number of 68 Alaska Native employees.

- Alaska Natives are employed at all levels of Alyeska (not so for the Contractors), but are under-represented in the manager/supervisor, professional and technician job categories.

- There are inconsistencies in accounting for expenditures chargeable to the Section 29 Program and in reporting status of progress.

- Mentoring and cross-cultural awareness programs have not yet been put into place.

- Most Designated Contractors are working diligently to meet their employment goals and some (for example Doyon Universal Services and Tatitlek Chugach Corporation) have exceeded Alaska Native hire goals. Successful approaches used include alliances and partnerships with unions, training facilities, oil and gas industry firms, Native Corporations and non-profit organizations.

- Two contractors (Crowley Marine and Tidewater) are not currently required by Alyeska to participate in the Section 29 Program. JPO believes these companies are subject to the Agreement.

- There is a need for clearer Section 29 Program rules to guide both Alyeska internally and its contractors.

Among the audit **Recommendations** for improvement are:

- Alyeska should expand the Internship program and add other entry-level or "gateway" employment opportunities, such as Apprenticeships and Co-op Student programs.

- To ensure fair treatment, Alyeska and the Designated Contractors should establish consistent procedures for routinely verifying Alaska Native tribal enrollment status claimed by job applicants.

- Alyeska should establish a clear link between scholarship funding and the expectation of future employment on TAPS or in Alaska's oil and gas industry.

- Alyeska should investigate vocation-education type opportunities for common job categories on TAPS.

The Audit Report provides a detailed account of the audit's background, scope and methodology, objectives, findings and recommendations. The audit is structured so that it parallels the structure of the 1995 Agreement.

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ENVIRONMENTAL CMP Executive Summary

March 1998

The Joint Pipeline Office evaluated existing surveillance, assessment, and audit data to determine the status of Alyeska's TAPS Environmental Protection Program. JPO makes the following conclusions about Alyeska's environmental performance:

- **Alyeska is in compliance with environmental stipulations of the grant and lease** based on 1997 performance.

- **Alyeska is in compliance with most environmental laws and regulations.** Several noncompliance issues identified by agencies were unresolved during the period covered by this report.

- **Alyeska has implemented an adequate oil spill prevention, preparedness and response program.** Maintaining an adequate program while making organizational and operational changes in the company will require continued diligence by both JPO and Alyeska. Alyeska has submitted a revised oil discharge prevention and contingency plan (C-plan) which will be reviewed by JPO to ensure response capability and oil spill prevention.

- **Corrective and preventive actions** resulting from past audit findings related to the TAPS Environmental Protection Program **are in place and effective.**

- **JPO and Alyeska employee concern programs have benefitted TAPS environmental protection.** Approximately 12.5% of the environmental concerns were validated by JPO or Alyeska and resulted in corrective action by Alyeska.

- **The effectiveness of Alyeska's environmental policy,** which communicates the corporate commitment to environmental protection to all Alyeska employees and contractors **could be increased** by clearly stating it in a high level document signed by Alyeska's top management.

- **Alyeska has implemented an effective program of environmental audits and environmental surveillances.** However, opportunities for improvement exist.

- Alyeska conducted **major maintenance projects** in a manner that **minimized risk to the environment.**

In addition, the JPO has documented **concerns related to the potential for increased risk to the environment posed by Alyeska's recent reorganization.** JPO cannot yet determine if potential risks are occurring because Alyeska is still in transition to the new organization. JPO plans to assess if consequences or events associated with potential risks actually occur after Alyeska's new organization is in place in mid-1998.

In 1998, **JPO will continue to oversee Alyeska's TAPS environmental protection program,** including compliance with environmental stipulations of the grant and lease.

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SAFETY CMP Executive Summary

April 1998

The Joint Pipeline Office evaluated surveillances and assessments conducted by JPO, employee concerns investigated by JPO, the BLM audit conducted by QTC, Inc., and the TAPS Assessment Audit to determine the status of Alyeska's employee safety program. Considering a certain amount of risk exists in any work environment, JPO formed these conclusions:

- **Alyeska is generally in compliance with grant and lease stipulations 1.17, Fire Prevention and Suppression and 1.20, Health and Safety, based on 1996-1997 performance.** Compliance with Stipulation 1.17 needs improvement.

- **Alyeska has constructed buildings without approved plans from the State Fire Marshall.**

- **The fire detection and suppression systems in the pump station and Valdez Marine Terminal processing areas meet the requirements of the grant and lease.**

- **The Alyeska Corporate Safety Manual (SA-38) adequately addresses safety of the workers on TAPS equipment and facilities.** Alyeska is in compliance with the requirements of SA-38, however, some sections could use improvement.

- **Alyeska conducted major maintenance projects in a safe manner that minimized risk to workers.** Alyeska and its contractors employ a competent safety staff to minimize accidents and mitigate risks.

- **Alyeska makes a concentrated effort to identify and abate hazards.**

- **Supervisors investigate and report accidents in a proper and timely manner, obtaining assistance of Alyeska safety staff when necessary.** Alyeska accident rates are lower than the national average.

- **The number of employee concerns relating to worker safety have decreased.** JPO investigates and resolves employee concerns as they surface.

- **JPO surveillance indicates audit items relating to worker safety are not repeating.**

JPO concluded that Alyeska has made a good faith effort to implement a personnel safety program. Alyeska's Employee Safety Program is effective in minimizing risk to personnel. No negative trends were noted and accident statistics are below the national average. These conclusions are consistent with accident statistics and the results of JPO's field surveillance and assessments. JPO determined that Alyeska is in compliance with the requirements of their Corporate Safety Manual (SA-38), with some exceptions noted in Chapter 2. JPO considered these exceptions to be minor in nature and Alyeska has satisfactorily addressed each finding.

- **JPO will continue to closely monitor the TAPS Safety Program.**

JPO will continue to closely monitor Alyeska's compliance with the safety stipulations of the grant and lease. Ongoing surveillance of selected sections of SA-38 assures JPO and its stakeholders that Alyeska will maintain and improve their Employee Safety Program.

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PROJECT PERFORMANCE Executive Summary

September 1998

The Joint Pipeline Office (JPO) selected eight 1997 TAPS projects for in-depth review and evaluation. JPO conducted surveillances and assessments and reviewed project documents to reach the following conclusions about Alyeska's project performance:

- **Alyeska conducted projects in a manner that minimized risk to the environment and worker safety. As a result of the work done on these projects, the risk to pipeline system integrity has been reduced.**

- **The pipeline excavation projects were implemented to enhance and protect pipeline system integrity and pipeline safety.**

- **Improved planning for some TAPS projects would have lessened the risk to pipeline system integrity during projects such as the Tank 140 and Wilber Creek Corrosion Investigations.**

- **Projects selected for evaluation complied with Stipulation 1.7, *Notices to Proceed* of the Federal Grant and State Lease.**

- **Alyeska projects had no agency permit violations during 1997.**

- **The Alaska State Department of Labor issued 124 National Electrical Code (NEC) violations to Alyeska's contractor involving some electrical components of the Marine Tanker Loading Vapor Control project at the Valdez Marine Terminal. The notices of violation required Alyeska to fix components not installed according to the Alaska State Department of Labor's (ADOL) interpretation of NEC requirements. JPO did not believe these violations presented a threat to the safe operation of the Marine Tanker Loading Vapor Control system. The violations were considered to be instances of noncompliance with the Federal Grant and State Lease. Alyeska subsequently corrected the violations, and JPO verified they had been corrected.**

- **Some projects lacked sufficient project planning, which led to a fragmented construction process and compromised timely completion of the project. For example, the Wilber Creek and Tank 140 projects would have benefitted from more thoughtful planning. The other excavation projects JPO reviewed were completed without incident, indicating good project planning.**

- **Alyeska and JPO surveillances both documented project and quality procedures that were not consistently followed for some Alyeska projects, particularly the Vapor Recovery and Vapor Control and Tank 140 projects. Alyeska should evaluate the root cause to determine if more training, clearer procedures, additional inspections, or increased accountability could improve future project performance.**

- **Alyeska's response to employee concerns was not timely for project related concerns in 1997, but response time significantly improved in the second quarter of 1998.**

- **Significant audit action items identified by audits conducted by Quality Technology Company, Inc., and Arthur D. Little were found to be recurring in some projects:**

  1) National Electrical Code violations for some electrical components of the Marine Tanker Loading Vapor Control project at the Valdez Marine Terminal; 2) use of untraceable project materials; 3) supplies and materials not receiving quality inspections; and 4) improper inspector certification, an item that has subsequently been resolved and closed.

Conclusion

The pipeline system, workers and environment remained safe, but project planning and execution processes showed need for improvement. Some 1997 projects could have benefitted from better project planning, which would have improved construction quality, efficiency and productivity.

Other projects, such as Pump Stations 2 and 6 Ramp Down, Thompson Pass Mainline Pipe Corrosion Investigation, Milepost 799 Mainline Pipe Corrosion Investigation and other repair projects were implemented with thorough planning. These projects were completed on time with minimum controversy and expense.

JPO is convinced that most of the issues cited in this report would have been prevented with a stronger quality assurance program, and that better planning for future projects will strengthen quality assurance. However, Alyeska's implementation of their Quality Assurance Surveillance Program did provide continuous improvement for some projects.

The project planning and compliance issues cited in this report are not severe enough to be individually significant. However, if future CMP reports continue to document similar deficiencies, then substantive concerns of Federal Grant and State Lease compliance would emerge. JPO will continue to document Alyeska's management and execution of projects for future CMP reports.

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OPERATIONS Executive Summary

February 1999

The Joint Pipeline Office (JPO) conducted field surveillances and assessments in 1997 and 1998, to evaluate selected aspects of Alyeska Pipeline Service Company's operation of the Trans-Alaska Pipeline System (TAPS). This report explains the issues which were addressed, describes their current status, and identifies instances of noncompliance with the Federal Agreement and Grant and State Lease of Right-of-Way. This report's conclusions will not surprise Alyeska. To their credit, Alyeska's own audits and surveillances have identified these concerns and corrective action is underway. In 1999, JPO will continue to oversee Alyeska's TAPS Operation Program, including compliance with the stipulations of the Grant and Lease, to determine Alyeska's effectiveness in resolving these issues.

Principal Conclusions About Pipeline Operations

- **Five of the sixteen stipulations JPO evaluated were in noncompliance with the Grant and Lease. The noncompliances relate to change management and below ground systems deficiencies. The issues vary in significance, however none of them represent an immediate threat to pipeline integrity, public safety, or the environment. Alyeska has been informed all noncompliances must be corrected, and is working to bring them into compliance. JPO will evaluate progress and verify all completed corrections.**

- **Alyeska does not have an effective change management process and has failed to maintain complete and up-to-date records on pipeline system modifications as required by Stipulation 1.18.3. Change is inherent in the operation of TAPS due to technology advances, equipment deterioration, and modifications to improve cost efficiency. Pipeline system changes often have ramifications beyond the physical replacement of equipment that Alyeska's change management processes have not anticipated.**

- **Alyeska's management of the movement of oil needs greater attention to detail, better trending and evaluation of incidents, and more rigorous procedural compliance. JPO will verify implementation of proposed corrective actions.**

- **New leak detection technology has the potential to improve Alyeska's ability to promptly detect and respond to small, slow oil leaks within the pipeline system. Alyeska is reviewing the latest technology for leak detection, which JPO strongly encourages. Alyeska's new transient volume balance system is an improvement, but needs a comprehensive performance evaluation now that start up problems are resolved. JPO incorporated this request as a condition of approval of Alyeska's oil spill contingency plan. Improving leak detection will remain a top priority for oversight.**

Additional Observations and Conclusions

- **Alyeska needs to better trend and evaluate unscheduled pipeline shutdowns to identify any causes not fixed by the planned fiber optic system improvements.**

- **Alyeska did not consistently follow their quality control procedures for calibrating and maintaining pressure control devices and documenting the results. Corrective action plans have been implemented to fix this problem, including a plan to increase surveillance of tracking and controlling pressure relief system devices to prevent these problems from recurring.**

- **A TAPS cold re-start study must first be completed before developing a new plan that includes procedures for re-starting the pipeline under extreme cold conditions after an extended shutdown. Study results will reveal information about system performance in the event of an extended shutdown.**

- **JPO continues to monitor Alyeska's ongoing investigation of an overpressure event that occurred in August 1998. A preliminary Alyeska engineering review concluded that pipeline damage was unlikely. JPO recently obtained the pipeline pig data and is currently evaluating it to verify Alyeska's conclusion. An oversight priority is to ensure Alyeska implements preventive measures to minimize future occurrences.**

- **Employees controlling oil flow have received considerable training. However, Alyeska should complete its qualification and development program initiative and comply with its requirements for self-audit and team qualification plans. Further, Alyeska should revisit controller's training and research information needs to cope with changes in system configuration. JPO encourages Alyeska to make full use of its new pipeline control simulator and to critically evaluate its effectiveness.**

- **Alyeska closed many operations-related audit action items in 1996 and 1997. Presently, five audit items remain open that are planned for completion later this year. However, several items that should significantly improve operations have not yet been closed. Operational deficiencies such as ineffective change management continue to exist, which will, if uncorrected, cause the repeat of many 1993 audit deficiencies. The audit items including change management will not be closed until an effective change management system is in place.**

- **JPO evaluated two issues involving buried pipe and concluded that: 1) the pipe curvature at Mainline Refrigeration Site No. 2, near the Gulkana River, is not a pipeline integrity concern under current operational conditions; and 2) no intervention is needed at Salcha River to address pipeline curvature.**

- **JPO finds Alyeska's Y2K effort to be well planned and organized. Alyeska's late start may increase the cost of the Y2K program, however, JPO does not have concerns about its effectiveness.**

- **Alyeska is replacing their current backbone communication system with a new fiber optics system and new valve control units, with the intent to: 1) minimize incidents of communication lapses to remote gate valves; 2) decrease unplanned shutdowns; and 3) enhance pipeline system safety. JPO will verify the reliability and safety of the system, once it becomes operational.**

- **Alyeska processed and closed two substantiated employee concerns related to operations in 1997-1998. JPO reorganized its employee concerns oversight to better trend and evaluate the concerns of TAPS workers.**

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MAINTENANCE PROGRAM Executive Summary

April 1999

The Comprehensive Monitoring Program (CMP) report, *An Evaluation of the Selected Portions of the TAPS Maintenance Program January 1997-April 1999*, is JPO's seventh CMP report, but the first to evaluate maintenance performance of the Trans-Alaska Pipeline System (TAPS). The status of six maintenance topics is addressed: preventive and workpad maintenance, electrical systems, slope stability, mineral material sites, and mainline valves.

The performance of most TAPS maintenance areas JPO evaluated has either improved or remained the same since the early 1990's. Recent planning, preparation, and execution of mainline valve repair projects achieved a high standard of performance. However, permit and project coordination is an exception, where recent performance has not been as good as Alyeska's previous record.

Compliance. JPO's study of the six maintenance areas included ten stipulations of the Grant and Lease. The aspects of noncompliance contained in this report vary in significance and should be put in perspective. Some aspects of noncompliance have previously existed on TAPS and have been corrected by Alyeska. Only recently did JPO begin reporting them using the CMP process.

Pipeline Integrity. The most significant aspect of noncompliance relates to pipeline integrity. JPO is concerned that two slopes have not been demonstrated to be stable enough to support the above ground pipe in the remote possibility of a large earthquake. JPO and Alyeska are actively studying these slopes. This report presents the interim status of evolving technical evaluations of the slopes and does not sug[illegible] a lack of responsiveness on Alyeska's part. If these slopes cannot be shown as safe, civil improvements must be made to fix them. Alyeska and JPO continue to monitor other slopes greater than 10% with no issues noted at this time.

Change Management. Alyeska needs to improve their management of TAPS system changes. Referred to as "change management," this issue was discussed in JPO's February 1999, CMP report about pipeline system operations. However, Alyeska has made progress with new controls that require completion of all updates and revisions before a modified system is "turned

over" to the system operators. They are improving their ability to detect system interactions, documents and parameters.

Principal Conclusions About TAPS Maintenance

- **Five of the stipulations evaluated contain some aspects of noncompliance. The areas of noncompliance include slope stability, failure to update records for system changes and civil maintenance, inconsistency between existing conditions and design requirements, and vegetation damage at material sites. Alyeska has efforts underway to address each issue. JPO will verify completed corrections.**

- **Two slopes at Squirrel Creek are not in compliance with design basis requirements and Stipulation 3.5, *Slope Stability* of the Grant and Lease. Instrumentation data shows the Squirrel Creek slopes are thawed, resulting in a degradation of permafrost and a noncompliance with Stipulation 3.9, *Construction and Operation.* The degree of integrity of the Squirrel Creek slopes under design contingency earthquake conditions is in question and under review by JPO and Alyeska. If these slopes cannot be demonstrated as being safe, civil improvements must be completed. Alyeska has scheduled a risk assessment for this year to evaluate the Squirrel Creek slopes. They recently completed the Pump Station 11 slope risk assessment, which JPO is currently reviewing. Alyeska concluded in their Pump Station 11 risk assessment the probability of a crude oil leak or spill is very remote. Appropriate mitigation actions will follow the review of the risk assessments.**

- **The Alaska Department of Labor electrical inspector found six National Electrical Code (NEC) violations on TAPS that were within the scope of this review. Alyeska corrected the violations and JPO verified the corrections. Alyeska now requires third party inspection of electrical installations and modifications. If consistently followed, this requirement should prevent future noncompliance with the National Electrical Code.**

- **Alyeska is meeting their commitments of the mainline valve testing and repair program. Recent planning, preparation, and execution of mainline valve repair projects achieved a high standard of performance. Maintenance goals include 1) testing of 44 mainline valves for internal leak-through in 1998, and testing of the remaining mainline valves by the year 2000, 2) repairing Check Valve 122, and 3) replacing Remote Gate Valve 80. The last two items were completed in 1998.**

- **Alyeska has not coordinated well with JPO's regulatory agencies during the planning, scheduling, and design of a number of maintenance projects along the TAPS right-of-way. This, coupled with Alyeska's lack of internal coordination, resulted in delays in the permitting and execution of some projects. To correct this problem, Alyeska is clarifying roles and responsibilities and providing additional training to their asset managers.**

- **Alyeska's maintenance records have only partially documented some workpad and above ground maintenance repairs. This hinders the trending of damage caused by**

flood, erosion and thawing. JPO considers this to be an instance of noncompliance with Grant and Lease Stipulation 1.18, *Surveillance and Maintenance.* Although Alyeska disagrees this deficiency is a noncompliance with this stipulation, they are working to improve tracking of civil maintenance repairs.

- **New projects were commissioned and turned over to pipeline operators without the necessary preventive maintenance procedures. Other electrical system modifications lacked updated drawings. Alyeska changed procedures to ensure timely completion of preventive maintenance procedures and project records.**

Additional Observations and Conclusions

- **Alyeska has not met scheduled goals for some parts of the mainline valve program, including below ground valve investigations and the mainline valve maintenance review. Instead, resources were committed to the repair of Check Valve 122 and replacement of Remote Gate Valve 80. Alyeska plans to accelerate their 1999 schedule to catch up on below ground valve investigations.**

- **Preventive maintenance work required by regulation was completed within required time frames, which was an improvement over 1996 and 1997 performance. However, JPO discovered that nonregulated preventive maintenance work orders were behind schedule.**

- **The material sites Alyeska uses are clean and well maintained. Erosion was not evident at any sites. However, not all the material sites met mineral sale requirements. Two sites had excessive vegetation damage and six sites had slopes that exceeded requirements for steepness. Corrections will be verified in 1999.**

- **JPO incorporated issues from concerned TAPS workers into its monitoring. Two of the TAPS workers concerns were validated after JPO's investigation. One concern involved the maintenance of fire alarm and suppression systems by employees without the appropriate state fire marshall permits. This concern was validated at one pump station. The other concern was that not all electrical work received third party inspections when required. This concern was validated when the six NEC violations were written by the Alaska State Electrical Inspector.**

- **Alyeska closed the remaining 1993 maintenance related audit action items. The six NEC violations written during this review were recurrences of previously closed audit action items. Additional monitoring by Alyeska and JPO is needed to ensure the corrective action to have a third party inspection of electrical installations and modifications is followed.**

Commitment 2.

Complete the staff work necessary for the renewal of the Alaska Native Utilization Agreement.

Section 29 of the Federal Grant of Right-of-Way requires Alyeska to target Alaska Natives for recruitment, training, testing, placement, and employment on TAPS. The Agreement is up for renewal every three years.

JPO and Alyeska met frequently in the past year to discuss renewal of the Alaska Native Agreement. JPO also solicited Native community comments on the renewal of the Agreement from 50 Native organizations which were considered in meetings with Alyeska.

At the Alaska Federation of Natives' annual convention October 15, 1998, the renewed Agreement was signed by Sylvia Baca, Deputy Assistant Secretary of the Interior for Land and Minerals Management, and Bob Malone, President of Alyeska Pipeline Service Company.

The renewed Agreement features several improvements including:

- establishment of a "Gateway" process whereby Alyeska will assist qualified Alaska Native employees and trainees in finding oil and gas industry work when an Alyeska position cannot be found;
- expansion of coverage to more TAPS contractors and subcontractors; and
- linkage of scholarship expenditures directly to TAPS or other oil and gas industry jobs.

One provision of the Agreement requires the TAPS work force to be comprised of 20% native employment among Alyeska and its' contractors by 2004. The percentage increases each year until that time. The 1998 employment goal was 10%. Combined Alyeska/contractor Native employment achieved nearly 13%.

1998 Year-End Work Force Statistics -

Total TAPS work force	2,390
TAPS Alaska Native work force	307
Percent Alaska Native workforce	12.7%

Commitment 3.

Evaluate and revise the Oil Spill Response Plan to provide for timely oil spill response capability for TAPS.

Oil spill contingency plans are required by the Grant, the Lease, and Federal and State Statutes. Among JPO agencies, these requirements are administered by the Alaska Department of Environmental Conservation, Bureau of Land Management, and Environmental Protection Agency with the Department of Environmental Conservation having the most prescriptive regulations. The JPO Oil Spill Prevention, Preparedness, and Response Coordination Team, comprised of representatives from these agencies, worked together in 1997 and 1998 to evaluate the revised Oil Spill Response Plan submitted by Alyeska for renewal.

The Contingency Plan is reviewed by regulating agencies to ensure that all legal requirements are met. The legal requirements are important because they provide the commitment of people and resources to assure industry uses prudent practices to keep the oil contained and to assure that a rapid and effective response will happen if needed.

Alyeska's Contingency Plan was substantially re-written in 1991 in a combined effort between Alyeska and the participating JPO agencies. In 1994 the plan was revised and approved as a result of the State's then newly promulgated oil pollution control statutes and regulations. This review was the triennial review of the 1994 approved plan. The plan has again been revised with significant changes to format, including the change from 12 sectional volumes to 5 regional volumes, and a closer adherence to the Department of Environmental Conservation recommended format.

Alyeska's Oil Discharge Prevention and Contingency Plan embraces actions to prevent an oil spill and provides the necessary information should a spill occur for effective clean-up. In most cases, once a spill happens the ability to effectively clean-up and avoid impacts to the environment ranges from poor to moderately good depending upon many variables. Alaska law may well be the most demanding in the world with respect to the level of clean-up performance expected of the oil industry.

Several significant changes in the way Alyeska operates and manages the pipeline in the past few years have had an impact on the Contingency Plan. Alyeska has undergone dramatic changes in response to the economics and lessons learned from Federal and third party audits. With oil flow reduced to around 1.2 million barrels, operation of four of the eleven pump stations have been shut down in the last two years. The company changed from an Anchorage-based organization to one centered in Valdez and Fairbanks.

JPO's review of the Contingency Plan began in July 1997. The plan was granted several extensions to accommodate requests for information and allow for adequate public review. The JPO conducted public open houses and public hearings in Anchorage, Fairbanks, Valdez,

Glennallen, Delta Junction, Copper Center, Stevens Village, and Rampart Village. On Monday, November 30, 1998, approval of the plan was issued by Environmental Conservation after a five-day review period for affected coastal zone management areas was completed. Approval by the Bureau of Land Management was issued on December 7, 1998. The Department of Environmental Conservation's review is triennial and the Bureau of Land Management's review is annual. Consistent with the State Pipeline Coordinator's Office position in response to an appeal of the Valdez Marine Terminal Contingency Plan, the Department of Natural Resources participates in the review process but no longer approves the plan.

The process for review of the Contingency Plan is an example of the government, industry, and public working together to identify and address concerns and develop improvements to the plan. While regulatory review requirements differ among agencies, the plan review process identified priority issues, such as drills and exercises, that all agencies will be tuned to during plan implementation. Plan implementation will be continually monitored and evaluated on a year round basis.

Commitment 4.

Issue the required permits and authorizations to Alyeska to operate and maintain TAPS.

One of JPO's five line functions is to issue the necessary authorizations and permits to operate and maintain TAPS. Permits are required for various activities and can be complex requiring specialized technical expertise to process. Other permits are fairly routine in nature, such as material sales, requiring temporary use permits. Permits are also issued for projects like valve replacement/repair with specific time frames designated and others are for long periods of time, such as land use permits.

Permit processing has been streamlined at JPO in the recent past to provide the best possible service and turn-around time. Once an application is received in the office, it is reviewed for compliance with laws and regulations and a determination is made to completeness and whether additional reviews or field studies are required. Once issued, the permit is monitored for compliance. The CMP includes surveillances of permitted activities.

Permits issued by individual JPO agencies in 1998 follow:

Agency	Description
Alaska Department of Natural Resources	3 Notices to Proceed 1 Right-of-Way Application 5 Right-of-Way Amendments 4 Applications received 7 Land Use permits 7 Off Right-of-Way Authorizations 2 Material Sale Contracts 10 Material Sale Contracts received 6 Temporary Water Use Permits 1 Notice of Violation
Alaska Department of Environmental Conservation	13 Wastewater Permits 1 401 Certification of Corps Permit 3 Water Quality Plan Reviews
Bureau of Land Management	12 TAPS Material Site Extensions 1 Notice of Violation 4 Notices to Proceed 5 Right-of-Way Modifications 15 Temporary Use Permits 1 Right-of-Way Grant for an Access Road 3 Authorizations

Alaska Department of Fish and Game	20 Fish Habitat 2 Hazing Permits 22 Title 16 Reviews 403 Authorizations
Division of Governmental Coordination	Alaska Coastal Management Program Reviews: 9 Cook Inlet 15 North Slope 2 TAPS

Commitment 5.

Monitor high-risk projects and activities to ensure that pipeline integrity, environmental protection, and public safety are achieved and maintained on TAPS.

The executive summary of the Project Performance CMP Report (see page 12) described project monitoring conducted in the first half of 1998. Other significant 1998 monitoring included:

Replacement of Remote Gate Valve 80 and Repair of Check Valve 122
Last year's JPO annual report explained the "Memorandum of Agreement-Valves," signed by Alyeska and four JPO agencies which called for testing of the TAPS mainline valves which limit the amount of oil in the event of a leak on the pipeline. As a result of this testing, three valves will be repaired or replaced. Two, Remote Gate Valve 80, located about 13 miles north of Delta Junction, and Check Valve 122, located about 20 miles north of Valdez, were fixed in 1998.

The pipeline was shut down for almost 29 hours September 25 and 26 to replace Remote Gate Valve 80 and repair Check Valve 122. This project represented outstanding project planning, including using "mock-ups" to refine procedures and detailed contingency planning. JPO extensively monitored this project finding the quality of the execution to be as good as the planning. All surveillance attributes monitored by JPO were satisfactory. Given project planning shortcomings (a conclusion drawn from monitoring other projects) identified in the prior CMP report, JPO was pleased to document the subsequent strong performance.

TAPS Corrosion Monitoring and Control Status Report

A chapter on corrosion is planned for the next Maintenance CMP report. Nevertheless, JPO was actively involved with corrosion issues in 1998. The following summarizes the key activities.

Corrosion Protection -Coupon Monitoring of TAPS
The JPO Corrosion Task Force completed its review of Alyeska's Final Report "1997 TAPS Mainline Cathodic Protection Coupon Monitoring Program." The following are some of JPO's recommendations:

- Alyeska shall be given conditional approval to use cathodic protection coupons as the primary means of cathodic protection monitoring for TAPS.
- The pipeline corrosion smart pigging program should be expanded for the detection of active corrosion.

- Alyeska should conduct a survey to verify that large coating defects do not exist on the buried section of TAPS.

In July, the JPO (U.S. Department of Transportation, Alaska Department of Natural Resources, and U.S. Bureau of Land Management) provided Alyeska with conditional approval for the use of the corrosion coupons and requested that a comprehensive "Corrosion Control Management Plan" be presented to the JPO early in 1999 for final approval. The Plan is to include a battery of monitoring and control means and metrics for long term management of the mainline pipe that will ensure pipeline integrity environmental protection and asset preservation.

TAPS Mainline Pipe Corrosion Damage, Prevention, and Monitoring
Alyeska and JPO agreed to implement an integrated approach to corrosion prevention and monitoring and to develop a "Corrosion Growth Estimation Procedure." The goal of the integrated approach is to determine if the various monitoring techniques are in agreement, and if not, to implement corrective actions. Where the monitoring methods are in alignment, i.e., indicating inactive corrosion, the region can continue to be monitored with the various monitoring methods with no direct intervention.

State of Alaska/Owner Companies Cooperative Program
New cathodic protection systems continue to be designed, installed, and commissioned. To date, over 150 miles of mainline pipe have received new, more effective, impressed current cathodic protection systems designed to prevent or minimize the effects of corrosion damage. At the end of the program, it is anticipated that 20 individual impressed current cathodic protection systems located along the length of the 800 mile TAPS will protect over two-thirds of the 380 miles of below ground 48 inch mainline pipe.

Corrosion Control Monitoring of TAPS Facilities
JPO reviewed Alyeska project packages concerning the annual cathodic protection survey of TAPS pump stations and the Valdez Marine Terminal to determine if cathodic protection systems are being monitored as required by regulations and stipulations and to determine if deficiencies are identified and corrected in a timely manner. JPO concluded that Alyeska takes prompt action to correct potential deficiencies with 49 CFR Part 195 regulations. Work continues in the development of plans for addressing and correcting potential deficiencies with Alaska State Code regulations.

Corrosion Protection of Crude Oil Tanks
The JPO member agencies have combined oversight authority for 58 major tanks along the TAPS. The JPO Corrosion Task Force completed a review of the current status of all 58. The conclusion was that based on 1997 cathodic protection monitoring protection data, Alyeska has not complied in full with Task Force recommendations in the "1993 JPO Final Report on Corrosion Protection of Crude Oil Tanks." Work is in progress or scheduled, however, for the installation of cathodic protection systems where Alyeska considers them to be economically justified.

JPO's specific concerns are related to oil spill prevention, asset preservation, and long-term maintenance of TAPS. Alyeska was requested to provide details and plans to close-out the outstanding recommendations on tanks.

Tanker Vapor Control System

The Valdez Marine Terminal Tanker Vapor Control and Vapor Recovery Systems were reported on in detail in last year's annual report. JPO's 1998 Project Performance CMP report captured conclusions drawn from JPO's monitoring of Tanker Vapor Control System construction. Subsequent JPO monitoring focused on the tanker loading vapor control aspect for operations and reliability.

The U.S. Coast Guard is the Federal jurisdictional agency covering the Tanker Vapor Control System. The Alaska Department of Environmental Conservation enforces the applicable State regulations. For most of 1998 as well as 1999 to date, JPO's Valdez office staff monitored the Tanker Vapor Control System. JPO surfaced operations, training, and procedural problems which have resulted in various corrective actions. Later, Alyeska would determine that a complete management review of the System operations, training, maintenance, and safety barriers was necessary. This review is currently underway with participation of four JPO agencies. JPO is further continuing its monitoring of day-to-day System operations to ensure that procedural nonconformances are not recurring.

Commitment 6.

Oversee Alyeska's employee concern case handling to assess whether concerns are being resolved and the harassment culture is being eliminated. Repeat 1997 survey of workers.

JPO considers an employee concern to be a statement or assertion of impropriety or inadequacy associated with the construction, operation, maintenance or management of TAPS and affects the quality, safety, environmental protection, and pipeline integrity of TAPS. A critical focus of JPO's oversight is to ensure that employees of Alyeska Pipeline Service Company or employees of Alyeska's contractors can voice their concerns about technical and business practices in an atmosphere which promotes free and open communications.

JPO Reorganizes the Employee Concern Function

During 1998, the JPO reorganized and renamed the Employee Concerns group. Four current JPO employees were reassigned to the new Culture Group now consisting of the former Employee Concerns, Equal Employment Opportunity compliance, and Section 29 (Alaska Native Hire) groups, more than doubling the number of staff. Organizationally, the Employee Concerns Program function was re-aligned to a project management arrangement, reflecting JPO's greatly increased emphasis on this function.

The Culture Program consists of Joe Correa, lead, Dave Perez, and Rob McWhorter. The Section 29 Program consists of Bob Jones, lead, Spud Williams, and Bill Reed, providing support to the entire group. The EEO compliance function is filled by Bob Jones.

JPO has three major goals for its oversight of Alyeska's Employee Concerns Program:

- To determine if Alyeska is maintaining an Employee Concerns Program; if the program is following procedures; if investigations are complete, responsive, and timely; if corrective actions that resolve the concerns are developed and implemented; if the concerned individual is notified of the findings and actions; if trends are developing and being addressed; and if management is acting to stop real or potential chilling effects.

- To determine if Alyeska and TAPS contractors are actually changing their culture in a positive direction to a culture that encourages and welcomes the raising of concerns and works toward resolution of the concerns.

- To obtain the necessary changes if the above is not occurring and employee needs are not being met.

As a follow-up to the 1997 Bureau of Land Management evaluation of Alyeska's Employee Concerns Program and JPO's oversight, a questionnaire was re-distributed to all Alyeska employees and TAPS contractor employees in 1998 with the intention to capture another set of data points about how the Employee Concerns Program is viewed by TAPS employees. This questionnaire was essentially the same one used in 1997. The response rate was 45% in 1998 compared to 55% in 1997.

Comparison of yearly data provides an update on where improvements are needed or if confidence has increased in particular areas. The annual data is very useful in pointing out areas needing increased management attention. Results of the 1998 questionnaire were mixed but several clear findings were indicated. In comparing 1997 and 1998 data, the 1998 Survey Results Summary issued on June 18, 1998 observed:

- It appeared that contractor employees (both managers and non-managers) made improvements in nearly every area addressed by the questionnaire over 1997.

- It appeared that Alyeska employees (both managers and employees) lost ground in a number of areas. It is apparent that Alyeska lost ground in the area of employee perception of how well its Employee Concerns Program is working. A direct connection between these results and the actual status of the program is clouded, however, by other factors such as the mid-1998 Alyeska reorganization and subsequent disruption in the Alyeska work force.

- The questionnaire results indicated that Alyeska declined most in the areas of improvements in corporate culture, management responsiveness to concerns, and willingness to bring issues to closure.

- Confidence in the JPO's handling of concerns increased significantly.

- Written comments were submitted by about 25% of respondents. These comments mostly expressed a lack of trust and confidence in Alyeska's Employee Concerns Program including some criticism of JPO's oversight of the program.

- To Alyeska's credit, they have strongly emphasized contractor participation in their Employee Concerns Program. At the same time, the entire employee concerns effort as it relates to corporate culture among TAPS workers, is viewed by JPO as a long-term effort requiring years to reach the level everyone agrees needs to be obtained.

Little Harbor Consultants, hired by Alyeska to help improve the work conditions of the company, released the results of a study, similar to JPO's, in January 1999. Because of this, JPO will defer re-distributing their annual questionnaire to compare data and increase the data points for greater overall understanding of how TAPS employees and contractors view the program.

The Alyeska Employee Concerns Program group issued their January 1999 Monthly Report to the Alyeska Officers dated February 9, 1999 which compiled a review of the Employee Concerns Program database to determine common organizational and subject themes and trends. The observations included:

- There is no significant difference in employee satisfaction or dissatisfaction with existing processes, procedures, and personnel policies between Fairbanks and Valdez.

- The lack of response to past requests for the determination of corrective actions for substantiated concerns, and the failure to complete agreed corrective actions is significantly and adversely affecting the Program's ability to be viewed as effective.

JPO views the demonstration of successful implementation of an Employee Concerns Program by Alyeska and TAPS contractors as a critical foundation component of the company's frequently troubled Quality Program. The ability of all TAPS employees, both Alyeska and Contractor, to freely express concerns without fear of harassment, intimidation, retaliation, or discrimination is vital to a safe working environment. Evidence of a harassment-free work place also provides vital assurance to the public that TAPS is currently safe and capable of being operated safely well into the 21st century.

The Culture Group is actively working on a comprehensive overall assessment and report of Alyeska's corporate culture, which includes all three functions: employee concerns, Section 29 (Alaska Native Hire), and Equal Employment Opportunity compliance. The report is scheduled to be completed in 1999.

Commitment 7.

Verify closure of remaining open audit action items.

All unresolved audit findings from seven audit sources between 1990 and 1994 were assembled to make up the Alyeska audit resolution program in 1994. There were 4,920 items identified and classified into four priority levels.

Going into 1998, 54 of the original 4,920 Audit Action Items still remained open. Alyeska submitted all but five closure packages in 1998 for JPO to review and close. The remaining items that should close out in 1999 are related to mainline valves, as-builts, secondary containment at Pump Station 1, bridge design, and Quality Development Program.

There are a lot of reasons why it has taken so long to close out many of the items. Initially, a plan had to be developed to determine extent of conditions. After that, Alyeska had to determine corrective actions, assemble crews, make corrections, verify the work, submit closure packages to JPO for verification, and close out the items. Many of the items were systemic and difficult to correct, and required significant resources to correct.

Many changes to TAPS occurred as a result of the audit findings. These changes led to modifications of pipeline operation systems, improvement and development of operations procedures and training, and increased safety and reliability of TAPS critical operating systems.

Revisiting past audit action items for repeatability is a major aspect of the JPO CMP process. Items to check are factored into surveillances and assessments which are ultimately evaluated in resulting CMP reports.

Commitment 8.

Develop the first phase of a TAPS geographic information system (GIS).

JPO entered into an agreement with Alyeska to develop a Geographical Information System. This agreement involved securing a System for JPO by extending rather than duplicating Alyeska's efforts. The System is layered providing the capability to view facilities, environmental, and oil spill information. The first phase of the System became operational in early in 1999. JPO will enter discussions with Alyeska for phases two and three which will involve adding more information for broader usage.

Commitment 9.

Secure permanent JPO offices and adopt an electronic records and mail distribution system.

JPO is currently operating under a six-month lease renewal valid through December 1999. Long-term, affordable lease options are limited, however, securing space will remain a commitment until a feasible solution is found.

Electronic records and mail distribution has been delivered. Records, correspondence, and documentation are scanned into the PaperClip system. Mail is routed electronically and records can be accessed from individual work stations. While the office will never be totally paperless, this is a major step to reduce paper and streamline records retention and retrieval capability.

Commitment 10.

Work with Alyeska to enhance oil leak detection.

New leak detection technology has the potential to improve Alyeska's ability to promptly detect and respond to small, slow oil leaks within the pipeline system. Alyeska is reviewing the latest technology for leak detection which JPO strongly encourages. Alyeska's new transient volume balance system is an improvement, but needs a comprehensive performance evaluation now that start up problems are resolved. JPO incorporated this request as a condition of approval of Alyeska's oil spill contingency plan. Improving leak detection will remain a top priority for oversight.

Alyeska commissioned the new Transient Volume Balance system of leak detection at the beginning of 1998 replacing the Line Volume Balance System. JPO reviewed the transient volume balance system data, focusing on testing of false alarms. There are three systems in place to detect leaks:

Transient Volume Balance System - The Transient Volume Balance system can detect whether a leak may be occurring and can identify the leak location by segment, especially with larger leaks. This system is based on transient flow modeling of the pipeline with data updated every 10 seconds. The volume balance is called transient because it takes into account a non-steady state flow. The Transient Volume Balance models compare the modeled flow to the flow measured by the leading edge flow meters.

Leading Edge Flow Meters -The Leading Edge Flow Meters estimate the oil flow rate from the difference in time it takes a sound wave to travel in the direction of oil flow versus against the direction of flow. Data from the flow meters are fed to the Supervisory Control and Data Acquisition System for transmission to the Operations Control Center in Valdez. This data is used for leak calculations and continuous monitoring of pipeline status by the pipeline controller. These instruments were recently upgraded to close an audit action item.

Deviation Alarms - The Deviation Alarm System detects large leaks greater than one percent of oil flow. There are three types of deviation alarms:

- Pressure alarms occur which occur when the oil pressure changes by more than 15 pounds per square inch.
- Flow alarms are activated if the amount of oil entering or leaving a pump station varies too much between check times.

- Flow deviation alarms are activated when the difference in the amount of oil flow between the upstream and downstream pump stations changes to greater than 700 barrels per hour flow. This calculation is performed on each pipeline section several times a minute.

False alarms analysis provides a measure of the performance of the transient volume balance system instrumentation and its ability to model real world pipeline conditions. The sensitivity of the leak detection system is always balanced against a manageable rate of false alarms. An alarm that cannot be attributed to a measurement problem or pipeline event will require Alyeska to conduct a field surveillance.

JPO reviewed leak alarm records from January through September 1998 to evaluate the Transient Volume Balance System false alarms recorded by Operations Control Center controllers in Valdez. JPO concluded the analyses of the false alarms for the Transient Volume Balance System indicate the 1998 performance was hindered by start up problems with the new, upgraded Leading Edge Flow Meters. Performance was also hindered by the temporary use of a "strap-on" Leading Edge Flow Meter in Valdez during the operation of the temporary back pressure system and leakage not metered by the Transient Volume Balance System through the Valdez incoming relief system.

JPO plotted false alarms versus location and found that they are not evenly distributed. When known, start up problems and those associated with the Valdez back pressure system are discounted, the distribution clearly singles out the Pump Station 5 and 6 segments due to the temperature of oil. Paraffin wax deposition is temperature dependent and this segment is where the oil cools and paraffin is deposited from the crude oil. JPO speculates the scraper pigs push the paraffin wax into the ports housing the leading edge flow meters. Alyeska should review this situation to see if maintenance schedule or equipment modification can improve Leading Edge Flow Meters and ultimately, Transient Volume Balance System performance. In response to JPO's review, the State of Alaska, Department of Environmental Conservation recommended that Alyeska produce a report on the transient volume balance performance. The recommendation is currently in the Trans-Alaska Pipeline System Pipeline Oil Discharge Prevention and Contingency Plan Findings Document and Response to Comments under Issue #14, *Leak Detection for Crude Oil Pipelines*. The report should contain the following elements:

- An analysis of the number of false alarms per month categorized into casual groups.

- A performance summary characterizing the quality of the data input into the Transient Volume Balance System including a measure of the loss of availability of the Leading Edge Flow Meters and other input data such as pressure and temperature.

- A summary of the median detection threshold and threshold range of each pipeline segment for the thirty minute, four hour, and eight hour averaging periods.

From a requirement perspective, the Grant and Lease do not provide performance criteria or specify leak detection technology. Rather, the documents reference detection of leaks under Stipulation 2.14.2, that requires Alyeska to submit an oil spill contingency plan. The design basis does contain engineering requirements, but the design basis did not foresee all the complications of leak detection under actual pipeline operations. Small, slow leaks are simply undetectable by current leak detection systems.

JPO encourages the use of the newest, most advanced technology available for leak detection. Some improvements are achievable in the Transient Volume Balance System, but dramatic improvements await new technology and a different approach. In 1997, JPO funded the State of Alaska's Aerospace Department to work with Alyeska to find new approaches. Alyeska published a formal solicitation which yielded 25 proposals. Evaluation of these proposals did not identify an immediate solution but did yield several promising technological leads. To Alyeska's credit, they are currently working with NASA's Jet Propulsion Lab to explore new sensors and technology. The approaches explored are not "off the shelf" and would substantially advance the best available technology paradigm for pipelines. JPO is strongly encouraging Alyeska in this pursuit.

Small, slow leaks are undetectable by current leak detection systems, however, new technology presents an opportunity to improve Alyeska's ability to promptly detect and respond to small, slow leaks. Improving leak detection will remain one of JPO's top priorities in future work planning.

Pipeline Projects.

Process, negotiate, deliver, and administer Right-of-Way Leasing Act leases.

The price of North Slope crude oil took a nose dive in 1998 dropping well below $10/barrel for a period of time. The major producers announced budget and staffing cuts leaving the State Pipeline Coordinator's Office wondering at year's end which projects would continue and which would be deferred.

The State Pipeline Coordinator's Office issues permits and processes right-of-way lease applications. Engineering and technical reviews are conducted and public comments are evaluated and resolved. They also monitor pipeline construction and operations.

Alpine - This project exemplified how well government, industry, local citizens, particularly the City of Nuiqsut, and the public can work together to develop a project in an environmentally responsible way. Several issues were raised during the public comment periods including an incident involving mud loss under the Colville River raised by the Northern Alaska Environmental Center. After extensive review and discussion with ARCO, an improved monitoring program and mud drilling plan was accomplished. Part of the right-of-way approval process involves resolving all outstanding issues prior to lease issuance.

Exactly a year to the day after the Badami pipeline right-of-way lease was signed with British Petroleum, the Final Decisions and Right-of-Way Leases for the Alpine crude oil and diesel pipelines were signed by Alaska Department of Natural Resources Commissioner, John Shively and ARCO in the Joint Pipeline Office, Tuesday, December 15, 1998.

There are two unique aspects associated with the Alpine project: use of vertical loops vs. valves for the first time on the North Slope and horizontal directional drilling under the Colville River.

The Alpine field is projected to contain up to 365 million barrels of recoverable oil or 70,000 barrels /day beginning in the year 2000 employing a total of 1000 people through construction. The crude oil pipeline will transport an estimated $1 billion in royalties and taxes from ARCO. The pipeline extends 35-miles west of the existing North Slope infrastructure tying into the Kuparuk extension.

The State Pipeline Coordinator's Office reviewed construction plans for the pipelines, monitored construction, and engaged contractor expertise to review critical engineering details specific to Alpine. After construction, the Office will shift from construction monitoring to operations monitoring with a program similar to the JPO Trans-Alaska Pipeline System Comprehensive Monitoring Program.

Nuiqsut Natural Gas Pipeline - The State Pipeline Coordinator's Office fast-tracked review of this proposed pipeline right-of-way lease application so that construction could coincide with the Alpine project. The engineering analysis was completed and the State Pipeline Coordinator's Office signed the Lease March 15, 1999.

The North Slope Borough applied for a right-of-way lease for the construction of a common carrier pipeline to transport natural gas from ARCO's Alpine Central Processing Facility to the City of Nuiqsut. The pipeline crosses approximately 13.7 miles; 8.8 miles above ground and 4.9 miles buried covering land owned by the State and Nuiqsut. Construction began in March 1999 with project completion scheduled for April 2001. Construction will only be performed in the winter, in consort with the Alpine project.

Northstar - Six miles offshore of Prudhoe Bay, BP has proposed a subsea 10-inch crude oil line and a 10-inch gas line. The pipelines would extend from Seal Island, a man-made gravel island that will support the production wells, in approximately 40 feet of water. An above-ground pipeline will tie Northstar into the Trans-Alaska Pipeline System at Pump Station 1. Recoverable oil reserves are estimated to be 145 million barrels. BP has estimated 300 construction jobs during a two-year period and about $575 million in taxes and royalties to the State.

During 1998, some of the major areas the State Pipeline Coordinator's Office worked in preparation for issuing a right-of-way lease were technical and engineering analysis including pipe-in-a-pipe, ice gouge, and strudel scour engineering issues which were provided to the Federal Environmental Impact Statement Team; engaging a third party contractor to address welding concerns; and observing four pipe bend tests and evaluating the results of those tests. BP conducted several bend tests to demonstrate safety against potential ice gouge and permafrost thaw settlement loadings as this proposed subsea pipeline would be located in an extremely sensitive environmental area.

Liberty -This proposed pipeline project is similar to Northstar as it would also extend from an existing man-made island in the Beaufort Sea about 11 miles southeast of the Endicott development and five miles offshore. There are an estimated 120 million barrels of recoverable oil. A 12-inch sales oil pipeline has been proposed requiring a tie-in with the Badami pipeline.

In 1998, the State Pipeline Coordinator's Office and the Minerals Management Service signed a Letter of Agreement to describe the coordination that will occur between the two offices to process right-of-way applications and in coordinating the preconstruction, construction, operation, maintenance, and termination oversight of the pipelines. This will eliminate duplication of effort, avoid unnecessary costs, and enhance the quality of the review process and any resulting rights-of-way agreements. Further, the two offices jointly developed the scope of the third party engineering review.

The State Pipeline Coordinator's Office has contracted with consultants to perform some engineering and technical reviews on Liberty.

Milne Point Enhanced Oil Recovery Project - BP submitted a right-of-way lease application to the State Pipeline Coordinator's Office for a 12" pipeline from the Oliktok tie-in to the Central Facilities Pad on existing vertical support members. The Office is reviewing the proposal including BP's Quality Assurance Plan. Lease signing is anticipated to occur around June 1999 with pipeline installation around February 2000.

Phillips Tyonek Deep - The State Pipeline Coordinator's Office received application for a right-of-way lease in June 1998 and public noticed the project in September holding meetings in six communities.

Phillips proposed to construct a natural gas pipeline and a crude pipeline from their Tyonek "A" platform in Cook Inlet to Unocal 's production facility at Granite Point. The proposed pipelines are approximately 17 miles long, including about 3.3 miles onshore. Phillips concluded their well tests in December and are now evaluating the results before a final decision is made to proceed with the project.

Badami - The State Pipeline Coordinator's Office oversaw construction of the oil and utility pipelines in 1998 and a tie-in to the Endicott pipeline. The 6" utility pipeline on the Endicott causeway remains to be buried. The transitioning to oversight of operations includes the current review of pipeline vibration dampeners installed in early 1999.

The field, 35 miles east of Prudhoe Bay, came on line in August. It is estimated to hold 120 million barrels of recoverable oil peaking at 30,000 barrels a day. BP encountered lower than expected throughput due to thicker oil that contained more wax. This cut production to less than half. Throughput was at just over 5,000 barrels a day when BP temporarily suspended production due to cold temperatures and low production. Badami is scheduled to restart production on May 1, 1999.

North Slope - The State Pipeline Coordinator's Office had a number of meetings with BP and ARCO regarding corrosion discovered on several North Slope pipelines after pig runs including Kuparuk, Endicott, and Milne Point. The Office has overseen the oil companies efforts to repair the corroded areas. New technology is being used to address corrosion problems. The Office is also helping the companies to develop monitoring programs for early corrosion detection.

Trans-Alaska Gas System - The State Pipeline Coordinator's Office renewed Yukon Pacific Corporation's Conditional Right-of-Way Lease for the Trans-Alaska Gas System project on December 11, 1998. The six-month renewal process involved coordination with State agencies and local governments and a public review process. The renewal is for ten years. The original Conditional Right-of-Way Lease, applicable to State land, was issued in December 1988, and expired in December 1998. The Conditional Right-of-Way Lease is not a property right but it does give Yukon Pacific Corporation a "blue print" of requirements which must be met to convert to a Final Lease which would allow construction.

The proposed Trans-Alaska Gas System project involves transportation of natural gas from the North Slope via a high pressure, large-diameter pipeline, approximately 800 miles in length and traversing State, Federal, and private lands adjacent to the dedicated Trans-Alaska Pipeline System corridor, to Anderson Bay in Port Valdez. A Liquefied Natural Gas Terminal would be constructed in Anderson Bay where Liquefied Natural Gas would be loaded on tankers for transport to Asia.

JPO's 1999 Work Program Goals.

JPO's 1999 Work Program Goals include:

1. Implement a project management concept to administer four programs: Culture, Maintenance, Construction, and Operations. This concept incorporates the 12 original focus areas previously used to evaluate TAPS performance into the four programs.

2. Begin to work four long range goals to be accomplished by year end of 2003.

3. Review critical Trans-Alaska Pipeline System "life cycle" for TAPS renewal.

4. Demonstrate safe operations of TAPS.

5. Demonstrate that the TAPS culture allows free and open reporting of problems without employees being harassed or intimidated.

6. Ensure that government and Alyeska can respond to a major oil spill.

7. Improve correspondence tracking, surveillances, assessments, and records process using key words that correspond to the Grant and Lease.

8. Issue the required permits and authorizations to Alyeska to operate and maintain TAPS.

9. Oversee Alyeska's employee concern case handling to assess whether concerns are being resolved and the harassment culture is being eliminated. Track and trend technical issues raised to ensure closure.

10. Verify closure of the five remaining open audit action items.

11. Develop the second phase for the TAPS geographic information system.

12. Monitor high-risk projects and activities to ensure that pipeline integrity, environmental protection, and public safety are achieved and maintained on TAPS.

13. Process, negotiate, deliver, and administer Right-of-Way Leasing Act leases.

14. Work with Alyeska to enhance oil leak detection.

15. Fully implement JPO's Response Action Plan for support and mobilization during a TAPS oil spill and conduct drills to exercise staff response capabilities.



JOINT PIPELINE OFFICE

Comprehensive Monitoring Program Report

Evaluation of Alyeska Pipeline Service Company's Operation of the Trans-Alaska Pipeline System

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Our Message to Stakeholders

TAPS and JPO

The Trans-Alaska Pipeline System (TAPS) transports nearly 20 percent of the nation's domestically produced crude oil through the unique and fragile environment of Alaska. TAPS is critical to the nation's business. Revenues and investment income from crude oil transported by TAPS account for 85 percent of the State of Alaska's general fund. Since start up in 1977, TAPS has safely transported more than 12 billion barrels of crude oil from Prudhoe Bay to Valdez. The Joint Pipeline Office (JPO), a unique consortium of six State and five Federal agencies, oversees Alyeska's management of TAPS.

JPO's Comprehensive Monitoring Program

JPO's vision is: ***"To work proactively with the oil and gas industry in Alaska to achieve safe operation, environmental protection, and continued transportation of oil and gas in compliance with legal requirements."*** The JPO Comprehensive Monitoring Program (CMP) is intended to influence continuous improvement in Alyeska's management of TAPS construction, operations and maintenance activities. The JPO CMP process is focused on problem prevention rather than reaction, emergency response, and damage control.

CMP reports periodically communicate to JPO stakeholders summaries of past significant findings, conclusions and recommendations drawn from JPO monitoring efforts. They revisit critical TAPS audit deficiencies; incorporate concerns raised by TAPS employees and outside interest groups; address high risk activities; verify compliance with laws, regulations, permit conditions, and Grant/Lease stipulations; verify compliance with important internal Alyeska controls such as the quality, safety and environmental programs; and evaluate causal factors and trends related to recent TAPS incidents. Each report covers one of twelve CMP functional topics and addresses a selection of significant issues of concern to JPO and its stakeholders:

- → Alaska Native Employment & Training
- → Configuration Management
- → Employee Concerns Program
- → Equal Employment Opportunity
- → Environment
- → Maintenance
- → Safety
- → Project Design
- → Project Performance
- → Quality
- → Risk Management
- → ***Operations***

Two additional CMP reports, Risk Management and Maintenance are nearing completion. Next year, the twelve categories will be consolidated into four CMP reports: Operations, Maintenance, Construction/Termination and Culture Change. Nevertheless, the emphasis of the CMP will remain unchanged. Coverage of environment, safety, quality, risk and configuration management will be addressed in each report.

About This Report

The JPO is pleased to present this evaluation of ***Alyeska Pipeline Service Company's Operation of TAPS*** to our stakeholders. While the operation and maintenance of TAPS will never be risk-free, JPO oversight will help minimize environmental risks and maximize compliance with worker safety and pipeline integrity standards.

Jerry Brossia
Authorized Officer

William G. Britt, Jr.
State Pipeline Coordinator

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LIST OF ACRONYMS

AAI	**Audit Action Item**
AIMS	**Alyeska Integrity Management System**
ACT	**Audit Compliance Tracking and Closure**
ADEC	**Alaska Department of Environmental Conservation**
ADNR	**Alaska Department of Natural Resources**
AO	**Authorized Officer**
APSC	**Alyeska Pipeline Service Company**
BCS	**Backbone Communication System**
BLM	**Bureau of Land Management**
BVCS	**Block Valve Communication System**
CAR	**Corrective Action Request**
CDM	**Corrosion Data Management**
CFA	**Causal Factor Analysis**
CFR	**Code of Federal Regulations**
CMP	**Comprehensive Monitoring Program**
CP	**Cathodic Protection**
CRO	**Control Room Operator**
DO-14	**Trans-Alaska Controller Operating Manual**
DOI	**Department of Interior**
DOP	**Department Operating Procedure**
DOT	**Department of Transportation**
DSMA	**Digital Strong Motion Accelerometer**
ECP	**Employee Concerns Program**
EDM	**Engineering Data Management**
EMS	**Earthquake Monitoring System**
FGL	**Fuel Gas Line**
FOC	**Fiber Optic Cable**
JPO	**Joint Pipeline Office**
LEFM	**Leading Edge Flow Meter**
LVB	**Line Volume Balance**
MAOP	**Maximum Allowable Operating Pressure**
MLU	**Main Line Unit**
MLR	**Main Line Refrigeration**
MOC	**Management of Change**
MP-166	**System Integrity Monitoring Program Procedures Manual**
MP	**Milepost**
NCR	**Non-Conformance Report**
NTP	**Notice to Proceed**
OM-1	**Procedural Manual for Operations, Maintenance and Emergencies**
OCC	**Operations Control Center**
OSCP	**Oil Spill Contingency Plan**
PIC	**Pressure Indicating Controller**
PIP	**Principal Implementing Procedure**
PLMP	**Pipeline Milepost**
PM	**Preventive Maintenance**

PS	**Pump Station**
QA	**Quality Assurance**
QA-36	**Alyeska Quality Program Manual**
QDP	**Qualification and Development Program**
QI	**Qualification Instrument**
QTC	**Quality Technology Company**
RGV	**Remote Gate Valve**
ROW	**Right of Way**
SA-38	**Corporate Safety Manual**
SCADA	**Supervisory Control and Data Acquisition**
SPCO	**State Pipeline Coordinator**
TAPS	**Trans-Alaska Pipeline System**
TAS	**Training Administration System**
TVB	**Transient Volume Balance**
UCP	**Unit Control Panel**
VMT	**Valdez Marine Terminal**
Y2K	**Year 2000 Compliance**
WO	**Work Order**

Executive Summary

The Joint Pipeline Office (JPO) conducted field surveillances and assessments in 1997 and 1998, to evaluate selected aspects of Alyeska Pipeline Service Company's operation of the Trans-Alaska Pipeline System (TAPS). This report explains the issues which were addressed, describes their current status, and identifies instances of noncompliance with the Federal Agreement and Grant and State Lease of Right-of-Way. This report's conclusions will not surprise Alyeska. To their credit, Alyeska's own audits and surveillances have identified these concerns and corrective action is underway. In 1999, JPO will continue to oversee Alyeska's TAPS Operation Program, including compliance with the stipulations of the Grant and Lease, to determine Alyeska's effectiveness in resolving these issues.

Principal Conclusions About Pipeline Operations

- **Five of the sixteen stipulations JPO evaluated were in noncompliance with the Grant and Lease. The noncompliances relate to change management and below ground systems deficiencies. The issues vary in significance, however none of them represent an immediate threat to pipeline integrity, public safety, or the environment. Alyeska has been informed all noncompliances must be corrected, and is working to bring them into compliance. JPO will evaluate progress and verify all completed corrections.**

- **Alyeska does not have an effective change management process and has failed to maintain complete and up-to-date records on pipeline system modifications as required by Stipulation 1.18.3. Change is inherent in the operation of TAPS due to technology advances, equipment deterioration, and modifications to improve cost efficiency. Pipeline system changes often have ramifications beyond the physical replacement of equipment that Alyeska's change management processes have not anticipated.**

- **Alyeska's management of the movement of oil needs greater attention to detail, better trending and evaluation of incidents, and more rigorous procedural compliance. JPO will verify implementation of proposed corrective actions.**

- **New leak detection technology has the potential to improve Alyeska's ability to promptly detect and respond to small, slow oil leaks within the pipeline system. Alyeska is reviewing the latest technology for leak detection, which JPO strongly encourages. Alyeska's new transient volume balance system is an improvement, but needs a comprehensive performance evaluation now that start up problems are resolved. JPO incorporated this request as a condition of approval of Alyeska's oil spill contingency plan. Improving leak detection will remain a top priority for oversight.**

Additional Observations and Conclusions

- **Alyeska needs to better trend and evaluate unscheduled pipeline shutdowns to identify any causes not fixed by the planned fiber optic system improvements.**

- **Alyeska did not consistently follow their quality control procedures for calibrating and maintaining pressure control devices and documenting the results. Corrective action plans have been implemented to fix this problem, including a plan to increase surveillance of tracking and controlling pressure relief system devices to prevent these problems from recurring.**

- **A TAPS cold re-start study must first be completed before developing a new plan that includes procedures for re-starting the pipeline under extreme cold conditions after an extended shutdown. Study results will reveal information about system performance in the event of an extended shutdown.**

- **JPO continues to monitor Alyeska's ongoing investigation of an overpressure event that occurred in August 1998. A preliminary Alyeska engineering review concluded that pipeline damage was unlikely. JPO recently obtained the pipeline pig data and is currently evaluating it to verify Alyeska's conclusion. An oversight priority is to ensure Alyeska implements preventive measures to minimize future occurrences.**

- **Employees controlling oil flow have received considerable training. However, Alyeska should complete its qualification and development program initiative and comply with its requirements for self-audit and team qualification plans. Further, Alyeska should revisit controller's training and research information needs to cope with changes in system configuration. JPO encourages Alyeska to make full use of its new pipeline control simulator and to critically evaluate its effectiveness.**

- **Alyeska closed many operations-related audit action items in 1996 and 1997. Presently, five audit items remain open that are planned for completion later this year. However, several items that should significantly improve operations have not yet been closed. Operational deficiencies such as ineffective change management continue to exist, which will, if uncorrected, cause the repeat of many 1993 audit deficiencies. The audit items including change management will not be closed until an effective change management system is in place.**

- **JPO evaluated two issues involving buried pipe and concluded that: 1) the pipe curvature at Mainline Refrigeration Site No. 2, near the Gulkana River, is not a pipeline integrity concern under current operational conditions; and 2) no intervention is needed at Salcha River to address pipeline curvature.**

- **JPO finds Alyeska's Y2K effort to be well planned and organized. Alyeska's late start may increase the cost of the Y2K program, however, JPO does not have concerns about its effectiveness.**

- **Alyeska is replacing their current backbone communication system with a new fiber optics system and new valve control units, with the intent to: 1) minimize incidents of communication lapses to remote gate valves; 2) decrease unplanned shutdowns, and 3) enhance pipeline system safety. JPO will verify the reliability and safety of the system, once it becomes operational.**

- **Alyeska processed and closed two substantiated employee concerns related to operations in 1997-1998. JPO reorganized its employee concerns oversight to better trend and evaluate the concerns of TAPS workers.**

Chapter 1. Purpose, Scope, Methods and Background

This report is the sixth in a series of Comprehensive Monitoring Program (CMP) reports designed to provide stakeholders with a view of how TAPS is operated and maintained. Previous CMP reports have covered safety, environment, project performance, Alaska Native utilization, and the employee concerns program. This report explains JPO's approach to situations when pipeline system integrity and safety are in question.

Purpose

All CMP reports evaluate compliance with relevant regulations and the Federal Agreement and Grant and the State Lease of Right-of-Way. The 30-year Federal Grant and State Lease for TAPS are scheduled for renewal by January 2004, therefore systematic compliance monitoring is a central purpose of the CMP. The intent of this report is to:

1) Report to the public and higher authorities about Alyeska's management of moving oil from Prudhoe Bay to the Valdez Marine Terminal, and JPO's oversight of pipeline operations.

2) Describe the status of system integrity concerns such as Salcha River pipe curvature and the Mainline Refrigeration Site No.2 permafrost thawing problem.

3) Explain concerns regarding Alyeska's difficulty in controlling and managing system modifications. Change management will be further discussed in upcoming CMP Reports.

4) Discuss system modifications relating to fiber optics, valve communication, leak detection and Year 2000 computer compliance, and oversight of these initiatives.

5) Identify Federal Grant and State Lease compliance issues identified through JPO's monitoring of TAPS operations.

6) Evaluate significant issues raised by TAPS workers and take another look at key deficiencies identified in the 1993 TAPS audits.

Scope

The report scope includes JPO oversight of TAPS operations from June 1997 through September 1998. The report focuses on activities integral to the safe operation of the Trans-Alaska Pipeline System, with the scope limited to pipeline system operations of moving oil from Prudhoe Bay to the Valdez Marine Terminal. It also contains information from Alyeska's internal audits, which provide insight into the adequacy of Alyeska's approach to TAPS operations. Also included are shutdowns related to communication failures that occurred from 1994 through 1998.

Since TAPS operation has a broad spectrum, this report does not evaluate all aspects of pipeline system operation. JPO selected areas for monitoring that were problem oriented, placing a heavy oversight emphasis on unscheduled shutdowns and pipeline restarts. This CMP report was chosen as the vehicle to report on the monitoring of pipeline integrity issues such as the Salcha River pipe curvature and Mainline Refrigeration Site No.2.

Methods

Conclusions reported here result from evaluation of JPO's field surveillances and engineering reports. Most surveillance and assessment reports were summarized in weekly reports that are routinely distributed to stakeholders. Information about individual surveillances or assessments is available by request from JPO's public affairs office.

How This Report is Organized

This report is structured differently from previous CMP reports. More background material has been added to aid readers in the understanding of pipeline operation issues. A difficult editorial challenge was to organize Chapter 2 into an integrated framework to present issues and conclusions from JPO's 1997-1998 monitoring of TAPS operations. Chapter 2 is organized into three subchapters: 1) pipeline control and telecommunications systems, including system improvements such as fiber optics and leak detection; 2) below ground stability systems that include problematic instances of pipeline curvature; and 3) change management. The first two subchapters draw heavily from categories found in the TAPS design basis so a consistent terminology and functional breakdown can be developed. The third subchapter introduces change management, which is a systemic deficiency, both currently and historically.

Monitoring TAPS Operations

This is JPO's first CMP report about oversight of TAPS operations. Before 1994, Federal and State oversight of TAPS focused on surface and subsurface protection, environmental issues, corrosion, oil spill contingency, and land use permitting. JPO did little monitoring on the transportation and management of oil inside the pipeline system. In response to identified deficiencies in the 1993 audits of TAPS, JPO expanded oversight to include transportation of oil inside the pipeline system. JPO planned the first evaluation of TAPS operations in late 1996, began initial field studies in 1997, and continued monitoring pipeline operations in 1998.

Chapter 2. Evaluation of TAPS Operations

- **Alyeska's management of the movement of oil needs greater attention to detail, more thorough trending and evaluation of incidents, and more rigorous procedural compliance.**

The hardware, software, processes, and trained staff to move oil are in place. Much of JPO's 1997 and 1998 operations monitoring addressed issues such as unscheduled shutdowns, driven by hardware or process failures in telecommunication and pipeline control.

Moving Oil Requires a Complex System of Hardware, People and Processes

The Hardware. TAPS has 800 miles of 48-inch diameter pipe, with 7 active pump stations, a tanker loading terminal and an electronic communication system. Approximately half of the pipe is below ground, with cathodic protection and below ground stability provisions. The above ground stability systems include vertical support members, anchors, bridges, and seismic and geotechnical provisions. Each pump station has a number of integrated pieces of equipment, such as turbine engines, pumps, valves, meters and relief tanks, as well as associated electrical, instrumentation and telecommunication. Each pump station has protective devices that prevent exceeding specified operating limits to ensure safe oil movement from Prudhoe to Valdez. The pipeline has 151 mainline valves and about 1,000 motorized pump station and marine terminal valves to control oil flow. The Valdez Marine Terminal contains the Operations Control Center, where TAPS is controlled through an elaborate telecommunication system. The Valdez Marine Terminal also contains storage tanks, tanker loading systems, ballast water treatment, tanker vapor recovery systems, and a large power generation facility.

Pipeline Controllers. The entire TAPS system of pumps and valves is remotely controlled from the Operations Control Center in Valdez. Pipeline controllers at the Operations Control Center watch and control all pipeline system activities to ensure crude oil flow moves within pressure, temperature, liquid level, and seismic design parameters. Pump station personnel operate and control the pumps and valves in their segment when instructed by the Operations Control Center.

Alyeska Processes and Management Controls Governing Oil Movement. Controllers follow certain procedures to operate the pipeline system under normal, abnormal and emergency conditions. Pipeline controllers use Alyeska's *Trans-Alaska Pipeline Controller Manual (DO-14)* as the primary guide for operating the pipeline. The *Procedural Manual for Operations, Maintenance and Emergencies (OM-1)* ensures compliance with Federal Department of Transportation regulations. *Alyeska's Quality Assurance Program (QA-36)* contains procedures for audits and surveillances to ensure that processes are carried out according to requirements. The *Alyeska Integrity Management System (AIMS)* is an approach designed to identify key management practices that are missing or unclear. Alyeska's oil spill contingency plan provides failure response processes.

TAPS Mechanisms That Protect the Environment, Pipeline Safety and Integrity. Leak detection, pressure alarms, seismic monitoring, valve status indicators, and automated shutdown mechanisms protect against adverse operating conditions that could potentially threaten the environment, pipeline safety and integrity. For instance, electronic systems automatically shut TAPS down when unplanned valve closures occur. Oil spill equipment is stored and ready for immediate deployment for emergency response.

Regulations and Jurisdiction of Joint Pipeline Office Agency Partners. The primary Federal regulations covering the movement of oil are contained in *49 Code of Federal Regulations 195 (Pipeline Safety)* and promulgated by the U. S. Department of Transportation, Office of Pipeline Safety. These regulations are incorporated and supplemented by additional stipulations and provisions in the Federal Agreement and Grant and Right-of-Way administered by the Bureau of Land Management and the State Lease of Right-of-Way administered by the Alaska Department of Natural Resources. Oil spill contingency is covered by each of the above agencies, along with the State of Alaska regulations administered by the Alaska Department of Environmental Conservation.

Pipeline Control and Telecommunications Systems

Unscheduled Pipeline Shutdowns

- **Unscheduled pipeline shutdowns continue to occur, however, most are related to communication failures. When installation of the new fiber optics communication system and control units is complete, it is anticipated unplanned shutdowns will become less frequent.**

- **Alyeska needs to better trend and evaluate the shutdowns that occurred before fiber optics installation to identify causes that may not be fixed by the new installation.**

Shutdowns Related to Communication Failures. Since June 1979, pipeline controllers have shut the pipeline down forty-seven times due to communications loss exceeding two minutes. Over one-third of the shutdowns occurred in 1994 and 1995. A March 5, 1997 JPO engineering report identified a continuing trend in 1994, 1995, and 1996 shutdowns related to communication difficulties. This trend was again evaluated in 1998, by conducting an assessment that addressed the same communication failures. The assessment directed Alyeska to revisit the incidents in question to assure identification of the root cause to avoid problems after the installation of the fiber optics system is complete and operational.

Communication Shutdowns: Good or Bad?

The increased rate of shutdowns due to loss of communication was driven by procedural changes to better protect the pipeline. Before 1992, the pipeline was not routinely shut down when communication was lost. This left the pipeline at risk to overpressure, should a remote gate valve close during the time communication was lost–an unlikely but possible occurrence. JPO supports the more cautious operating procedures, even with the increased rate of shutdowns.

Reducing the number of communication shutdowns is an opportunity for improvement. The number and occurrence of these shutdowns do not represent a noncompliance with Alyeska's management controls or government requirements.

Alyeska stated in their response to JPO's assessment, the root cause of the failures were hardware-related. Alyeska further stated since the aging installations were being replaced as a result of the fiber optic and remote gate valve control improvement projects, the occurrence of failures should be reduced. In the meantime, Alyeska has procedures in place requiring the pipeline to be shut down if communication is lost longer than two minutes. JPO has no evidence to dispute Alyeska's conclusion, but will monitor future shutdowns for causes that would *not* be addressed by the fiber optic system and the new control units.

Shutdowns Related to Mainline Units. JPO conducted investigations of two separate incidents at Pump Station 4 in May 1998. A common root cause was not identified for the two incidents, however, investigation revealed pipeline safety systems had responded as required. The Pump Station 4 relief tank is normally used to divert oil and relieve pressure. However, it had been removed from service for maintenance when the incidents occurred. Without the relief tank in service, mainline overpressure protection was accomplished by a station shutdown, using automatic controls, rather than the pump station pressure relief system. Relief Tank 140 has been returned to service, so this type of inadvertent pipeline shutdown should decrease.

Unplanned Shutdown Incidents
On May 24, 1998, a shutdown incident occurred at Pump Station 4, involving a pump, or mainline unit (MLU) "swap." Pump Station 4 has three MLU's, two on-line and one in stand-by, that are periodically swapped as part of the regular maintenance strategy (*see Appendix I photos*). When a MLU swap is executed properly, the standby MLU is brought to idle and subsequently loaded. The MLU selected for stand-by is then idled and shut down. During this particular unit swap, the OCC Controller mistakenly shut down MLU #2 before idling, which caused a pressure device to shut down Pump Station 4.

A second incident occurred at Pump Station 4, on May 27, 1998, as a result of a mechanical alarm that shut down MLU #2. The cause of the alarm was due to the MLU #2 lube oil pump, which was removed from service and inspected for damage and wear. No apparent problem with the lube oil pump was identified, although it was noted several preventive maintenance activities for the lube oil pump were back logged.

Why Did These Events Result in a TAPS Shutdown?
When a pump suddenly stops, suction pressure increases due to reduced oil flow rate, which then increases the static head pressure. If the suction pressure exceeds the already programmed pressure settings, the pump station is automatically idled.

JPO recommended that Alyeska trend pipeline shutdowns caused by mainline units, to determine if a mainline unit swap procedure for normal pipeline operations is necessary. JPO also conducted a surveillance of training issues related to the mainline unit swap procedure, without finding any significant deficiencies. Oversight will continue for these incidents as they occur.

Trend and Causal Factor Analysis. Alyeska has committed to use trend and causal factor analysis to meet the requirements of CFR 195.402 (d) (1) "Responding to, investigating, and correcting the cause of: (I) Unintended closure of valves or shutdowns; (ii) Increase or decrease in pressure or flow rate outside normal operating limits; (iii) Loss of communications; (iv) Operation of any safety device; (v) Any other malfunction of a component, deviation from normal operation, or personnel error which could cause a hazard to persons or property."

Trend and Causal Factor Analyses

Trend and causal factor analyses are tools used to determine potential trends, implications adverse to quality, and process improvement areas. The procedures and requirements governing the use of these tools are found in Alyeska's safety manual and quality program Principal Implementing Procedures.

Trend Analysis
A trend analysis is used to identify patterns of occurrence related to people, processes and hardware. Alyeska's objective of trend analysis is to "discover trends related to quality and to use them as a tool in the decision making process in continuous improvements, quality, operations, maintenance, or other business activities." Trending should be done on a continuous basis. The data are weighed to reflect significance, and are compared with previous trend results. Trends are reported quarterly. The *Trend Analysis Summary Report* is sent to the appropriate managers tasked with coordinating the determination, if an adverse trend requires the issuance of a corrective action report or root cause analysis.

Causal Factor Analysis
A causal factor analysis identifies the cause of a problem. This analysis examines personnel, hardware, procedures, and environmental effects. It involves a detailed, systematic review of cause and effect conditions to determine the root cause and propose actions to rectify the condition and prevent recurrence.

What's Involved in the Process?
Sources of data for analysis include nonconformance reports, quality and environmental audit findings, surveillances, incident reports and other appropriate documents.

Operations incident investigation, evaluation and trending has been an Alyeska weakness, documented by JPO's 1997 surveillance. Tc Alyeska's credit, their 1998 quality audit also identified these weaknesses. In the same report, Alyeska committed to make corrective actions.

A May 28, 1998, JPO assessment report contained a finding that causal factor analysis was not being performed in accordance with Alyeska's Quality Manual and inconsistencies were noted in the format used to investigate equipment failures. The assessment recommended a review of incidents to assess the adequacy of the causal factor analysis process.

Alyeska's handling of an August 5, 1998, overpressure incident (discussed on p.14) used the appropriate "root cause" tools. Further, they have tightened the management over the pipeline control function. Alyeska's future performance in trending and evaluating shutdowns and other incidents will determine whether deficiencies in the use of causal factor analysis are corrected.

Planned Re-starting of the Pipeline

- **Alyeska's performance in re-starting the pipeline system improved during the last shutdown covered in this reporting period. However, Alyeska needs to better plan re-starts to: 1) ensure attention to detail on procedure revision, 2) complete functional testing of new and repaired hardware, 3) document changes in operating status, and 4) develop contingencies for activities conducted during shutdowns to avoid recurrence of problems from previous re-starts.**

During 1997 and 1998, TAPS had several planned maintenance shutdowns. Frequent problems occurred during re-start activities both at the pump stations and the Operations Control Center in Valdez. Procedural lapses were found that revealed pipeline re-starts had not received needed management or attention to detail. Procedures could have improved, functional checks should have been completed, and contingencies better anticipated. The experience and skill of controllers and hydraulic engineers was evident, but better planning could have made re-starts less eventful.

The September 1998 re-start during a valve repair and replacement project showed a significant improvement and better attention to procedures and detail. The procedural changes clearly reflected lessons learned from earlier re-starts. While these improvements were commendable, strengthening Alyeska's change management processes is necessary to ensure that contingency events associated with testing new products such as "Gel Block" or system modifications are anticipated. Alyeska needs to aggressively manage this, given the natural tendency for controllers to work from experience, rather than follow detailed procedures.

The following is a summary of incidents that occurred in the re-starting of the pipeline after being shut down:

1. During the August 1, 1997 re-start, Alyeska allowed the pipeline to be overpressured. While the overpressure did not threaten pipeline integrity or damage the pipe, this overpressuring was neither trivial nor unpreventable. It was a violation of U.S. Department of Transportation, Office of Pipeline Safety regulations. Two of the findings from JPO assessment, *1997 TAPS Shutdown and Re-start*, address Alyeska Quality Program requirements covering procedure modification and waivers. Conformance with the Alyeska Quality Program requirements may have prevented this incident.

2. Before the August 8, 1997 re-start of the pipeline, the pressure relief system at the Valdez Marine Terminal malfunctioned. The incident, which was manageable, is not the issue of concern. Instead, functional testing requirements of Alyeska's Quality Program should have exposed this

problem before re-starting the pipeline.

3. In August 1997, during and after testing of Remote Gate Valve 60, Alyeska tested a valve sealant, called "Gel Block." Approximately 4,000 gallons of the Gel Block remained in the pipeline after the test, clogging screens and causing the pumps to vibrate at Pump Station 7. This resulted in an upset condition. The potential for this upset condition should have been anticipated and contingencies planned.

4. The June 20, 1998 shutdown was scheduled to test several remote gate and check valves to gather data for Alyeska's valve maintenance program. The re-start was well managed except for one unexpected event. When testing was complete, Remote Gate Valves 58, 59, and 60 failed to function when commanded from the Operations Control Center in Valdez, and had to be opened locally. The failure to open was due to a "block line sequence logic" that did not complete its sequence. The cause of the incomplete sequence was due to a valve at Pump Station 5, that was locked open for maintenance when the block line sequence was initiated. The sequence logic and equipment had performed as designed.

Pipeline Pressure Control

- **Alyeska did not follow their quality control practices for calibrating and maintaining pressure control devices and documenting the results. However, they have implemented corrective action plans to fix this problem, including a plan to increase surveillance of tracking and controlling pressure relief system devices to prevent these problems from recurring.**

TAPS has safety mechanisms in place to maintain pressure within safe operating limits and prevent overpressure along the pipeline. Alyeska's Quality Assurance Program ensures proper procedures are in place to maintain the integrity of the pipeline. Pipeline pressure is controlled and maintained according to Alyeska's quality control procedures. Each operating pump station along TAPS has pressure control devices to prevent pressure from exceeding safe operating limits.

Pipeline controllers follow written procedures for maintaining pressure control. The procedures cover both normal and abnormal operation. Controllers must use specific "settings" when adjusting devices to control pressure. These settings are referred to as pressure control "set points." Set points are critical because they control relief valves that prevent exceeding maximum oil pressures allowed by U.S. Department of Transportation regulations. For example, if oil pressures exceed the set point value, relief valves automatically open to reduce the pressure. Alyeska's hydraulic engineers calculate set point values for each pump station, based on flow rate and pipeline configuration. Set point values are also calculated for upset conditions and are specified by Alyeska's operating manuals. The Operations Control Center (OCC) in Valdez has the responsibility for the settings and maintenance of the field pressure control set points along TAPS. OCC controllers input the set point values in the automated pressure control system for the entire pipeline.

JPO conducted a surveillance to 1) verify that the OCC controllers were operating the pipeline in accordance with the pressure control set points developed by Alyeska's hydraulic engineers, and 2) verify that the equipment used to support the operation of the pressure relief system was

calibrated in accordance with Alyeska's Quality Assurance Program. Controllers used the set points specified by hydraulic engineers, but Alyeska had problems following their quality control practices for calibrating and maintaining the pump station pressure control devices. Set points were not consistently documented and labeled on some of the devices used to control pipeline pressure, as required by Alyeska's *Quality Program Manual*. JPO could not verify calibration set points and frequency of calibration due to: 1) missing labels on the pressure control devices, and 2) missing calibration documentation. Alyeska requires calibration labels to be attached to all pressure control equipment, since they contain essential set point value information. Without them, pipeline controllers cannot be assured the settings are maintained within the safe operating parameter (*see Appendix II photos*).

Alyeska's quality control procedures contain a two-step level for safety: 1) pressure control devices are calibrated using a specific set of procedures, and 2) the set point values of each control device are documented in a written record. Labels are attached to each device with the specific value against which it was calibrated. The intent of these safety precautions is to ensure all pressure control devices on TAPS are accurately maintained according to recommended industry practices, and to ensure regulatory compliance.

Alyeska concurred with the finding and took action to re-calibrate pressure control devices and revise their tracking and documentation procedures. They plan to increase their surveillance to prevent recurrence of this problem. JPO accepted Alyeska's response to this issue, and will continue to monitor Alyeska's compliance with their quality program and pipeline operating procedures concerning pipeline pressure control.

Pipeline Overpressure of August 5, 1998

- **JPO continues to monitor Alyeska's ongoing investigation of an overpressure event that occurred in August 1998. A preliminary Alyeska engineering review concluded that pipeline damage was unlikely. JPO recently obtained the pipeline pig data and is currently evaluating it to verify Alyeska's conclusion.**

- **Alyeska identified lessons learned and completed some corrective actions, with other corrective actions remaining to be completed. An oversight priority is to ensure Alyeska implements preventive measures to minimize future occurrences.**

On August 5, 1998, a significant overpressure of the Trans-Alaska Pipeline System occurred. Hydraulic pressure exceeded 110% maximum allowable operating pressure (MAOP) in the 32-mile segment between Pump Stations 9 and 10. Alyeska completed a hydraulic analysis indicating the pressure had peaked at 130% MAOP near Pipeline Milepost 568, south of Delta Junction, Alaska. The cause of the event was thought to be a pipeline controller error at the Operations Control Center in Valdez. Alyeska began an immediate, formal investigation to determine the root cause.

JPO's records review revealed two more overpressure incidents had occurred later the same day, while Alyeska was responding to the incident. JPO became concerned about the two additional overpressures because Alyeska had not identified them. JPO could not find specific procedures for the response and investigation of the overpressure incidents. Analysis of the data led JPO to

question how Alyeska initially responded to this incident. JPO is also concerned about Alyeska's slow response in implementing remaining changes to prevent future overpressure incidents from recurring, and will continue to monitor this issue.

JPO found a lack of procedures for the response and investigation of pipeline overpressure events, and discussed with Alyeska the OCC controller's ability to manage overpressure events; along with recommended procedural improvements for responding to and investigating events. A letter was sent to Alyeska, requesting: 1) the status of potential system changes that Alyeska committed to make, 2) procedures for investigating and responding to pipeline overpressures, and 3) a detailed analysis of all overpressure incidents that occurred on August 5, 1998.

After reviewing the records and evaluating the situation, JPO concluded improvements in the real time hydraulic display controllers use to determine the oil pressure gradient are necessary. The gradient does not accurately represent pipeline pressures during surge events. Surge events generally occur during upset conditions, when oil flow stops abruptly. When valves unexpectedly close, the front of the oil flow is suddenly stopped as it slams against the closed valve, creating a surge wave that abruptly moves in the opposite direction.

Pipeline Overpressure
U.S. Department of Transportation, Office of Pipeline Safety regulations specify a pipeline controller shall not exceed the maximum allowable operating pressure of 100% for the pipeline, except in abnormal conditions. Excess oil pressure is a concern due to the potential for leaks or ruptures in the pipeline. Normal operating pressures vary according to the topography the pipeline traverses. Under abnormal conditions, the regulations allow pressure up to 110%.

Pipeline Integrity
Alyeska visually inspected the affected pipe segment and found no indication of excessive stress conditions of the pipe or valve. Alyeska also tested for presence of hydrocarbons at Remote Gate Valve 88 and Control Valves 89 and 90. All test results were negative. In October 1998, Alyeska sent the deformation pig through the pipeline from Pump Station 4 to Valdez to confirm pipeline integrity. JPO is currently evaluating the pig data to verify Alyeska's conclusion there were no excessive stress conditions of the pipe and valve.

As a result of the August 5, 1998 overpressure event, Alyeska planned some system changes for 1999. The changes will make it possible to determine the status of the valves downstream of the pump stations which have been ramped down, or removed from operation. Alyeska recently completed a causal factor analysis which not only addresses this event, but other pipeline controller errors. It identifies many of the programmatic deficiencies cited in this CMP report, including the principles of change management, which Alyeska has not effectively employed. It is a positive step and consistent with the Quality Assurance Program. Nevertheless, Alyeska needs to complete the corrective action and respond to issues JPO has identified.

Pipeline Hydraulic Model

- **The procedures for the use and maintenance of the pipeline hydraulic model need clarification in Alyeska's manuals. While no major problems were found, much confusion can be eliminated if procedures for using the hydraulic model were clearly stated in the appropriate manuals.**

The hydraulics and internal pressures of the pipeline are continuously displayed, monitored, and calculated on the OCC pipeline controller's computer screen. The "pipeline hydraulics model" is a tool controllers use to determine pipeline pressures during steady state operation. (See *Oil Movements Gradient Chart* in appendix). JPO incorporated the hydraulic model in the 1998 work plan because: 1) it provided an opportunity to examine three "priority one" audit action items which had been previously closed, 2) the *Oil Movements Gradient Drawing* appeared to be out of date, and 3) the hydraulic model is a key tool for the safe operation of TAPS.

JPO's surveillance report contained two findings: 1) The *Oil Movements Gradient Drawing* had not been recently updated, and 2) milepost calculations in Alyeska's Engineering Data Management system were inaccurate. After evaluating Alyeska's response to these findings and investigating the matter further, JPO concluded that neither issue presented an imminent threat to system integrity or pipeline safety. Alyeska has agreed to clarify their manual procedures and update the Engineering Data Management system to remove inconsistencies.

The Oil Movements Gradient

The *Oil Movements Gradient Drawing* is an on-line chart that tracks oil movement linewide, and is displayed on the Operations Control Center pipeline controller's console (See *Oil Movements Gradient Drawing* in appendix). Alyeska Manual OM-1, the *Procedural Manual for Operations, Maintenance and Emergencies*, specify the maximum allowable operating pressures defined in the oil movements gradient. Neither the drawing nor the on-line oil movement gradient defines these terms. The definition of maximum allowable operating pressure resides in Alyeska's engineering data management system, the corrosion data management system, pipe purchase and installation records, and hydro-test records. The drawing 1) does not directly tie to the pipeline hydraulic models, and 2) is only used for planning, training, and rough approximations of pipeline operations. It isn't used to define maximum allowable operating pressures, operate the pipeline, or determine the set points referenced in the *Department Operating Procedure* manual.

The survey data used in the *hydraulic models* is a compilation of data from all of these sources for only those points on the pipeline of hydraulic significance--often referred to as "pinch points." It is not a compilation of maximum allowable operating pressure for every point or joint of pipe on the pipeline system. This is acceptable because most areas of pipe cannot be operated near their rated limits due to the need to stay below these pinch points. These are located in areas where high pressures must be maintained to move oil. In summary, the manual reference to the oil movement gradient in OM-1 is not completely accurate and Alyeska plans to delete it.

Pipeline milepost calculation problems in the Engineering Data Management (EDM) system began in November 1996, resulting in inconsistent pipeline milepost numbers in the report. Sometimes the mileposts agreed with the hydraulic survey database, but often they were offset as much as 0.034 miles. On April 3, 1998, Alyeska's pipeline hydraulics group decided to resolve the problem. EDM is now calculating correct pipeline milepost data, based on additional survey equations added by Alyeska's system integrity team.

Alyeska committed to revise OM-1 and improve the documentation of annual reviews and update the milepost numbers as a training exercise for new hydraulic engineers. JPO verified that Alyeska complied with promises made in 1995 to close audit findings regarding the hydraulic models. The Joint Pipeline Office concurred with Alyeska's response that the *Oil Movements Gradient Drawing* has no direct ties to the pipeline hydraulic model and the survey data are now being calculated correctly. However, because of the recent overpressure event, it may be necessary to implement improvements in the real time hydraulic display that controllers use to determine the oil pressure gradient. JPO will monitor Alyeska's activities to verify that models are updated, manuals and documents are revised, and controlled copies are distributed as required.

Controller Training

- **Employees controlling oil flow have received considerable training, however, Alyeska needs to complete its qualification and development program (QDP) initiative and comply with the self-audit and team qualification plan aspects of the program for all system controllers and operators.**

- **Alyeska's evaluation of recent controller errors revealed that some controllers lack full knowledge of the pipeline control systems and the training program does not effectively assess controller performance under abnormal operating conditions.**

The employees controlling the pipeline have received considerable training. The largest substantive weakness in controller training involves inadequate and poorly implemented change management processes. Despite training, OCC controllers lack full knowledge of the pipeline control system including the systems that automatically shut down the pipeline if a problem occurs. As the pipeline system changes configuration through ramp down, testing or repair, controllers should understand the ramifications of these changes according to what information is on the display screens. Controllers should also understand how these changes affect the automatic functions driven by the computer. Two recent events illustrate this problem. Both involve controllers who were experienced and trained.

- The June 20, 1998 re-start had a delay in opening Remote Gate Valves 59 and 60. JPO conducted a follow-up surveillance at Pump Station 5 to determine if the cause of the delay was training related, and concluded it was not. In fact, one of the trainers was at the controls at the time. The reason why the control logic would not allow the controllers to open the valves was related to activities conducted during the shutdown, the implications of which weren't initially recognized even by a controller trainer.

- During the August 5th overpressure the controller made wrong decisions in a situation complicated by valve control modifications and control screens that didn't fully reflect ramp down reconfiguration. As mentioned earlier, Alyeska committed to additional training, recertification and modification of some of the screen displays. Better anticipation of the complications in TAPS operations due to both ramp down and day-specific testing or repair is needed.

Alyeska's recent causal factor analysis of OCC pipeline controller errors recognized this problem and recommended corrective action. Alyeska's new pipeline control simulator should be a useful tool for training and skill development, and can be used to address change management. JPO encourages Alyeska to make full use of its new pipeline control simulator and to critically evaluate its effectiveness.

The Qualification and Development Program (QDP) for pipeline controllers and operators is underway. However, it will not be considered fully implemented until: 1) qualification instruments are validated and entered in Alyeska's training administration system; 2) all team members are qualified to use designated core qualification instruments, and 3) all program components are complete and documented, including team qualification and business plans.

Why Was The QDP Initiated?

The Qualification and Development program (QDP), initiated during 1994 and 1995, is a result of the 1992 Owners Safety Audit, the BLM Audit, and the TAPS assessment to address technician capabilities. A one year site-specific pilot program was developed and implemented in the Operations Control Center in late 1995, and a site-specific program for the pipeline control rooms was initiated in August 1996. Implementation of these two programs closed ten audit action items. The primary audit action item, full QDP implementation, remains open and is scheduled for closure later this year.

The QDP's Purpose

The purpose of the QDP is to ensure no technician or controller will be expected or allowed to perform core tasks without passing a qualification assessment on that task. Newly hired technicians are level one of a six-level progression system. After successfully completing basic training, they move to level two and enter the regular technician work force. A level two technician has one year to achieve qualification to level three. Further progress is at the technician's direction and is achieved by qualifying on additional qualification instruments. However, technicians may be required to become qualified on higher level tasks by their team leader, based on business needs. Improving the QDP program is an ongoing task and JPO will continue to track program progress.

JPO's 1998 work plan included an assessment of Alyeska's progress in completing the QDP. The QDP assessment focused on the qualifications and training of those employees directly controlling the movement of oil linewide. The assessment identified findings related to the development of team qualification plans and failure to conduct an internal audit as required by the *Qualification and Development Program Manual*. All OCC controllers in Valdez are now required to complete a pipeline training class, using the new simulator.

The primary audit action item of full QDP implementation remains open, and is scheduled for closure in 1999. To close the main audit item, the above findings must be corrected along TAPS and at the Valdez Marine Terminal. When pump station personnel complete the closure criteria, Alyeska and JPO will verify it. Alyeska plans to close this audit item by November 1999.

TAPS Leak Detection System

- **New leak detection technology has the potential to improve Alyeska's ability to promptly detect and respond to small, slow oil leaks from the pipeline system. Alyeska is reviewing the latest technology for leak detection, which JPO strongly encourages. Alyeska's new transient volume balance system is an improvement, but needs a comprehensive performance evaluation now that start up problems are resolved. JPO incorporated this request as a condition of approval of Alyeska's oil spill contingency plan. Improving leak detection will remain a top priority for oversight.**

Alyeska commissioned the new Transient Volume Balance system of leak detection at the beginning of 1998. JPO reviewed the transient volume balance system data, focusing on the testing of false alarms. The results were included in JPO's evaluation of the TAPS mainline oil spill contingency plan and led to a condition for oil spill plan approval, requiring a formal review of system performance and reliability.

The TAPS Leak Detection System

The TAPS leak detection system uses oil flow and pressure measurements to detect oil leaks in the pipeline system. TAPS has three systems that detect leaks:

Transient Volume Balance System (TVB)
This is a new leak detection system recently put into operation at the Operations Control Center in Valdez. The Transient Volume Balance system can detect whether a leak may be occurring and can identify the leak location by segment, especially with larger leaks. This system is based on transient flow modeling of the pipeline with data updated every 10 seconds. The volume balance is called transient because it takes into account a non-steady state flow. The TVB models compare the modeled flow to the flow measured by the leading edge flow meters.

Leading Edge Flow Meters (LEFMs)
The metering system has leading edge flow meters which estimate the oil flow rate from the difference in time it takes a sound wave to travel in the direction of oil flow versus against the direction of flow. Data from the flow meters are fed to the *Supervisory Control And Data Acquisition System (SCADA)* for transmission to the Operations Control Center in Valdez. These data are used for leak calculations and continuous monitoring of pipeline status by the pipeline controller. These instruments were recently upgraded to close an audit action item.

Line Volume Balance System (LVB)
The Line Volume Balance System was the former primary system for detecting small oil leaks. The Line Volume Balance portion of the leak detection system senses leaks by checking the oil volume in the pipeline every 30 minutes. The system compares the volume entering the line with the volume leaving the line, adjusting for temperature, pressure, tank-level changes, and slack line conditions.

Deviation Alarms
The deviation alarm system detects large leaks, greater than 1% of oil flow. There are three types of deviation alarms: 1) *pressure alarms* occur when the oil pressure changes by more than 15 pounds per square inch, 2) *flow alarms* are activated if the amount of oil entering or leaving a pump station varies too much between check times, and 3) *flow deviation alarms* are activated when the difference in the amount of oil flow between the upstream and downstream pump stations changes to greater than 700 barrels per hour flow. This calculation is performed on each pipeline section several times a minute.

False alarms analysis provides a measure of the performance of the transient volume balance system instrumentation and its ability to model real world pipeline conditions. The sensitivity of the leak detection system is always balanced against a manageable rate of false alarms. An alarm that cannot be attributed to a measurement problem or pipeline event will require Alyeska to conduct a field surveillance.

JPO reviewed leak alarm records from January through September, 1998, to evaluate the transient volume balance system false alarms recorded by OCC controllers in Valdez. JPO concluded the analyses of the false alarms for the transient volume balance system indicated 1998 performance was hindered by start up problems with the new, upgraded leading edge flow meters (LEFM). Performance was also hindered by the temporary use of a "strap-on" LEFM meter in Valdez during the operation of the temporary backpressure system.

JPO also plotted false alarms versus location, and found they are not evenly distributed. When known start up problems and those associated with the Valdez back pressure system are discounted, the distribution clearly singles out the Pump Station 5 and 6 segments due to the temperature of the oil. Paraffin wax deposition is temperature dependent and this segment is where the oil cools and paraffin is deposited from the crude oil. JPO speculates the scraper pigs push the paraffin wax into the ports housing the LEFM sensors. Alyeska should review this situation to see if a maintenance schedule or equipment modification can improve LEFM and transient volume balance system performance. In response to JPO's review, the Alaska Department of Environmental Conservation recommended that Alyeska produce a report on the

transient volume balance performance. The recommendation is currently in the *Trans-Alaska Pipeline System Pipeline Oil Discharge Prevention and Contingency Plan Findings Document and Response to Comments* under Issue #14, *Leak Detection for Crude Oil Pipelines.* The report should contain the following elements:

1. An analysis of the number of false alarms per month categorized into causal groups.

2. A performance summary characterizing the quality of the data input into the TVB system including a measure of the loss of availability of the LEFM's and other input data such as pressure and temperature.

3. A summary of the median detection threshold and threshold range of each pipeline segment for the ½ hour, 4 hour, and 8 hour averaging periods.

JPO encourages the use of the newest, most advanced technology available for leak detection. Some improvements are achievable in the transient volume balance system, but dramatic improvements await new technology and a different approach. In 1997, JPO funded the State of Alaska's Aerospace Corporation to work with Alyeska to find new approaches to leak detection. Alyeska published a formal solicitation, which yielded twenty-five proposals. Evaluation of these proposals did not identify an immediate solution, but did yield several promising leads for new technologies. To Alyeska's credit, they are currently working with NASA's Jet Propulsion Lab to explore new sensors and technology. The explored approaches are not "off the shelf" and would substantially advance the best available technology paradigm for pipelines. JPO is strongly encouraging Alyeska in this pursuit.

As a final point, much of JPO's monitoring is to push Alyeska to attend to details and procedures. Small, slow leaks are undetectable by current leak detection systems, however new technology presents an opportunity to improve Alyeska's ability to promptly detect and respond to small, slow leaks. Improving leak detection will remain one of JPO's top priorities in future work planning.

Questions & Answers About Leak Detection

What is the most critical factor that determines how fast a leak can be found? The larger the leak, the faster it can be found. Small, slow leaks cannot be detected. The speed of detecting a leak is dependent on the size of the leak, measured in terms of barrels per day (BPD). The size of the spill before detection varies and is determined by multiplying the leak rate by the time to detection, which equals the leak volume in barrels (BBL).

What are other factors that affect performance of a leak detection system? The steadiness of the flow, the packing of the line and the repeatability and accuracy of the flow measurements. (A pipe full of oil is referred to as "packed," and a partially filled pipe is called a "slack" line).

Is the new transient volume balance system a significant improvement? Yes. It is the first leak detection system used on TAPS that detects leaks within a pipeline segment (between two pump stations) and takes into account dynamic flow conditions and effects of drag reduction agents. It is "state-of-the art" at the current time.

Can the transient volume balance system be improved to detect small, slow leaks? No. Detecting small, slow leaks requires a different approach to technology.

What were the original design basis requirements for small leak detection? The design basis estimated that the minimum detectable leak volume at a flow rate of 2,000,000 barrels per day would be 560 barrels. At 600,000 barrels per day, it would be 750 barrels using the line volume balance. The design basis curve shows that leak detection would only be possible for leak rates above 3,000 barrels per day.

Do the transient volume balance system detection limits meet the original design basis leak volume limits? Only under optimal conditions does the leak detection system approach the original design basis expectations. In one simulated leak test with tight line, the transient volume balance system found a 4,000 barrel per day leak in 3.7 hours, for a volume of 617 barrels. Slack line testing gave considerably worse results, taking 10.9 hours to detect a 9,696 barrel per day leak with a volume of 4,404 barrels.

What is JPO's focus for leak detection oversight?
To encourage new technology to detect small, slow leaks and to review transient volume balance system experience for reliability and cause of false alarms.

Fiber Optics Cable Project

- **Alyeska is replacing their current backbone communication system with a new fiber optics system and new valve control units. The purpose of these projects is to improve the reliability of the remote gate valve system on TAPS and decrease unplanned shutdowns, minimize incidents of communication lapses, and enhance pipeline system safety. JPO will verify reliability and safety of the system once it becomes operational.**

Fiber Optics in Alaska
More than 6,000 miles of fiber optic cable is being laid across the state of Alaska to better connect the state with the Lower 48 and the rest of the world. Cable is being laid from Prudhoe Bay, through Fairbanks to Valdez. When the system is completed, it should increase the state's communication capacity by 40 times what it is currently.

The fiber optics cable system consists of a communications network from Pump Station 1 to the Valdez Marine Terminal, including service to the Fairbanks Network Operations Center, major river crossings, and airports. Fiber optic lines use pulses of light to send vast amounts of information great distances at extremely fast speeds. The system will transport all communication traffic now transported by the current backbone communications system. The system is being constructed on a separate right-of-way from TAPS, but overlaps the TAPS right-of-way for a large part of the route.

Fiber optics should increase the speed of communications and improve reliability. Equally important is the ongoing project to replace the aging and obsolete remote gate valve and master terminal units with updated ones. The fiber optics should improve the informative alarms and provide better information to pipeline controllers (*see photos in Appendices IV and V*).

The master terminal replacement project encountered numerous employee concerns, and the project was temporarily stopped to assess these concerns. Plans are being made to institute better managerial cost and quality controls. The employee concerns focused on other electrical, maintenance and testing duties also being performed by the project team. The formal stop work order was prudent and an appropriate use of Alyeska's quality program and supports the implementation of necessary controls. JPO has encouraged Alyeska to address the concerns and move forward with the project, which is one of two remaining "priority one" (P1) open audit action items.

The system testing, documentation and change management involved in the use of the fiber optics and Triconex systems are important. Oversight of this effort will be a priority in JPO's 1999 work plan.

JPO received Alyeska's application for a notice to proceed (under Stipulation 1.7) to perform the switch from the old communications system to the fiber optics cable project. It was approved in part, in accordance with the stipulation requirement that permittees maintain communication systems. The approved aspects do not apply to the control of valves or pumps, but to other communication which will be useful for system testing. JPO requested the following additional information prior to approval for remaining aspects of the notice to proceed:

- Documentation for the seismic certification of the fiber optics equipment (inclusive of the racks, their anchorage, and cable support), and allowing for differential seismic movements at Pump Station 12, the Operations Control Center in Valdez, and the signal booster site at Remote Gate Valve 97.

- Documentation of the seismic certification for the Network Operation and Control Centers located at Prudhoe Bay, Fairbanks, and Valdez.

- Documentation to support the claim that the fiber optics system can accommodate the increased light attenuation between the fiber optics cable specification temperature minimum of -40 F and the design basis requirement of -60 F.

- The test procedure for judging if critical communications can continue if the fiber optics cable is completely severed exiting Pump Station 4.

TAPS Cold Re-start

- **A TAPS cold re-start study must first be completed before developing a new plan that includes procedures for re-starting the pipeline under extreme cold conditions after an extended shutdown. Study results will help Alyeska obtain objective information about system performance in the event of an extended shutdown.**

JPO has been concerned about problems re-starting the pipeline after an extended shutdown during extremely cold weather. The concern grew after the ramp down of four pump stations, which caused procedures in the old re-start plan to be outdated. Four less pumps to move cooled oil meant less horsepower to start a pipeline after a long shutdown.

Alyeska has committed to develop a new cold re-start procedure. However, the project has been delayed to complete a study to determine the amount of pressure it takes to move cooled, thickened, and possibly gelled oil. Even though oil may turn to a gelled state, pipeline pressure must still remain within the maximum allowable operating pressure. Completion of the study (referred to as the cold "rheology" study) is planned for the second quarter of 1999. The study objective is to determine how oil properties change as the oil cools and how the oil is affected by temperature changes. Once the results of the rheology study are obtained, a thermal and hydraulic analysis should be completed to determine the amount of pressure it takes to move the cooled oil.

In the meantime, Alyeska is developing computer software to simulate pipeline pressure under a re-start scenario. JPO encourages Alyeska to complete the rheology study and the subsequent thermal and hydraulic analysis, to obtain detailed information about system performance during start-up, after an extended shutdown. Once the rheology study and the hydraulic analysis is completed, a new cold re-start plan with updated re-start procedures should be initiated.

Progress on Year 2000 (Y2K) Compliance

- **JPO finds Alyeska's Y2K effort to be well planned and organized. Alyeska's late start may increase the cost of the Y2K program, but there are no concerns about its effectiveness.**

JPO has been monitoring Alyeska's progress of compliance with the year 2000 computer problem, and found there is active work on this issue. The first phase was to determine what changes would be necessary. Alyeska began their Y2K program two years later than most other oil companies. JPO has maintained regular contact with Alyeska's Y2K project lead to monitor compliance efforts, and to stay informed of any circumstances which could hinder Alyeska's ability to successfully meet Y2K requirements. The program appears to be well planned and organized. The impact of starting the Y2K compliance program at a later time may raise the cost of the overall Y2K effort, but JPO sees no concerns about program effectiveness.

Below Ground Stability Systems

Several issues addressed by the operations CMP team involve below ground stability systems. Above ground stability issues covered in 1997 and 1998 were handled by the maintenance CMP team and will be addressed in the upcoming *CMP Maintenance Report*.

Mainline Refrigeration Site No. 2

- **JPO does not believe the pipe curvature at Mainline Refrigeration Site No. 2, near the Gulkana River, is a pipeline integrity concern provided 1) the curvature remains constant or decreases, 2) oil temperature does not significantly increase, and 3) pipe wall wrinkling does not occur. All are aspects which can be monitored. Alyeska is currently assembling performance based criteria to evaluate areas of high curvature which should result in a site-specific design basis waiver scheduled for completion in early 1999.**

What is MLR-2 and why is it a concern?	Why is MLR-2 a good case study?
Main Line Refrigeration Site No. 2 (referred to as MLR-2) is a 2-mile long buried section of pipeline near the Gulkana River north of Glennallen, Alaska. This is a segment of pipeline that resides in ice-rich, thaw susceptible soils. This area of the pipeline system requires mechanical refrigeration to ensure the soils remain frozen to prevent pipe settlement. Because of the lack of adequate refrigeration, soils below the pipe at MLR-2 thawed. Refreezing of the soils could cause upward movement of the pipe.	**When this issue arose, it appeared that pipeline integrity was in question. This situation occurred because Alyeska failed to closely monitor the installation and maintenance of the refrigeration units. The pipeline insulation was wet, contrary to the TAPS design basis, and the curvature also exceeded the design basis. This is not an uncommon problem. Poor maintenance or procedural compliance usually leads to situations where the pipeline deviates from its design basis specification and becomes "indeterminate," ie. not demonstrably within design parameters.**
Localized thawing of the soils resulted in pipeline operation and maintenance problems, such as thaw settlement and curvature of the pipeline. Pipeline curvature is a concern because it stresses the pipe, which potentially could result in wrinkling. If allowed to continue, this could cause pipe buckling and subsequent oil leakage. Alyeska installed temporary refrigeration equipment, which is currently in operation, and is in the process of replacing it.	**The approach to evaluate MLR-2 was similar to how JPO studies other issues: 1) Determine whether the pipeline is safe. This step frequently requires a second opinion from a contracted consultant, usually a Department of Energy National Laboratory. 2) Identify process issues and resolve them. 3) Require the system to comply with the design basis or adjudicate engineering-supported waivers or modifications. 4) Verify that corrective and preventive actions have been completed.**

In 1997, Alyeska assessed the integrity implications of the pipeline curvature at MLR-2. JPO reviewed the resulting report and TAPS monitoring rod data (monitoring rods indicate settlement of the pipe after burial). The data indicated the curvature of the pipeline at MLR-2 under current operating conditions does not require re-leveling of the pipeline in that area.

JPO requested Alyeska to:

- Continue monitoring the position of the pipe on a monthly basis.
- Use pig data to verify no wrinkles have formed in the pipe.
- Develop a maximum allowable curvature criteria for remote gate valves.

- Request a design basis waiver for the curvature at MLR-2.
- Request a design basis waiver to address the fact that the design basis maximum differential temperature is no longer allowable at MLR-2.
- Obtain JPO approval for the design basis waivers and ensure that all other existing conditions conform to the design basis requirements.

JPO continues to review monitoring rod data and operating conditions in order to protect the integrity of the pipe at MLR-2. Monitoring data will provide an alert of pipe distress or distortion of Remote Gate Valve 98A if excessive rebound of the pipe occurs.

Migrating caribou are the reason for the MLRs.

The Nelchina caribou herd migrates annually across the Gulkana River and the Richardson Highway between Sourdough and Paxson. At the time of TAPS construction, State and Federal fish and wildlife experts recommended a below ground pipe mode in two areas (MLR-1 and MLR-2) in the seven miles between the Gulkana River and Hogan Hill. Resource managers feared that an above ground pipeline might function as a fence, affecting migrating wildlife.

The effect of above ground pipe on Nelchina caribou movements has been studied since construction. Indications are they may have avoided elevated pipe to some extent immediately after construction of the pipeline, when TAPS was a new feature on the landscape.

During October 1998, JPO surveyed caribou migrations in the MLR areas as well as at other points in the 26-mile wide corridor used by migrating animals this year. Conditions for a survey were optimal (it was the optimal conditions which prompted JPO to add this survey to its work plan). The migration of over thirty-thousand caribou occurred between October 23 and 25th. During this period, new snowfall was minimal, allowing tracks to show clearly in the snow already on the ground. Snow cover ranged from 4 inches near the Gulkana River pipeline crossing, to about 12 inches in the Meiers Lake vicinity. Tracks left by this large caribou migration showed that the animals crossed under the above ground pipeline as well as over buried pipeline segments, with no apparent concern or preference. No evidence of caribou avoidance or of lateral movement of caribou along the above ground segments was found.

Salcha River Pipeline Curvature Analysis

- **Review of pig data confirms that no intervention is needed at the Salcha River to address pipeline curvature.**

In 1992, Alyeska made the first curvature measurements of TAPS with the "smart" pig. Curvature is a measure of the sharpness of bend in the pipe. It is a pipeline integrity concern because too much curvature can lead to buckling or wrinkling of the pipe, which weakens the pipe wall. The Salcha River crossing was an area of concern because the measured curvature exceeded the design basis critical curvature, which could cause the pipe to wrinkle.

This prompted JPO to obtain the services of Pacific Northwest National Laboratory (PNNL), operated by Battelle Laboratory of Columbus, Ohio, to look at the capacity and demand design for mainline pipe curvature. PNNL reviewed the methods Alyeska used to evaluate the structural integrity of TAPS. They also examined Alyeska's analysis methods, used to estimate the curvature capacity and the sensitivity of the smart pig, and data reduction methods for estimating curvature demand. Alyeska then completed a series of studies addressing PNNL's concerns.

How Did JPO Approach the Salcha River Issue?

Salcha River pipeline curvature was a significant concern in 1994 and 1995. For a time, data suggested the pipe may be moving, therefore increasing curvature. A consultant was brought in to help JPO evaluate curvature, in general. Once the pipe was determined to be static, the concern about Salcha River lessened. However, this study was planned in the *1998 Pipeline Operations CMP Work Plan* to follow through on this issue with the 1997 data. The focus on the design basis waiver illustrates how JPO resolves integrity and process questions.

Four zones of curvature at the Salcha River Crossing were addressed by the analysis, including an increase in curvature in one area between the 1993 and 1994 inspections with the smart pig. Battelle recommended that Alyeska send the smart pig through again to inspect for stability, and do a sensitivity analysis for online inspection methods that identify wrinkling. Alyeska sent the pig through the pipeline in April 1997. The resulting report concluded the curvature and ovality were stable at the Salcha River Crossing and had not changed. The curvature at the crossing showed no significant change from the 1994 inspection. Alyeska found no evidence of wrinkling and concluded the pipe does not require re-leveling under current operating conditions.

JPO reviewed the 1997 pig data and found no change in the data to require further action by Alyeska. However, a site-specific design basis waiver is needed, and Alyeska reports that it is being developed. Pipeline curvature analysis along the pipeline is an ongoing CMP operations initiative. JPO has curvature studies underway that will be presented in future CMP operations reports.

Pump Station Facility Settlement

- **Facility settlement at a pump station is a noncompliance with the Grant and Lease, and Alyeska's design basis requirements. Alyeska developed a schedule for the corrective action plan, which JPO reviewed and accepted. After Alyeska has implemented their corrective action plan, they will be considered compliant with this stipulation.**

Pump Stations 1 and 3 have experienced settlement of some building facilities from thawing of permafrost, due to an inability to maintain soil temperatures below freezing. Thawing of the permafrost foundation has occurred under some pump station buildings, resulting in partial settlement of the facilities. Facility settlement at a pump station is a noncompliance with stipulations 1.18.1 and 3.9 of the Grant and Lease, and Alyeska's design basis requirements. Alyeska had documented the settlement, and JPO surveillance verified it. JPO then requested Alyeska to use an appropriate quality tool to address the building settlement issues, and submit an annual action plan for the corrective work. In an October 1998 response to JPO, Alyeska laid out corrective actions for facility settlement at Pump Stations 1 and 3. Corrective action included a plan to initiate Project F016, a multi million dollar, two year project later this year to correct the settlement. Alyeska developed a schedule for the corrective action plan, which JPO reviewed

and accepted. After Alyeska has followed through with the implementation of their corrective action plan, they will be considered to be in compliance with this stipulation

Atigun Pass Heat Pipes

- **Alyeska needs to complete its planned project to install thermistor strings at Atigun Pass.**

Some heat pipes originally designed for the segment of insulated buried pipe at Atigun Pass, (pipeline milepost 167.2), are no longer functioning. Heat pipes are important because they maintain a consistent below ground temperature for buried pipe. In 1996, a consultant evaluated the adequacy of the remaining heat pipe configuration to prevent degradation of thaw unstable material. The consultant recommended the installation of three thermistor strings in this area. Thermistor strings are temperature measurement devices that monitor soil temperatures. Alyeska initiated a work order for the installation work with a projected completion date of September 30, 1998. However, the thermistor strings have not yet been installed, as of this printing. This segment of pipeline could be rendered indeterminate without a method of monitoring soil temperatures to measure effectiveness of existing heat pipes. Until these conditions are resolved or corrected, Alyeska is not in compliance with Stipulation 3.3, *Construction Mode Requirements*. JPO will conduct more surveillances in 1999, to evaluate the adequacy of the heat pipes and track the progress of the thermistor string installation.

Change Management

- **Until Alyeska implements a functioning change management process, inconsistencies in critical operational instructions will continue to occur.**

Change management, also referred to as configuration management, is an approach that provides for control of a system through disciplined management of all information pertaining to its configuration and operational requirements. Examples of this information are drawings, manuals, vendor documents, procedures, problem identification reports, survey data, and data sheets.

Deficiencies in change management accounted for approximately 40% of the 1993 Quality Technology Company audit findings, yet Alyeska still does not have an effective change management process. The recently released Alyeska assessment of the Alyeska Integrity Management System agrees with this conclusion. Alyeska committed to implementation of a functioning configuration management system as a requirement for closure of AAI 1955, which is the host AAI for issues regarding configuration management and TAPS determinacy. "Determinacy" refers to the assurance that the system is accurately described by existing records and is consistent with the final design and design basis.

Several sections of this report address incomplete revisions to operational procedures and other documentation problems associated with pump station ramp down efforts. Alyeska's internal audit group audited the ramp down projects for Pump Stations 8 and 10 to ensure all required ramp down procedures had been followed. The audit report stated:

> "The majority of configuration management deficiencies are attributable to lack of a corporate-level change management policy... The absence of a corporate management of change system for large projects, like ramp down, unnecessarily increased the risk of a safety or environmental upset during ramp down of Pump Stations 8 and 10."

Though the lack of a fully functional change management process had been identified following ramp down of Pump Stations 8 and 10, documentation problems continued to surface during subsequent ramp down projects for Pump Stations 2 and 6. This is cause for JPO concern. If the need arises to bring these pump stations back on line, a lack of current, accurate records increases the risk of a safety or environmental upset. Up-to-date modification records are a requirement of Stipulation 1.18.3, *Surveillance and Maintenance* and implementation of a controlled and effective system for documentation revisions is one of the cornerstones of configuration management. Until Alyeska incorporates an effective document revision process, changes made on TAPS will not be adequately represented, resulting in a state of indeterminacy.

JPO determined through assessment and surveillance that Alyeska does not currently have the ability to identify all the documentation affected by a change to an item or system. The two databases used to control documentation do not completely link system components with related drawings, documents, and procedures (the *Master Equipment List* in the *Passport* system and the *Technical Document and Drawing Index*). Alyeska committed to develop a systems-based physical item hierarchy with the capability to identify the data and documentation associated with a system or subsystem. This should mitigate document revision problems such as those encountered during ramp down.

A number of the issues identified in this report are related to delays in completing project commitments, which include revisions to affected documents. Modifications are frequently completed on a system, but the required documentation update work is backlogged rather than completed in a timely manner (reference Grant/Lease Stipulation 1.18.3, which requires completed and up-to-date modification records). Interviews conducted in support of JPO Assessment 98-A-009 indicated a strong perception on the part of TAPS workers that incomplete work efforts may be attributable to insufficient resources. Interviews with Alyeska employees further reveal that completion of work with less than full compliance to procedures, is often believed necessary in order to expedite the work load. Though regulatory oversight does not extend into specifying Alyeska's resource allocations, it does focus on assessing the results of those resource decisions. Grant and Lease Stipulation 1.21.1 requires that "...permittees shall perform all Pipeline System operations in a safe and workmanlike manner... and shall at all times employ and maintain personnel and equipment sufficient for that purpose." As discussed in Chapter Three, JPO will need to see significant and sustained improvement in this area before determining that Alyeska is in compliance with these two stipulations.

A critical element of successful configuration management is the development of: 1) methods for measuring the success of comprehensive program implementation, and 2) criteria for resource allocation decisions. Alyeska is moving toward implementation of these through corporate-wide performance standards in the revised Alyeska Integrity Management System program which should facilitate their ability to provide adequate resources for projects, project closeout, functional check-out, and turnover.

Chapter 3. Federal Grant and State Lease Compliance

- **Five of the sixteen stipulations JPO evaluated were in noncompliance with the Grant and Lease. The noncompliances relate to change management and below ground systems deficiencies. The issues vary in significance, however none of them represent an immediate threat to pipeline integrity, public safety, or the environment. Alyeska has been informed all noncompliances must be corrected, and is working to bring them into compliance. JPO will evaluate progress and verify all completed corrections.**

- **The five stipulations containing aspects of noncompliance with the Grant and Lease include Surveillance and Monitoring, 1.18.1; Operation and Maintenance Records, 1.18.3; Conduct of Operations, 1.21; Construction Mode Requirements, 3.3; and Construction and Operation, 3.9.1. The noncompliances relate to the major discussion in this report: change management, pipeline control and telecommunication, and below ground systems.**

Approach To Compliance: JPO pursues issues under the Grant and Lease proactively with Alyeska to maintain compliance, and uses the strategic approach of "compliance partnership." This involves frequent communication, proactive problem resolution and a no surprises approach to achieve oversight objectives. These objectives include:

- Continued safe movement of oil through TAPS,
- Compliance with the Federal Grant and State Lease,
- Adequate spill and response capability,
- Reduction of TAPS risk by requiring knowledge of hardware condition, effective management controls, protection of the environment and worker safety.

Different aspects of the Grant and Lease stipulations evaluated here have previously been addressed in other CMP reports. Future reports will evaluate other aspects. The intent of this report is to discuss aspects of the stipulations that relate to pipeline operations, evaluated in 1998. Where instances of noncompliance were reported, this report does not imply that all other aspects of the stipulation were compliant. Instances of noncompliance do not have to be widespread or of long standing significance to be noted herein. JPO's view is that issues of noncompliance remain until corrected, but it is fair to say that none of the issues noted have required the Authorized Officer or State Pipeline Coordinator to issue a formal order to engage corrective action. All are believed to be correctable in the short term, with the exception of the change management issue and the fuel gas pipeline reburial.

The Grant and Lease stipulations were originally divided into three categories, General, Environmental and Technical. JPO evaluated all except two of the Technical stipulations, which will be included in future work planning. JPO also evaluated several stipulations from the General and Environmental categories as they relate to pipeline operations. The stipulations are discussed in the order in which they appear in the Grant and Lease.

General Stipulations

1.7 Notice to Proceed

A *Notice to Proceed* is the official document issued by the Authorized Officer giving Alyeska the permission to construct TAPS projects. Construction may not be initiated without the prior written permission of the Authorized Officer or State Pipeline Coordinator. A *Notice to Proceed* is required for some, but not all projects, according to Stipulation 1.7 of the Federal Agreement and Grant and State Lease of Right-of-Way. The Authorized Officer and State Pipeline

Coordinator issue a notice to proceed when the design, construction and operation proposals conform with the provisions of the stipulations of the Grant and Lease. JPO determined that projects requiring a *Notice to Proceed* followed the Grant and Lease stipulations during construction.

1.13 Electronically Operated Devices

Alyeska is required to screen, filter, or suppress devices that are installed as part of the pipeline system which are capable of producing electromagnetic interference radiation, so the devices will not adversely affect the existing communications systems or navigational aids. Structures such as towers or buildings that are erected as part of the pipeline system must not obstruct line-of-sight communication systems. JPO did a surveillance of this stipulation and verified that Alyeska is in compliance with the Grant and Lease. JPO will continue to monitor this stipulation as permits are issued for new installations.

1.15 Small Craft Passage

The Grant and Lease prohibit the creation of any permanent obstruction to the passage of small crafts in streams. While not directly related to this stipulation, JPO has observed some workpad bridges and pipeline river crossings have not been inspected, nor do they have the required permits. JPO will follow up on this situation and plans to conduct more surveillances in 1999 to make a complete and accurate compliance determination.

1.18 Surveillance and Maintenance

Stipulation 1.18.1 requires the permittee to conduct a surveillance and maintenance program applicable to the subarctic and arctic environment. It should be designed to: 1) provide for public health and safety, 2) prevent damage to natural resources, 3) prevent erosion, and 4) maintain pipeline system integrity. Two issues reflect noncompliance with this stipulation: 1) the need to rebury exposed parts of a fuel gas line as a result of ground upheaval, and 2) the facility settlement at Pump Stations 1 and 3. (The pump station facility settlement issue was discussed on page 26). JPO requested Alyeska to submit an annual fuel gas line corrective action plan that includes a schedule of the specific work to be completed for the year; and also requested Alyeska to rebury all fuel gas pipeline exposures in compliance with the minimal depth of cover per Department of Transportation regulations. Alyeska will be considered compliant with this stipulation after they have implemented their corrective action plan.

Fuel Gas Line

JPO's 1998 surveillance of the fuel gas line indicated locations where standing or flowing water crosses the gas line and thermokarsting, or ground upheaval buckling exists. The fuel gas pipeline supplies Pump Stations 1, 3, and 4 with fuel gas from the ARCO Central Compressor Plant. The control center for the fuel gas line is located at Pump Station 1. The ground upheaval conditions resulted in the reduction of the fuel gas line insulation cover between Pipeline Milepost 12-18, exposing the pipe in some areas. Exposed gas line pipe does not meet either Department of Transportation regulations or design basis requirements. Alyeska proposed corrective action, which is acceptable to JPO. However, until corrected, it represents an instance of noncompliance, since Alyeska's surveillance and maintenance processes did not prevent this situation.

Stipulation 1.18.2 requires a communication system that ensures the transmission of information necessary for the safe operation of the pipeline. The fiber optics project, when completed, should improve the system that was judged acceptable under this stipulation at start up.

Stipulation 1.18.3 requires maintaining complete and up-to-date records on operations activities. This stipulation specifically references modification records. Evidence from JPO surveillances as well as Alyeska's quality assurance activities demonstrates that modification records are not timely updated. The lack of timely records update is a symptom of the change or configuration management deficiencies discussed in Chapter 2, and constitutes a noncompliance with this stipulation.

Stipulation 1.18.4 involves access roads and airstrips, and was not completely evaluated this year. However, JPO does not have reason to believe Alyeska is not in compliance. This stipulation is broad in scope and relates to more than operations-related issues. Other aspects of this stipulation, including work pad maintenance and slope stability will be covered in the *CMP Maintenance Report*, planned for release early in 1999.

1.19 Housing and Quarters

This stipulation involves provision of reasonable housing, quarters, office space and transportation for representatives of the Authorized Officer and the State Pipeline Coordinator. In the judgement of the Authorized Officer and the State Pipeline Coordinator, Alyeska is in compliance with this stipulation.

1.21 Conduct of Operations

Most of the findings JPO identified through surveillances and assessments conducted within the last year were related to this stipulation, which states:

> "...the permittee shall perform all pipeline system operations in a safe and workmanlike manner so as to ensure the safety and integrity of the pipeline system, and shall at all times employ and maintain personnel and equipment sufficient for that purpose."

The issues preventing a finding of compliance stem from inattention to procedural requirements and poor management of change rather than direct threats to system integrity or safety. The thirty unsatisfactory conditions discussed in Chapter Two regarding managing and documenting pressure control set points have been resolved. The change management issues previously discussed are inconsistent with operating the system in a safe and workmanlike manner. Alyeska is considered to be in noncompliance under this stipulation until the change management issue is resolved. Start up problems were also presenting a pattern of procedure and planning deficiencies that could have risen to noncompliance if recent start ups had not evidenced improvement. Overall, the compliance issues with this stipulation are the most significant issues raised in this CMP report.

This stipulation also requires immediate notification of the Authorized Officer and State Pipeline Coordinator of any condition, malfunction, problem or occurrence which threatens pipeline integrity. Alyeska and JPO have agreed upon a reporting protocol which Alyeska has followed.

Environmental Stipulations

2.11 Use of Explosives

The Grant and Lease state that a plan must be submitted to the Authorized Officer and the State Pipeline Coordinator for use of explosives, including, but not limited to blasting techniques in

accordance with Stipulation 1.7. JPO conducted a surveillance that verified no recent blasting has occurred within the 3,000 foot corridor of the pipeline right-of-way, as referenced in Alyeska's blasting requirements. To the extent this stipulation was surveilled, Alyeska was found to be in compliance with the Grant and Lease. If future projects require blasting, JPO will monitor and evaluate Alyeska's compliance with the Grant and Lease.

2.14 Contingency Plans

This stipulation states that no discharge of oil or other pollutant should occur on land or water. Permittees must recognize their prime responsibility for the protection of the public and the environment from the effects of spillage. JPO previously stated in the CMP Report, *Alyeska Pipeline Service Company TAPS Environmental Protection Program*, March 1998:

> "Oil spill contingency plans (C-Plans) are required by the Grant, Lease, and State and Federal laws. There are separate C-Plans for the Valdez Marine Terminal (VMT) and the pipeline. The range of issues covered by each C-Plan includes spill prevention, preparedness, and response requirements. The VMT C-Plan was conditionally approved by JPO agencies in January 1997. C-Plans are reviewed by State and Federal agencies every three to five years. The Grant and Lease require that the Bureau of Land Management and Alaska Department of Natural Resources review the C-Plans annually. The eleven conditions of approval for the Terminal C-Plan include a range of requirements such as further planning for shoreline protection in Port Valdez and maintenance of secondary containment structures around the terminal crude oil storage tanks. Many conditions of approval were to be addressed in 1998."

Of the remaining conditions of approval that awaited completion in 1998, four conditions are awaiting additional public review: 1) preventing or controlling a potential fire hazard, 2) slope stability, 3) shoreline protection, and 4) protection of the Valdez Duck Flats and Solomon Gulch Hatchery. A condition regarding oil storage tank secondary containment structures and a condition on prevention training programs also remain open. All others have been completed.

In addition to the progress made in resolving the conditions of approval for the Valdez Marine Terminal C-Plan during 1998, the C-Plan for the pipeline was reviewed and approved. The Pipeline C-Plan approval also has conditions that JPO will oversee, including an examination of response options near tributaries to the Copper River, including the Gulkana River. During 1998, JPO looked at traditional areas for spill preparedness, completed at least three surveillances of oil spill equipment inventories and two surveillances of spill response training exercises. There were no problems found in either area. Alyeska is in compliance with this stipulation. However, this compliance determination is subject to Alyeska meeting the C-Plan approval conditions and commitments.

Technical Stipulations

3.2 Pipeline System Standards

This stipulation requires that all design, material and construction, operation, maintenance and termination practices employed in the pipeline system will be done according to pipeline standards described by the stipulation. JPO conducted surveillances to verify that materials and design met appropriate codes and specifications. A surveillance at the Valdez Marine Terminal indicated undersized material that did not meet specifications was used on the face of the

avalanche berm. However, this unsatisfactory condition was minor in nature. JPO's overall conclusion was that Alyeska has complied with the Grant and Lease requirements concerning this stipulation.

3.3 Construction Mode Requirements

This stipulation specifies the criteria for selecting the construction mode of above ground and buried pipe and contains a suite of requirements including soil conditions and heat transfer. As mentioned in Chapter Two, JPO's field surveillance indicated some of the heat pipes originally designed for the insulated buried pipe in Atigun Pass, were no longer functioning. (Heat pipes maintain a consistent below ground temperature for buried pipe). Alyeska plans to measure the effectiveness of existing heat pipes, using data acquired from thermistor strings which have not yet been installed. Until these conditions are resolved or corrected, Alyeska is not in compliance with stipulation requirements. JPO will conduct more surveillances later this year to evaluate the adequacy of Atigun Pass heat pipes, and track the progress of the thermistor string installation.

3.4 Earthquakes and Fault Displacements

The pipeline system is required to be designed to prevent any oil leakage from the effects of earthquakes, including seismic shaking, ground deformations, and earthquake-induced mass movements. Where such design is not technically feasible, efforts to minimize damage must include ground motion detectors, rapidly programmed shutdown and close inspection of system integrity if ground motion reaches the operational design level. A special contingency plan for oil spill control must also be in place, according to Stipulation 2.14.

JPO approved a November 26, 1997 request from Alyeska for a temporary waiver of Grant and Lease Stipulation 3.4.1.2. Alyeska requested approval to remove the existing Earthquake Monitoring System (EMS) from service so they could install new EMS equipment. Equipment was installed and the system restored to full operating status after testing, calibration, and a functional check out of the new equipment was completed (*see Appendix VI photos*).

In January 1998, JPO did an assessment to evaluate the overall effectiveness of Alyeska's Earthquake Monitoring System. JPO concluded the system is capable of providing information to the Operations Control Center in Valdez, should a major seismic event occur. Seismic units, or digital strong motion accelerographs, are located at all pump stations (except Pump Stations 2 and 3) and at the Valdez Marine Terminal. The units detect seismic activity from light tremors to severe earthquakes. Seismic information is fed directly to the SCADA system and transmitted to Valdez via a separate telecommunications channel. Data is then transmitted to the Operations Control Center and acquires information from the seismic units in the area of the earthquake.

Alyeska assigned EMS responsibility to their operations section. Fault monitoring is no longer conducted on an annual basis. Instead, Alyeska conducts annual site inspections of permanent reference marks, called fault monitoring monuments to: 1) check for damage or disturbance, 2) ensure that all monuments are well marked and protected from human and wildlife disturbance, and 3) provide a survey of monitoring points after a major seismic event. JPO found all the monuments were visible, although some required maintenance due to wildlife disturbance. JPO verified Alyeska conducted surveys and engineering surveillances as required by their *Surveillance and Monitoring Manual* and *System Integrity Monitoring Program.*

Alyeska is in compliance with the Grant and Lease requirements concerning this stipulation. JPO will continue to track the performance of the earthquake monitoring system for TAPS.

3.6 Stream and Flood Plain Crossings and Erosion

The pipeline must be designed to withstand or accommodate the effects of meteorologic, hydrologic (surface and sub-surface), and hydraulic conditions considered reasonably passable for each region the pipeline passes through. These effects and conditions include runoff, stream and flood plain erosion, meander cutoffs, lateral migration, ice jams and icing. Alyeska conducts an annual engineering surveillance to observe and document changes in river environments that may affect TAPS. JPO reviewed Alyeska's *River and Flood Plain Monitoring Summary Report* that verified compliance with this stipulation.

3.7 Sea Waves

The Grant and Lease require that oil transfer facilities at the Valdez Marine Terminal be protected by devices designed to cut oil flow and prevent major leaks in the event of destructive sea waves such as those generated in Port Valdez by the March 27, 1964 earthquake. JPO conducted a surveillance to verify that quick disconnect couplings are used at the marine tanker loading arms, quick shut-off valves can be remotely controlled from the Operations Control Center, and shut-off valves are installed at the main manifold at the dock and each tank in the tank farm. The automatic controls regulate oil flow rates and prevent excessive surge pressures. The system ensures safety for all normal operations and permits shutdown at all of these locations in event of emergency. The seabed at the Terminal docks consists of steeply sloping rock, with a soft overburden up to 30 feet deep. The docks are anchored directly to the bedrock. JPO determined that Alyeska complies with the Grant and Lease requirements for this stipulation. To maintain compliance with this stipulation, Alyeska decided to insert a specific reference to this stipulation in appropriate manuals. JPO supports this decision.

3.8 Glacier Surges

The Grant and Lease require the installation of surveillance systems to provide adequate warning of impending glacier surges that could potentially damage the pipeline system. JPO did an assessment to evaluate Alyeska's glacier monitoring procedures to determine the effectiveness of the surveillance systems to adequately warn of impending glacier surges. The assessment concluded Alyeska monitors and evaluates glacier movement, as required by Grant and Lease Stipulation 3.8, and Alyeska's manuals and documents. Alyeska has not documented any significant glacier movement, so at present glacier surges are not a threat to the pipeline.

The *System Integrity Monitoring Program Procedures Manual* (MP-166) requires aerial photographs be taken every five years, to analyze and identify trends in glacier movement. The photos will also identify if maintenance of the right-of-way is required, and whether to adjust the frequency of glacier monitoring as described in MP-166. Alyeska is in compliance with the Grant and Lease requirements for this stipulation, and is considering inserting additional protective contingency measures to their manuals.

3.9 Construction and Operation

The Grant and Lease require all activities performed in connection with the pipeline system to be conducted to avoid or minimize thermal and other environmental changes and to provide protection to people, fish and wildlife habitat. All working platforms, pads, fills and other

surface modifications are to be planned and executed in such a way that any resulting degradation of permafrost will not jeopardize the pipeline or related facility foundations. This stipulation relates to Stipulation 1.18, *Surveillance and Maintenance*, where JPO noted a noncompliant condition due to facility settlement. Alyeska and JPO are presently working toward resolution of this issue. JPO recommended that Alyeska initiate a corrective action plan to address the facility settlement at Pump Stations 1 and 3. This problem must be corrected for Alyeska to be compliant with this stipulation.

3.11 Containment of Oil Spills

This stipulation requires the installation of oil spill containment dikes or other structures around storage tanks at pump stations, the Valdez Marine Terminal, and at critical locations along the pipeline system. Structures must be constructed to withstand earthquake failure and to provide storage of oil to prevent drainage or seepage until the contents can be disposed of safely. JPO did surveillances to verify that containment areas be constructed to contain sufficient volume of the tanks within the containment areas, and checked to make sure containment areas were routinely examined for cracks and seepage. Alyeska complied with the Grant and Lease for the attributes JPO checked during field surveillance. JPO plans to do more surveillances in 1999 to gather more information to determine compliance with all the criteria of this stipulation.

Chapter 4. The Employee Concerns Program and Audit Item Resolution

- **Alyeska processed and closed two substantiated employee concerns related to operations in 1997-1998. JPO reorganized its employee concerns oversight to better trend and evaluate the concerns of TAPS workers.**

Alyeska's Employee Concerns Resolution Program

An employee concern is a statement or assertion of impropriety or inadequacy associated with the construction, operation, maintenance or management of TAPS and affects the quality, safety, environmental protection, and pipeline integrity of TAPS. A critical focus of JPO's oversight is to ensure that employees of Alyeska Pipeline Service Company or employees of Alyeska's contractors can voice their concerns about technical and business practices in an atmosphere which promotes free and open communications.

Alyeska established the employee concerns program to investigate, resolve and document employee concerns that were not otherwise being resolved. The program is available to all people working on TAPS, including Alyeska and contractor employees and other interested persons. Alyeska has made available several avenues for the expression of employee concerns. Employee concerns should be promptly investigated to gather and analyze facts to determine a course of future action. The Joint Pipeline Office has a toll-free telephone hotline for anonymous reporting of concerns. JPO staff has an Employee Concerns Specialist to assist workers in resolving concerns and provides information and guidance on available resources. JPO recently reorganized its Employee Concerns office, increased staff and placed a new emphasis on the trending of concerns.

Employee Concerns Relating To Operations

JPO reviewed two operations-related employee concerns filed with Alyeska between June 1, 1997 and September 30, 1998. Both concerns were substantiated.

The first concern was filed in July 1997. The concern raised an issue of a security guard employed by a contractor working on Alyeska facilities who had violated the *Amendments to the Gun Control Act* of 1968. The individual was not authorized to be an armed guard due to the prior conviction under the Act. This was an operations-related concern because it involved pump station security personnel. An investigation substantiated the concern and the security guard in question was reassigned to duties that did not require a firearm be carried. This concern was closed September 1997.

The second concern was filed in December 1997. This concern alleged Alyeska violated their own procedure by granting conditional approval for a contractor to be on the Quality Suppliers List. The contractor was granted two 120-day extensions in addition to the original conditional approval time of 120 days, because the Quality Program requirements were not met for placing personnel on the Quality Suppliers List. This concern was validated through an internal Alyeska investigation. As a result, Alyeska took corrective action by revising their Quality Program *Principal Implementing Procedures*. This concern was closed in January 1998.

Audit Action Item Resolution

- **Alyeska closed many operations-related audit action items in 1996 and 1997. Presently, five audit items remain open that are planned for completion later this year. However, several items that should significantly improve operations have not yet been closed. Operational deficiencies such as ineffective change management continue to exist, which will, if uncorrected, cause the repeat of many 1993 audit deficiencies. The audit items including change management will not be closed until an effective change management system is in place.**

TAPS Audits

In 1993, BLM contracted with Quality Technology Company to conduct an audit of TAPS operations and maintenance. This audit, which was inspired by testimony of TAPS "whistle blowers" at Congressional oversight hearings, uncovered numerous systemic deficiencies including:

- An ineffective Alyeska quality program;
- Questionable electric code compliance; and
- A pipeline that, after 17 years of accumulative modifications, could no longer be shown to be able to withstand major earthquakes or other possible contingencies.

The TAPS Owners and Alyeska Pipeline Service Company contracted with Arthur D. Little in 1993 to do an independent assessment of the entire pipeline, which essentially validated the BLM audit. The audit identified several more deficiencies. Most of the "problems" occurred inside the fences of the pump stations and the Valdez Marine Terminal rather than along the pipeline itself, where JPO had previously placed monitoring focus. Similarly, few of these deficiencies were environment related or involved the oil spill contingency plan, two key areas of JPO emphasis.

As a result of these audits, Alyeska identified 4,920 audit action items. As of January 4, 1998, 54 items remained to be completed. Presently, 5 audit action items remain open and should be completed later this year.

Pipeline Hydraulic Model

The Joint Pipeline Office believes Alyeska has complied with the commitments made in 1995 to close audit findings regarding the hydraulic model.

Qualification and Development Program (QDP) for Pipeline Controllers and Operators

The qualification and development program initiated during 1994 was a result of the 1992 owners safety audit, the BLM audit and the TAPS assessment addressing technician capabilities. A one-year pilot program for OCC operators was started in the Valdez Operations Control Center in late 1995. A site-specific program for the pump station control rooms was initiated in August 1996. Full implementation of these two programs closed ten AAI's, with a single audit item remaining. This is scheduled for closure in 1999. The QDP will be fully implemented when the qualification instruments (QI) are validated and entered in Alyeska's training administration system, all appropriate team members are qualified on designated core QI's, and all components of the program are complete and records on file, including team qualification plans and business plans.

The TAPS Leak Detection System

The leak detection system on TAPS consists of a uniquely designed line-wide metering system with several components to measure net oil flow in and out of each pump station. These leading edge flow meters use ultrasonic sound pulses and transit time to measure precise flow, and flow rate. Data from these units are passed to the Supervisory Control And Data Acquisition (SCADA) system for transmission to the Operations Control Center in Valdez. These data are used in leak calculations and for the continuous monitoring of pipeline status by the pipeline controller. JPO conducted surveillances that verified the installation of new flow meters, closing an audit action item in April 1998.

Seismic Monitoring System

Seismic units known as digital strong motion accelerographs, are located at all pump stations except Pump Stations 2 and 3. These units detect earth movements caused by earthquakes. Information from the seismic units are transmitted to the SCADA System in Valdez by a separate telecommunications channel. JPO did a surveillance to verify the accelerographs had been installed at Pump Stations 1 and 4, where they had been previously removed. JPO verified the installation and start up of the new system at different locations. This resulted in the closure of an audit action item. Additionally, JPO verified that equipment located in the pump stations and control rooms were secured to prevent movement and damage in a seismic event. This resulted in closure of several audit items related to the seismic monitoring system.

Supervisory Control and Data Acquisition System

The age and maintenance of the Supervisory Control and Data Acquisition (SCADA) system and communication equipment required an upgrade and replacement of equipment. Alyeska developed a long range plan to modernize the SCADA system. This closed an audit action item. Another audit item was closed, involving the replacement of components and the inventorying of adequate spare parts.

Seismic Cable Tray Supports

Audit Action Item No. 10011 was designated as the host closure package for the seismic cable tray support issues. The evaluation phase addressed all of the cable tray concerns, as well as other related audit compliance tracking and closure items. The evaluation detailed written procedures for engineering evaluation; qualification of TAPS cable trays to specify the applicable seismic criteria; drawings of modifications to be made, and engineering screening and a walkdown process to identify supports or tray spans that are potentially overloaded. JPO verified the completion of the seismic cable tray work at the Valdez Marine Terminal in September 1998, which closed this audit item.

Chapter 5. Future JPO Work Commitment

JPO will continue to monitor a large variety of TAPS operations functions and operational requirements during 1999. Future oversight of pipeline system operations and other related areas will focus on:

Grant and Lease Compliance

JPO will monitor the identified instances of noncompliance to verify that corrections have been made. The compliance monitoring contained in this report was not intended to be a complete report card, but rather to initiate corrective action in those aspects where JPO found noncompliances. Grant and Lease compliance will constitute an increasing component of oversight and CMP reporting in preparation for Grant and Lease renewal before the year 2004.

Audit Action Items

Alyeska's change management ineffectiveness contributed to a large percentage of the 1993 audit action items. JPO's recent approval of Alyeska's revision to their quality program is intended to prevent recurrence of audit deficiencies. JPO's 1999 monitoring will include collection of the necessary information to report on the effectiveness of Alyeska's efforts and identify any noncompliance with the Federal Grant and State Lease.

Causal Factor Analysis

JPO will evaluate the adequacy of the causal factor analysis process to determine the root cause of incidents, to ensure Alyeska has a process to track and trend these incidents.

Qualification and Development Program and Controller Training

JPO will verify the full implementation of the Qualification and Development Program, and will also further investigate the adequacy of training of controllers or provision of information to controllers regarding changes in system configuration, both temporary and permanent.

Leak Detection System

JPO will continue oversight to determine whether the leak detection system is performing as designed, and to encourage Alyeska to explore NASA's Jet Propulsion Lab technologies in developing better leak detection sensors.

Instrumentation

JPO will continue to monitor critical process instrumentation pressure control set points as referenced in *DO-14, Trans-Alaska Pipeline Controller Manual.*

Fiber Optics Cable Project

JPO will monitor the fiber optics cable communication project to ensure TAPS safety and operational reliability. Later this year, JPO will decide on the issuance of a "Notice to Proceed," for the project, to allow control of valves using the fiber optics system.

Shutdowns and Re-starts

JPO will closely monitor start up conditions after planned shutdowns have occurred, to evaluate Alyeska's performance and adherence to procedural controls and safeguards, and determine if changes to operating procedures are controlled through the use of an effective document control system.

Cold Re-start Plan

JPO will continue to monitor Alyeska's progress for completion of the necessary studies before initiating a cold re-start plan for starting the pipeline under extreme weather conditions.

Pipeline Hydraulic Model

JPO will verify the models are updated and manuals and documents are revised and distributed as promised.

Pipeline Overpressure Events

JPO will continue to monitor Alyeska's improvements in handling potential overpressure events. JPO recently obtained the pipeline pig data and is currently evaluating it to verify Alyeska's conclusion that pipeline integrity was not affected.

Alyeska's Progress on Y2K

JPO will continue to monitor Alyeska's Y2K compliance efforts, and stay informed of any circumstances which could hinder Alyeska's ability to successfully meet Y2K requirements.

Mainline Refrigeration Unit No. 2 (MLR-2)

Monitoring of MLR-2 will continue for 1999, to ensure pipeline integrity is protected.

Closing Summary

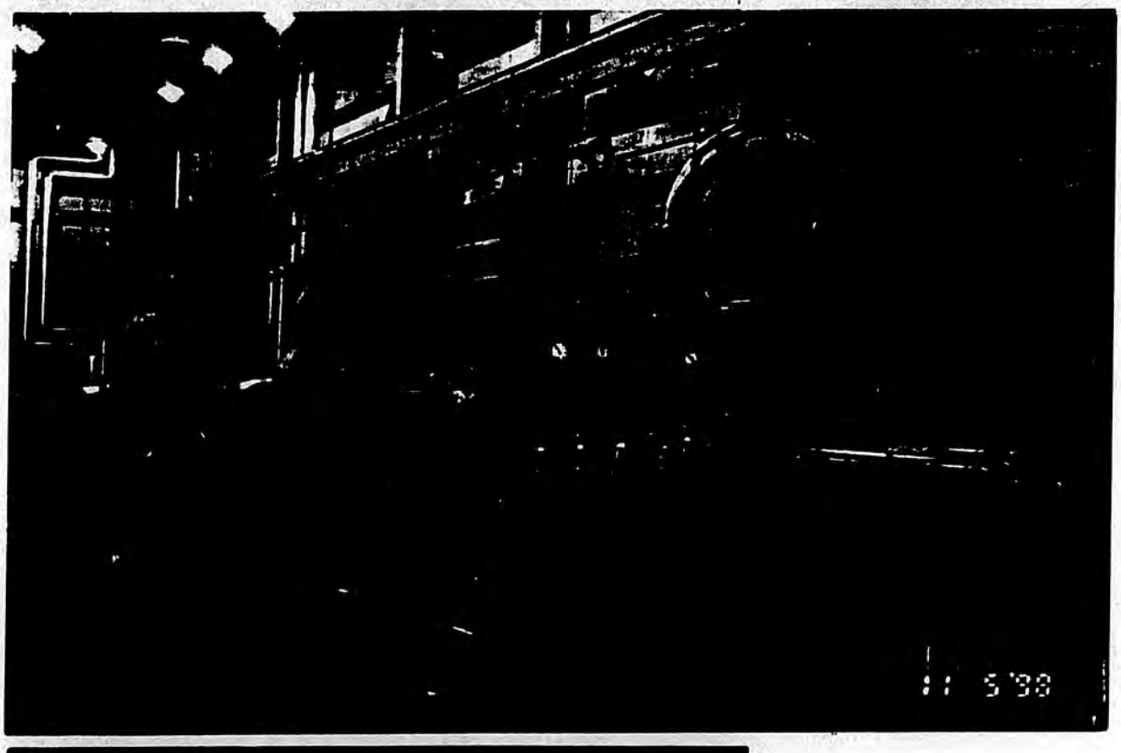
Alyeska's noncompliance with some aspects of the Grant and Lease do not constitute an immediate threat to pipeline integrity, public safety, or the environment. As stated earlier, the issues vary in significance. JPO's future work plans will include the necessary monitoring to ensure these deficiencies are corrected.

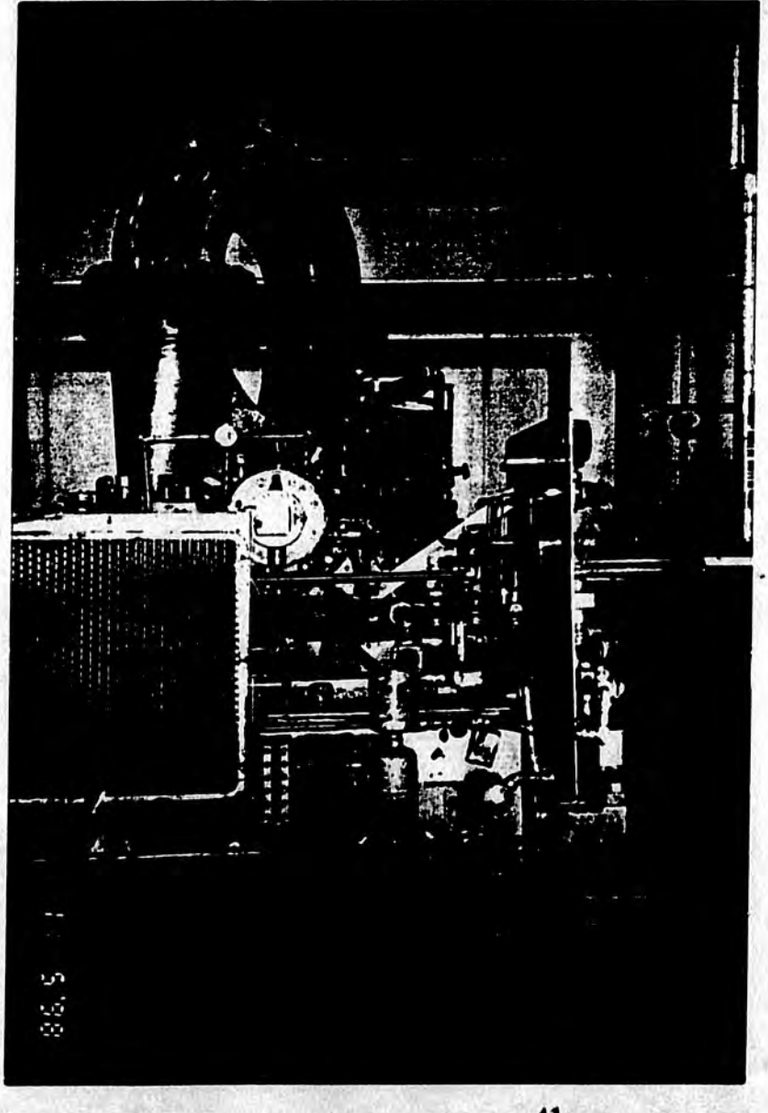
JPO believes that Alyeska needs to pay greater attention to detail, do more thorough trending and evaluation of incidents, and comply more rigorously with their own procedures. Alyeska's own quality assurance audits and reviews have recognized this and corrective action is underway.

Change management of TAPS critical systems and components is ineffective, and Alyeska agreed with this conclusion in their *Internal Assessment Report* (September 1998). In the upcoming year, JPO will assess Alyeska and contractors application of quality program controls and Alyeska Integrity Management System principles to ensure effective management of changes to critical TAPS systems and components.

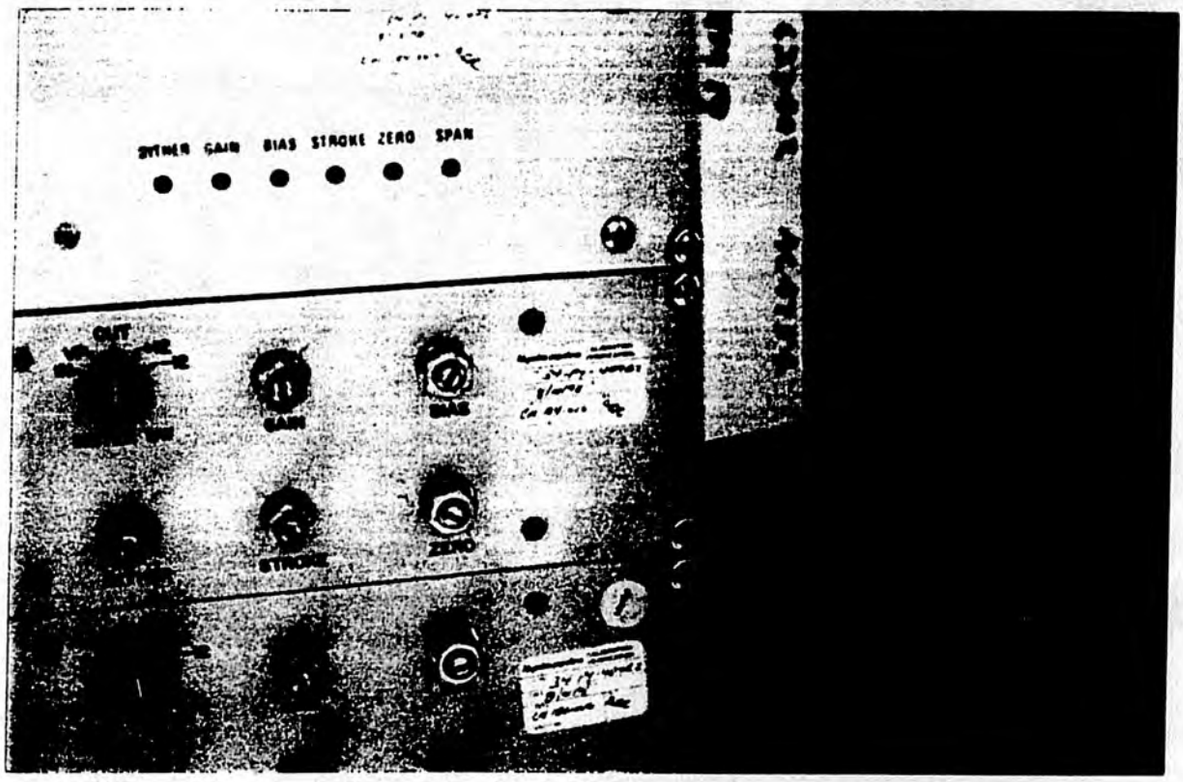
APPENDICES

Mainline Unit Pumps





Both photos are mainline unit pumps (MLU) at Pump Station 3. Pipeline throughput is controlled by pump speed that meet specific set points on the suction and discharge side of each pump station. This controls the speed and amount of oil that flows between each pump station, until it reaches the Valdez Marine Terminal. **(See p. 11)**



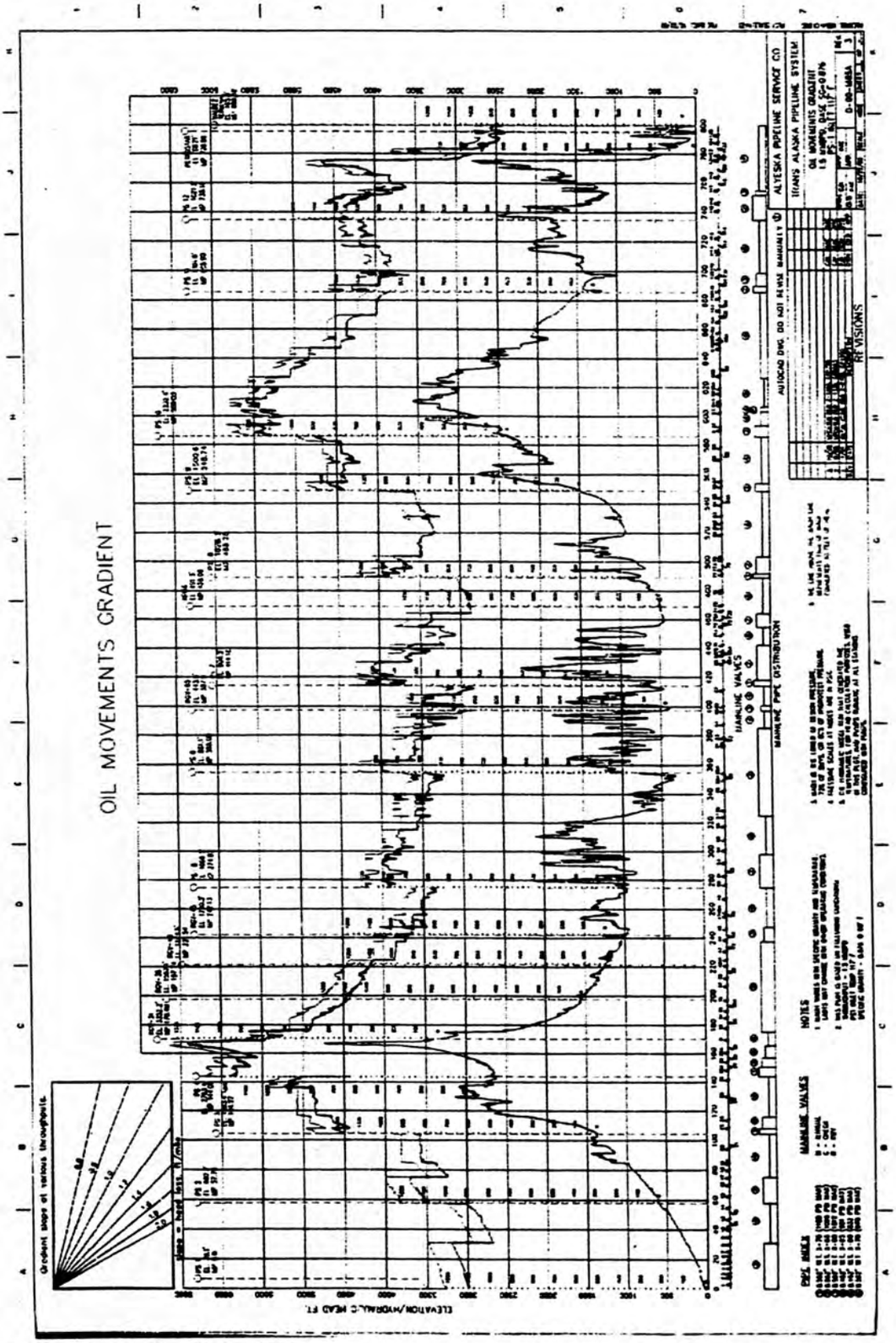
Calibration stickers on pressure controller equipment at PumpStation 4. Calibration stickers are put on all pressure control equipment to display essential set point value information. This is a safety mechanism for pipeline pressure control.



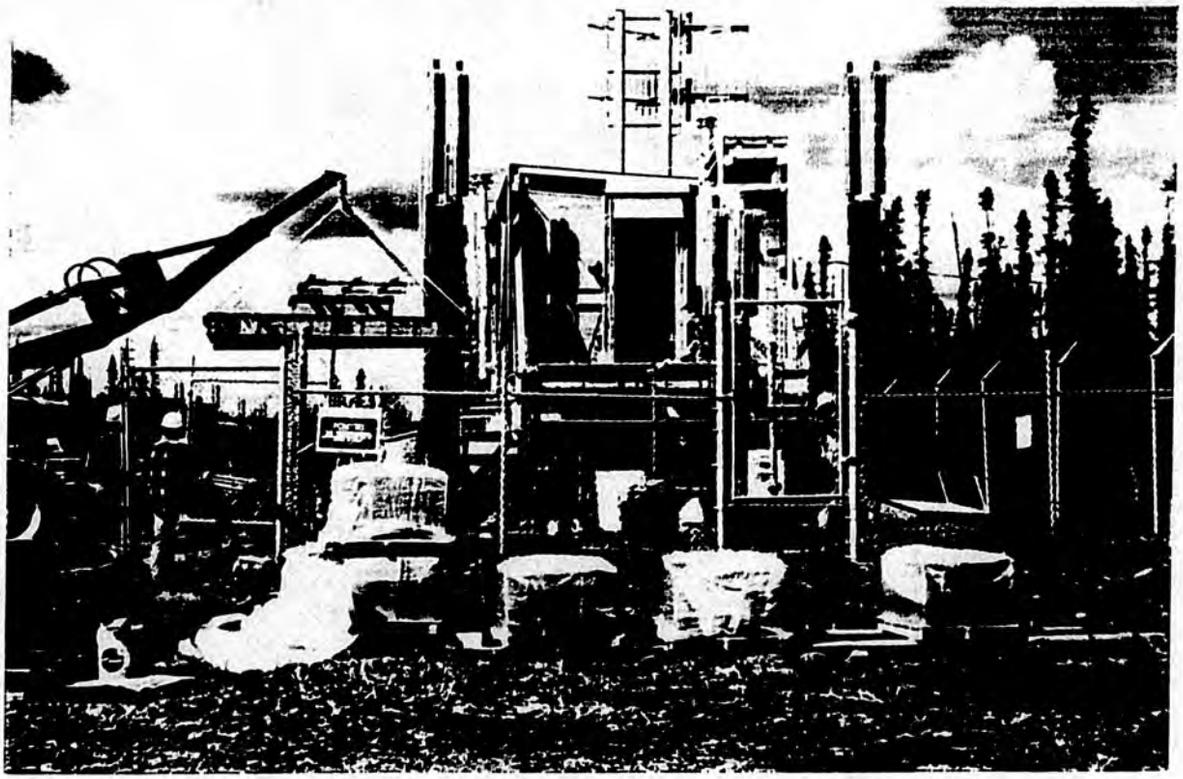
Calibration and verification sticker on pressure switch at Pump Station 4.
(See p. 14)

OIL MOVEMENTS GRADIENT

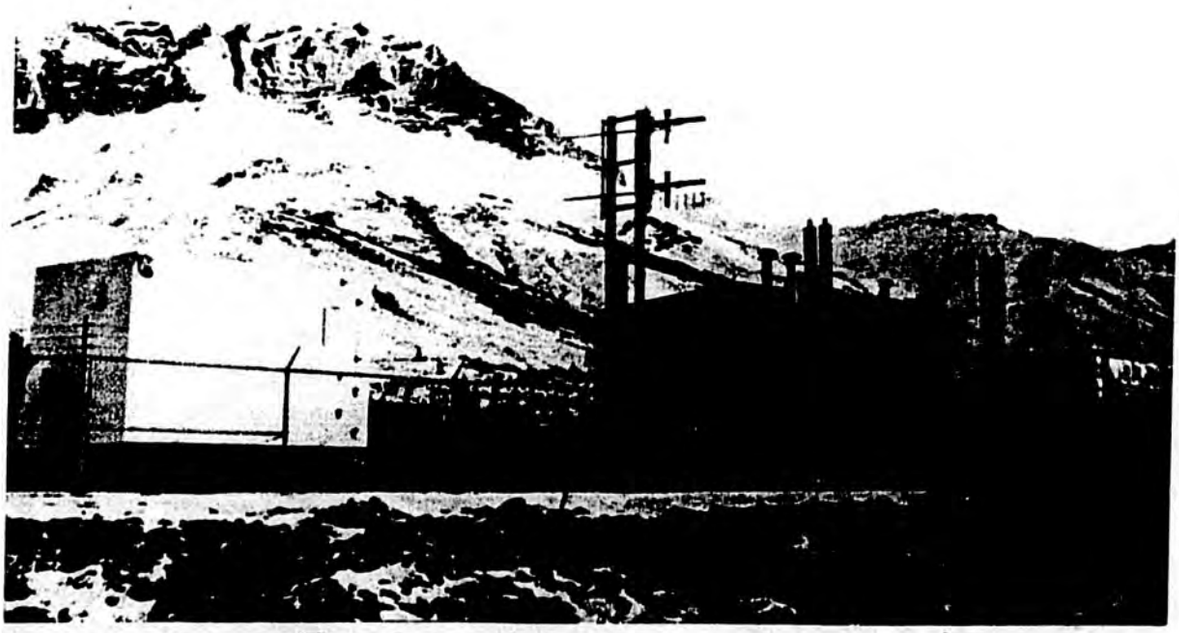
(See p. 16)



Courtesy Alyeska Pipeline Service Company



Installing new battery packs at Remote Gate Valve 72

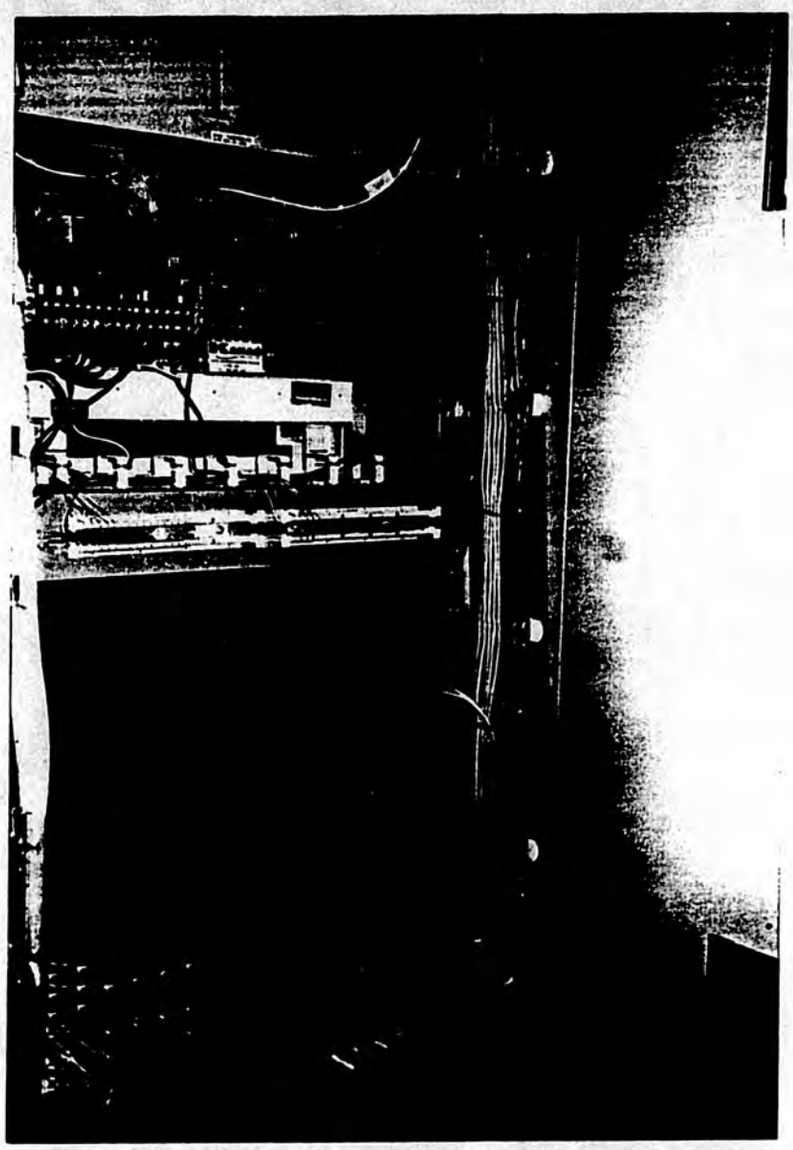


Remote Gate Valve No. 34 battery unit at the MFS Fiber Optic Station. The green building is the battery unit. The white building is the Fiber Optic Station, the housing unit for the batteries and communication link. **(See p. 21)**

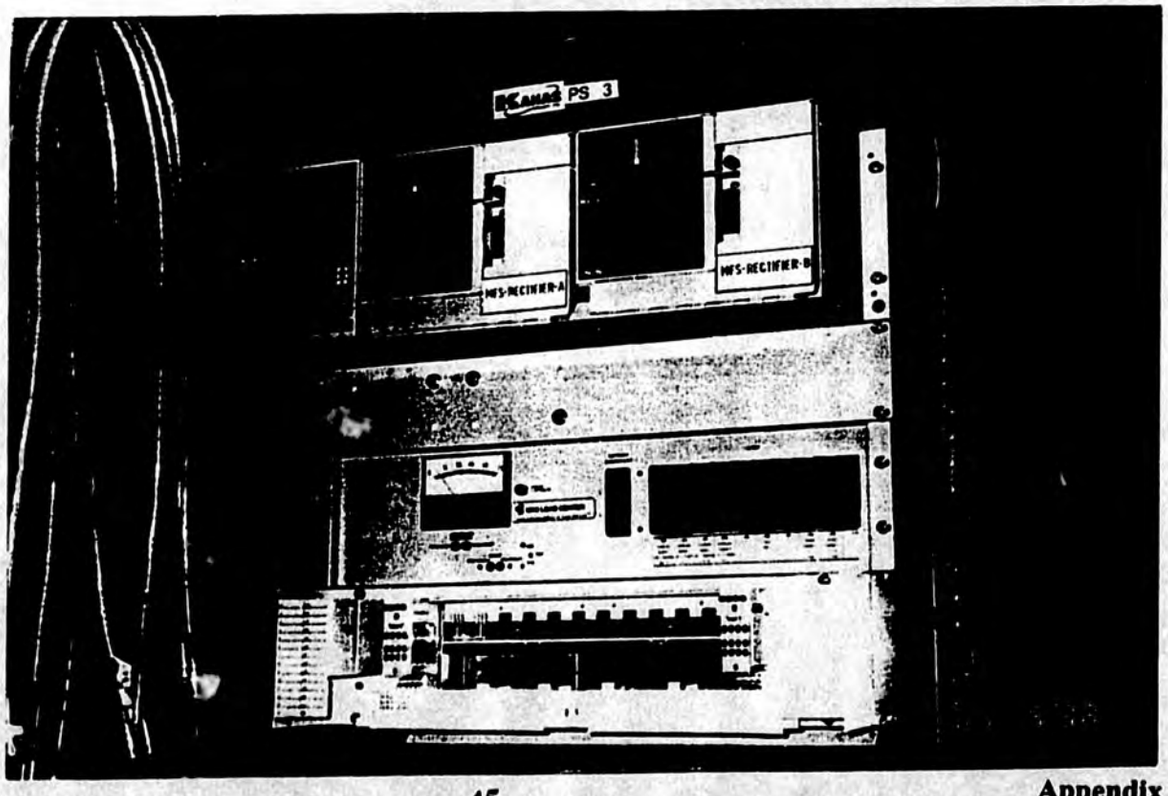
Fiber Optic Communication System

Fiber optic cable panel at Pump Station 3 ➜

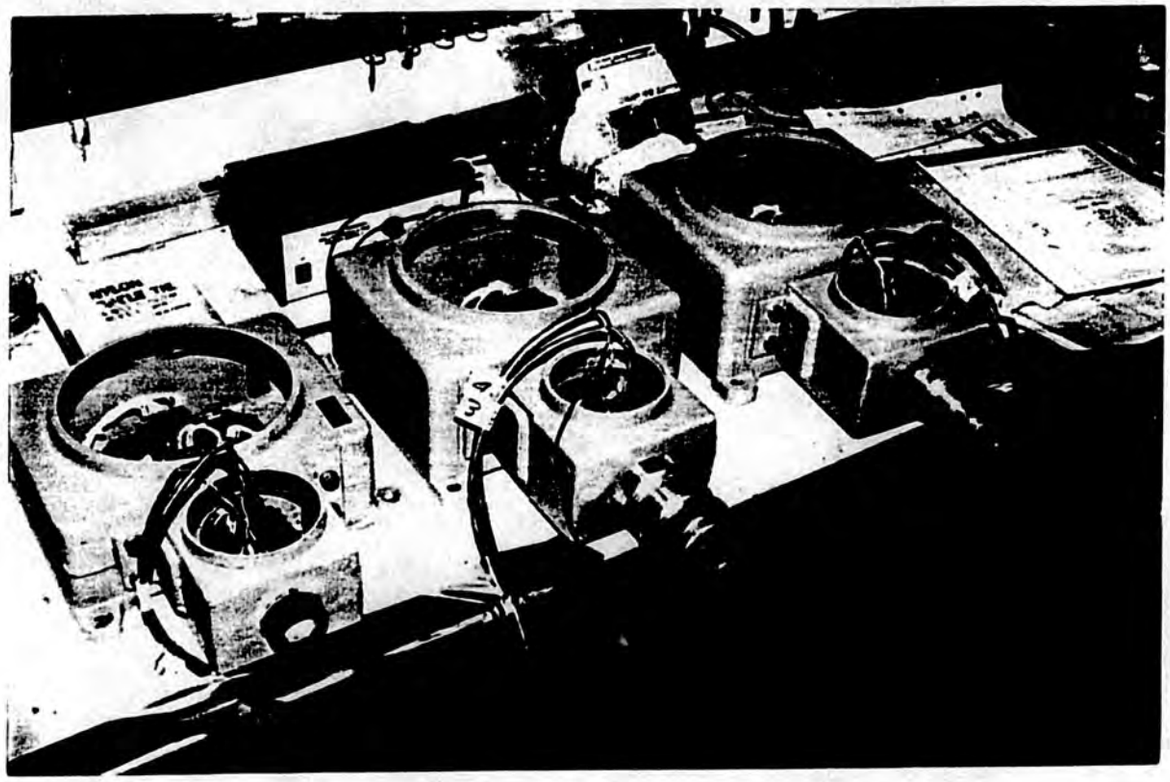
(See p. 21)



Fiber optics panel and cable at Pump Station 3



The TAPS Earthquake Monitoring System



Digital Strong Motion Accelerometers (DSMA)
These units detect seismic activity from light tremors to severe earthquakes. DSMA's are at all pump stations (except 2 & 3) and the Valdez Marine Terminal.



Accelerometer computers used for the TAPS Earthquake Monitoring System.
(See p. 33)



JOINT PIPELINE OFFICE

Comprehensive Monitoring Program Report

An Evaluation of Selected Portions of the TAPS Maintenance Program January 1997-April 1999

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April 1999

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Our Message to Stakeholders

TAPS and JPO

The Trans-Alaska Pipeline System (TAPS) transports nearly 20 percent of the nation's domestically produced crude oil through the unique and fragile environment of Alaska. TAPS is critical to the nation's economy and security. Revenues and investment income from crude oil transported by TAPS account for 80 percent of the State of Alaska's general fund. Since start up in 1977, TAPS has safely transported more than 12 billion barrels of crude oil from Prudhoe Bay to Valdez. The Joint Pipeline Office (JPO), a unique consortium of six State and five Federal agencies, oversees Alyeska's management of TAPS.

JPO's Comprehensive Monitoring Program

JPO's vision is: ***"To work proactively with the oil and gas industry in Alaska to achieve safe operation, environmental protection, and continued transportation of oil and gas in compliance with legal requirements."*** The JPO Comprehensive Monitoring Program (CMP) is intended to influence continuous improvement in Alyeska Pipeline Service Company's management of TAPS construction, operations and maintenance activities. The JPO CMP process is focused on problem prevention rather than reaction, emergency response, and damage control.

CMP reports periodically communicate to JPO stakeholders summaries of past monitoring efforts. The reports revisit critical TAPS audit deficiencies; incorporate concerns raised by TAPS employees and outside interest groups; address high risk activities; verify compliance with laws, regulations, permit conditions, and Grant/Lease stipulations; verify compliance with important internal Alyeska controls such as the quality, safety and environmental programs; and evaluate causal factors and trends related to recent TAPS incidents. Reports have previously covered one of twelve CMP functional topics:

- → Alaska Native Employment & Training
- → Configuration Management
- → Employee Concerns Program
- → Equal Employment Opportunity
- → Quality
- → *Maintenance*
- → Safety
- → Project Design
- → Project Performance
- → Environmental Protection
- → Risk Management
- → Operations

This year, the twelve oversight categories are being consolidated into four CMP reports: Operations, Maintenance, Construction/Termination and Culture Change. The emphasis of the CMP will remain unchanged. Coverage of environmental protection, safety, quality, risk and configuration management will be addressed in each report.

About This Report

The JPO is pleased to present *An Evaluation of Selected Portions of the TAPS Maintenance Program For 1997-1999* to our stakeholders. While the operation of TAPS will never be risk-free, JPO oversight helps minimize environmental risks, maximize compliance with worker safety and pipeline integrity standards, and improve maintenance performance.

Jerry Brossia
Authorized Officer

William G. Britt, Jr.
State Pipeline Coordinator

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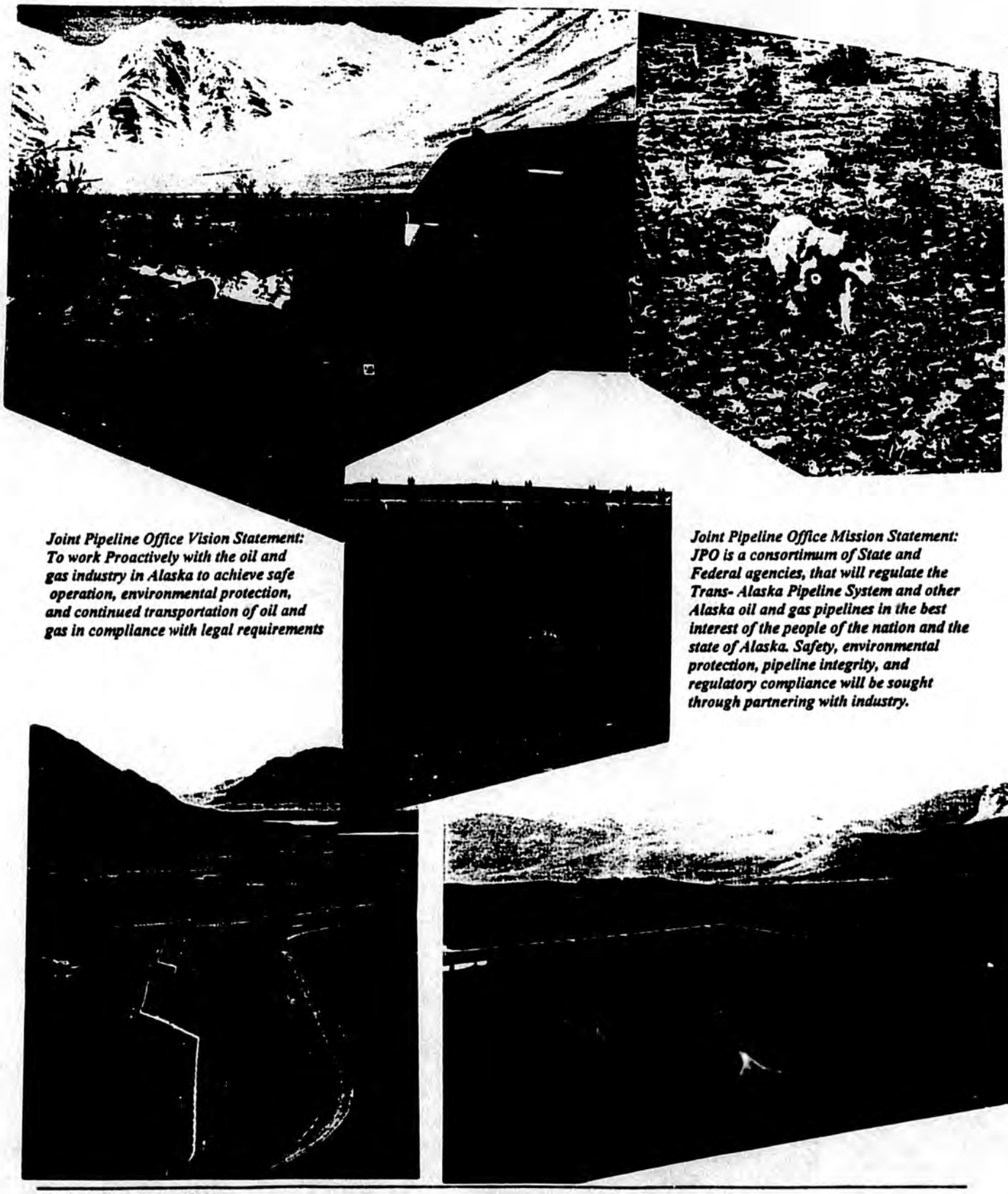
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Joint Pipeline Office Vision Statement: ***To work Proactively with the oil and gas industry in Alaska to achieve safe operation, environmental protection, and continued transportation of oil and gas in compliance with legal requirements***

Joint Pipeline Office Mission Statement: ***JPO is a consortimum of State and Federal agencies, that will regulate the Trans- Alaska Pipeline System and other Alaska oil and gas pipelines in the best interest of the people of the nation and the state of Alaska. Safety, environmental protection, pipeline integrity, and regulatory compliance will be sought through partnering with industry.***

Executive Summary

The Comprehensive Monitoring Program (CMP) report, *An Evaluation of the Selected Portions of the TAPS Maintenance Program January 1997-April 1999,* is JPO's seventh CMP report, but the first to evaluate maintenance performance of the Trans-Alaska Pipeline System (TAPS). The status of six maintenance topics is addressed: preventive and workpad maintenance, electrical systems, slope stability, mineral material sites, and mainline valves.

The performance of most TAPS maintenance areas JPO evaluated has either improved or remained the same since the early 1990's. Recent planning, preparation, and execution of mainline valve repair projects achieved a high standard of performance. However, permit and project coordination is an exception, where recent performance has not been as good as Alyeska's previous record.

Compliance. JPO's study of the six maintenance areas inciuded ten stipulations of the Grant and Lease. The aspects of noncompliance contained in this report vary in significance and should be put in perspective. Some aspects of noncompliance have previously existed on TAPS and have been corrected by Alyeska. Only recently did JPO begin reporting them using the CMP process.

Pipeline Integrity. The most significant aspect of noncompliance relates to pipeline integrity. JPO is concerned that two slopes have not been demonstrated to be stable enough to support the above ground pipe in the remote possibility of a large earthquake. JPO and Alyeska are actively studying these slopes. This report presents the interim status of evolving technical evaluations of the slopes and does not suggest a lack of responsiveness on Alyeska's part. If these slopes cannot be shown as safe, civil improvements must be made to fix them. Alyeska and JPO continue to monitor other slopes greater than 10% with no issues noted at this time.

Change Management. Alyeska needs to improve their management of TAPS system changes. Referred to as "change management," this issue was discussed in JPO's February 1999, CMP report about pipeline system operations. However, Alyeska has made progress with new controls that require completion of all updates and revisions before a modified system is "turned over" to the system operators. They are improving their ability to detect system interactions, documents and parameters.

Principal Conclusions About TAPS Maintenance

- **Five of the stipulations evaluated contain some aspects of noncompliance. The areas of noncompliance include slope stability, failure to update records for system changes and civil maintenance, inconsistency between existing conditions and design requirements, and vegetation damage at material sites. Alyeska has efforts underway to address each issue. JPO will verify completed corrections.**

- **Two slopes at Squirrel Creek are not in compliance with design basis requirements and Stipulation 3.5, *Slope Stability* of the Grant and Lease. Instrumentation data**

shows the Squirrel Creek slopes are thawed, resulting in a degradation of permafrost and a noncompliance with Stipulation 3.9, *Construction and Operation.* The degree of integrity of the Squirrel Creek slopes under design contingency earthquake conditions is in question and under review by JPO and Alyeska. If these slopes cannot be demonstrated as being safe, civil improvements must be completed. Alyeska has scheduled a risk assessment for this year to evaluate the Squirrel Creek slopes. They recently completed the Pump Station 11 slope risk assessment, which JPO is currently reviewing. Alyeska concluded in their Pump Station 11 risk assessment the probability of a crude oil leak or spill is very remote. Appropriate mitigation actions will follow the review of the risk assessments.

- The Alaska Department of Labor electrical inspector found six National Electrical Code (NEC) violations on TAPS that were within the scope of this review. Alyeska corrected the violations and JPO verified the corrections. Alyeska now requires third party inspection of electrical installations and modifications. If consistently followed, this requirement should prevent future noncompliance with the National Electrical Code.

- Alyeska is meeting their commitments for the mainline valve testing and repair program. Recent planning, preparation, and execution of mainline valve repair projects achieved a high standard of performance. Maintenance goals include 1) testing of 44 mainline valves for internal leak-through in 1998, and testing of the remaining mainline valves by the year 2000, 2) repairing Check Valve 122, and 3) replacing Remote Gate Valve 80. The last two items were completed in 1998.

- Alyeska has not coordinated well with JPO's regulatory agencies during the planning, scheduling, and design of a number of maintenance projects along the TAPS right-of-way. This, coupled with Alyeska's lack of internal coordination, resulted in delays in the permitting and execution of some projects. To correct this problem, Alyeska is clarifying roles and responsibilities and providing additional training to their asset managers.

- Alyeska's maintenance records have only partially documented some workpad and above ground maintenance repairs. This hinders the trending of damage caused by flood, erosion and thawing. JPO considers this to be an instance of noncompliance with Grant and Lease Stipulation 1.18, *Surveillance and Maintenance.* Although Alyeska disagrees this deficiency is a noncompliance with this stipulation, they are working to improve tracking of civil maintenance repairs.

- New projects were commissioned and turned over to pipeline operators without the necessary preventive maintenance procedures. Other electrical system modifications lacked updated drawings. Alyeska changed procedures to ensure timely completion of preventive maintenance procedures and project records.

Additional Observations and Conclusions

- **Alyeska has not met scheduled goals for some parts of the mainline valve program, including below ground valve investigations and the mainline valve maintenance review. Instead, resources were committed to the repair of Check Valve 122 and replacement of Remote Gate Valve 80. Alyeska plans to accelerate their 1999 schedule to catch up on below ground valve investigations.**

- **Preventive maintenance work required by regulation was completed within required time frames, which was an improvement over 1996 and 1997 performance. However, JPO discovered that nonregulated preventive maintenance work orders were behind schedule.**

- **The material sites Alyeska uses are clean and well maintained. Erosion was not evident at any sites. However, not all the material sites met mineral sale requirements. Two sites had excessive vegetation damage and six sites had slopes that exceeded requirements for steepness. Corrections will be verified in 1999.**

- **JPO incorporated issues from concerned TAPS workers into its monitoring. Two of the TAPS workers concerns were validated after JPO's investigation. One concern involved the maintenance of fire alarm and suppression systems by employees without the appropriate state fire marshall permits. This concern was validated at one pump station. The other concern was that not all electrical work received third party inspections when required. This concern was validated when the six NEC violations were written by the Alaska State Electrical Inspector.**

- **Alyeska closed the remaining 1993 maintenance related audit action items. The six NEC violations written during this review were recurrences of previously closed audit action items. Additional monitoring by Alyeska and JPO is needed to ensure the corrective action to have a third party inspection of electrical installations and modifications is followed.**

Chapter 1. Purpose, Scope and Background

JPO's past CMP reports have covered pipeline system operations, environmental protection, worker safety, employee concerns, pipeline system projects, and Alaska Native employment and training.

Purpose

All CMP reports evaluate compliance with relevant regulations and the *Federal Agreement and Grant and the State Right-of-Way Lease.* The 30-year Federal Grant and State Lease for TAPS are both scheduled for renewal by January 2004. Therefore, systematic monitoring of compliance is a central purpose of the CMP. The purpose of this report is to:

1) Explain JPO's systematic monitoring approach to the oversight of pipeline system maintenance.

2) Describe JPO's approach to monitoring pipeline system integrity concerns, and present the status of slope stability for areas of concern the pipeline traverses, such as the Squirrel Creek, Treasure Creek, Pump Station 11, and Klutina slopes.

3) Communicate to the public and higher authorities about Alyeska's performance of maintaining the pipeline system, including electrical and valve systems; and performance maintaining the work pad, material sites, and slopes the pipeline traverses.

4) Discuss Grant and Lease compliance issues identified through JPO monitoring of TAPS maintenance.

5) Evaluate significant issues raised by TAPS workers and reexamine key deficiencies related to pipeline system maintenance identified in the 1993 TAPS audits.

Scope and Methodology

The scope of this report includes JPO oversight of TAPS maintenance from January, 1997 through April, 1999. JPO conducted surveillances and assessments to evaluate selected portions of Alyeska Pipeline Service Company's maintenance program and formed conclusions based on the assessments. This report focuses on six activities integral to the maintenance of TAPS: 1) electrical, 2) preventive, 3) mainline valve, 4) work pad civil maintenance and surveillance, 5) slope stability, and 6) mineral material sites. This report explains the issues, describes their status, and discusses compliance with the *Federal Agreement and Grant and the State Right-of-Way Lease.* JPO evaluated these six elements to determine whether Alyeska's maintenance activities were conducted with:

- Minimum environmental impact;
- Conformance to employee safety standards;
- Protection of pipeline system integrity;
- Compliance with the *Federal Agreement and Grant and State Right-of-Way*

Lease;

- Conformance with approved maintenance plans and required documentation of maintenance.

The scope for the six portions of the TAPS maintenance program JPO evaluated are laid out in more detail below.

Electrical Maintenance. The electrical system for TAPS is complex. This system operates and controls the pipeline from Prudhoe Bay to Valdez, including the Valdez Marine Terminal. The electrical system along TAPS includes the sub-systems of lighting, emergency lighting, grounding, heat tracing, lightning protection, and motors. In 1998, a JPO assessment team evaluated electrical system installations at pump stations along TAPS, from Pump Station 1 on the North Slope to the Valdez Marine Terminal to determine whether Alyeska complied with the National Electrical Code.

Preventive Maintenance. In 1997, JPO completed surveillances of selected preventive maintenance areas and identified areas of concern. JPO examined the areas of concern again in 1998, which included required regulatory and mandatory preventive maintenance tasks. JPO reviewed samples of 1997-1998 records to verify whether required preventive maintenance was completed in a timely manner.

Mainline Valve Maintenance. During the time frame covered by this report, JPO reviewed mainline valve maintenance along TAPS. JPO did not review maintenance performance for valves at the pump stations and the Valdez Marine Terminal. Therefore, valve maintenance in these locations are not included within the scope of this report. Evaluation of valve maintenance for these areas will be addressed in future reports.

Workpad Maintenance. In 1997, JPO conducted surveillances of Alyeska's surveillance, monitoring and maintenance of the workpad, and identified areas of concern that involved the workpad and above ground mainline conditions. JPO looked at these areas of concern again in 1998.

Slope Stability. At the time of TAPS construction, any slopes greater than 10 percent that the pipeline traversed were studied for potential mass movement. Of the slopes studied, Alyeska identified 49 slopes that would require continual future monitoring. The 49 slopes were prioritized according to their greatest potential for geologic movement. Four slopes posed enough of a concern to warrant instrumented monitoring. JPO evaluated the safety and integrity of the above ground pipeline on the four slopes at Treasure Creek, Pump Station 11, Klutina, and Squirrel Creek.

Material Sites. Alyeska uses 76 sites on public lands along TAPS for mineral materials mining. In 1998, JPO inspected 72 of the 76 mineral material sites to determine whether Alyeska complied with Grant and Lease requirements. Four sites were not inspected due to time and access constraints.

Monitoring Maintenance Performance

This is JPO's first CMP report about TAPS maintenance. Before 1994, State and Federal oversight of TAPS focused on surface and subsurface protection, environmental issues, corrosion, oil spill contingency, and land use permitting. JPO had done little monitoring of the maintenance of the pipeline system. In response to identified deficiencies in the 1993 audits of TAPS, JPO expanded oversight to include maintenance of pipeline system hardware. JPO planned the first evaluation of TAPS maintenance in late 1996, began initial field work in 1997, and continued monitoring pipeline system maintenance in 1998.

How This Report is Organized

To aid readers in the understanding of pipeline maintenance issues, this report includes background information about systems and maintenance. Chapter 2, *Evaluation of Selected Portions of the TAPS Maintenance Program* summarizes the results of JPO monitoring issues and background about the issues. Chapter 3, *Federal Grant and State Lease Compliance* describes JPO's monitoring results according to the requirements of Grant and Lease stipulations and provisions. Chapter 4 discusses employee concerns and audit action items related to maintenance of the pipeline system. Chapter 5 lays out JPO's planned future work to track identified issues and areas not recently reviewed for evaluation.

Chapter 2. Evaluation of Selected Portions of the TAPS Maintenance Program

TAPS Electrical Maintenance

- **During a 1998 assessment, the Alaska Department of Labor electrical inspector found six National Electrical Code violations on TAPS for work performed without the required supervision of a journeyman electrician, and for work that did not receive a third party inspection. Alyeska corrected the violations and JPO verified the corrections.**

- **JPO's review of 129 electrical nonconformance reports written by third party electrical inspectors raised questions about uninspected work. Alyeska's 1998 decision to inspect all electrical modifications should substantially minimize future National Electrical Code violations.**

- **Modification packages reviewed by the electrical assessment team were incomplete, lacking up-to-date drawings and other documents. This contributes to both the "change management" deficiencies cited in JPO's previous *CMP Operations Report*, and the noncompliance with the aspect of Stipulation 1.18.3 concerning modification of records.**

The Trans-Alaska Pipeline Electrical System

The TAPS electrical system consists of the pump stations, the pipeline, and the electrical power system at the Valdez Marine Terminal. TAPS electrical systems include the following sub-systems: lighting, emergency lighting, grounding, heat tracing, lightning protection, impressed current cathodic protection, and motors. In addition, some pump station electrical systems include power generation facilities, since commercial power is not available at most pump stations. The Valdez Marine Terminal electrical system also includes a power generation plant.

How Are TAPS Electrical Systems Regulated?

The U.S. Department of Interior, Bureau of Land Management is responsible for monitoring the safety of electrical systems along TAPS. Under the Federal Grant and State Lease, JPO is responsible for safety issues and ensuring that Alyeska is in compliance with all laws and regulations. All TAPS electrical work is required to meet codes and standards specified by the Federal Grant and State Lease. The Alaska Occupational Safety and Health (AKOSH) electrical standards and the National Electrical Code (NEC) standards are the basis for all electrical requirements and inspection criteria for TAPS. The Alaska Department of Labor enforces AKOSH and NEC compliance with two staff members assigned to the Joint Pipeline Office, the safety liaison and the state electrical inspector. Each advises JPO according to their separate areas of jurisdiction.

Who Enforces Which Regulations?

If a violation is identified and an enforcement action becomes necessary under NEC or AKOSH, enforcement can be approached two ways: 1) JPO may enforce an NEC or AKOSH requirement through the Grant and Lease process, or 2) the Alaska Department of Labor can directly enforce the NEC or AKOSH requirement. JPO considers any NEC or AKOSH violations to be instances of noncompliance with the Grant and Lease until they are corrected.

The National Electrical Code (NEC)
NEC is the code used to inspect *new* electrical systems. The Alaska Department of Labor state electrical inspector enforces all new work, alterations, and modifications in electrical load according to the NEC standards.

The Alaska Occupational Safety and Health Standards (AKOSH)
The AKOSH inspection standard covers *existing* electrical systems. The Alaska Department of Labor safety liaison enforces safety regulations for existing systems according to the AKOSH standards under the Grant and Lease. Any interpretation of AKOSH is done by the Alaska Department of Labor.

In November 1998, JPO assigned an electrical assessment team, including a state electrical inspector to conduct a review of TAPS electrical systems. The purpose of the assessment was to verify that electrical work and fire alarm and suppression systems on TAPS were in compliance with applicable regulations, codes and Alyeska's Quality Program requirements. JPO selected certain aspects of the electrical systems to look at because 1) employee concerns had been filed concerning NEC compliance, and 2) some electrical systems contained deficiencies that were initially identified in the 1993 audits.

National Electrical Code Compliance. The assessment team reviewed electrical systems at several pump stations and the Valdez Marine Terminal. The team conducted several unofficial grounding checks at these locations and found no deficiencies. (The indeterminate electrical grounding had been a significant issue identified by the 1993 TAPS audits). During the review, JPO identified six electrical items within the scope of this report that were not in compliance with the National Electrical Code. The Alaska Department of Labor state electrical inspector issued six notices of violation to Alyeska for areas of noncompliance with the National Electrical Code. The violations involved electrical work that was completed without the direct supervision of a journeyman electrician, and had not been inspected by a third party inspector. Alyeska corrected the notices of violation and the state electrical inspector verified the corrections.

NEC code compliance has been a continual problem for Alyeska (See chapter 4). This report represents the second time since 1993 that JPO endorsed Alyeska actions to prevent recurrence of NEC violations (the closure of the NEC code violation audit action item preceded this assessment).

Electrical Inspections. The National Electrical Code violations involved electrical work that was not inspected by a third party inspector at some locations. JPO's review did not find any National Electrical Code violations in the areas that had been checked and verified by third party inspection. The third party inspections appeared effective in preventing National Electrical Code violations. A review of Alyeska's nonconformance reports written by third party inspectors revealed 129 instances of National Electrical Code violations had occurred between 1996 and 1998. An Alyeska quality assurance audit led to a decision to require third party inspection of all electrical modifications.

Work and Modification Packages. A work "package" is a requirement of Alyeska's Quality Program, and includes everything necessary to complete a project. Packages contain project designs, drawings, documentation, and instructions for implementation. JPO reviewed several project packages and found several without current as-built drawings. Other packages lacked complete inspection checklists and other project documents. The assessment team learned these

documents were in the process of being completed. The team also found some packages were not closed out in a timely manner. This finding is not individually significant, however, considering Alyeska's deficiency in managing change, there is a need to improve compliance with the aspect of Stipulation 1.18.3 that requires management of change. (Electrical modifications are system changes and are part of change management).

Work Orders. JPO investigated an employee concern that a specific project failed to have a "work order" for electrical work required by Alyeska's Quality Assurance Program. JPO found completion of the work order complied with the Quality Assurance Program and did not validate this concern.

State Fire Systems Work Permits. JPO received another employee concern involving workers who had designed, installed and maintained TAPS fire alarm and suppression systems. The workers lacked the necessary permits from the state fire marshall. All inspected locations met state fire marshall regulations concerning permits, with the exception of Pump Station 7. An individual that had worked on the fire suppression system at Pump Station 7 only had a permit to work on fire alarm systems. Although not required by the state fire marshall, but for purposes of consistency, the pipeline manager then directed Pump Station 7 to follow overall TAPS policy and secure the necessary fire system permits. JPO will follow up with surveillances to validate Alyeska's directive and verify that fire system permits were obtained.

Electrical Administrator. Electrical administrators have the overall responsibility for certifying that all electrical installation and repair work complies with the National Electrical Code. Alyeska has two electrical administrators, one for the Valdez Marine Terminal and one for the pipeline system. Alyeska's electrical administrators have the responsibility of making sure all electrical work completed by Alyeska employees complies with the National Electrical Code. The electrical administrator positions complied with State of Alaska requirements. However, JPO observed that the role of Alyeska's electrical administrator was not clearly defined. There was a misconception within Alyeska about the exact responsibilities of the electrical administrator. Many Alyeska employees assumed the electrical administrator's primary role was inspecting all electrical work on TAPS; however, each company performing electrical work is required to provide their own electrical administrator for the oversight of any electrical work completed by that company. Alyeska clarified their master specification requirement to specify that, although the electrical administrator is responsible for all electrical work completed by Alyeska's electricians, the electrical administrator does not have the responsibility for defining inspection criteria for electrical work packages designed on site.

TAPS Preventive Maintenance

- **New projects were commissioned and turned over to pipeline operators without the necessary preventive maintenance procedures. Other electrical system modifications lacked updated drawings. Alyeska changed procedures to ensure timely completion of preventive maintenance procedures and project records.**

- **Preventive maintenance work required by regulation was completed within required time frames which was an improvement over 1996-1997 performance.**

- **Preventive maintenance tasks which are not regulatory or mandatory, but are important in protecting pipeline safety and integrity were often overdue and backlogged. Alyeska reported that 98% of these preventive maintenance tasks were completed within 60 days of the original due date, eliminating the concern they weren't being performed.**

Preventive Maintenance. Preventive maintenance is the service, inspection, and performance of function checks of the pipeline system on a scheduled basis. It is intended to prolong equipment life and avoid in-service failure. Some areas of preventive maintenance are mandatory and are required to be performed on a specific schedule set by State or Federal regulatory agencies.

JPO began active monitoring of preventive maintenance in late 1996 after reviewing Alyeska trending reports which cited preventive maintenance backlogs. JPO's initial assessment focused on those TAPS preventive maintenance tasks required by regulation. Alyeska's preventive maintenance records reside in their electronic tracking system, *Passport.* Passport generates work orders for preventive maintenance tasks. When work orders are generated, each has a required due date for completion of the preventive maintenance task.

Alyeska's Scheduling and Tracking of Preventive Maintenance Tasks

Alyeska categorizes maintenance tasks and assigns each category a level of importance, using "priority" codes in *Passport*, the electronic data base Alyeska currently uses to track TAPS maintenance work. Preventive maintenance tasks are grouped by five priority codes:

Priority 01 - *Emergency work*...requires immediate action.
Priority 02 - *Reactive work*... not known, or not scheduled fourteen days in advance of implementation date.
Priority 03 - *Non-deferrable preventive maintenance tasks*... regulatory and mandatory preventive maintenance tasks that may not be deferred.
Priority 04 - *Routine preventive maintenance tasks*... routine tasks that are not regulatory driven, and may be deferred.
Priority 05 - *Lowest priority preventive maintenance tasks*... these may be deferred.

JPO's 1996-1997 monitoring found several *Priority 03* tasks that were being deferred. Some of these were neither regulatory or critical, but were still being coded as *Priority 03* tasks. Alyeska implemented corrective and preventive actions.

Priority 03 PM Tasks. Required preventive maintenance work orders are categorized as *Priority 03.* A review of *Priority 03* preventive maintenance items revealed they were completed within required time frames, except those that could not be completed without TAPS being shut down. This was an improvement over past performance for completion of *Priority 03* preventive maintenance tasks.

Priority 04 PM Tasks. JPO also reviewed *Priority 04* preventive maintenance tasks. These tasks are not regulatory or mandatory, but are important to safety and integrity of the pipeline. Alyeska queried *Passport* to obtain information for JPO that revealed 831 tasks were overdue for *Priority 04* preventive maintenance line-wide. Alyeska's response to JPO's assessment findings stated that 98% of *Priority 04* preventive maintenance tasks were being completed within 60

days of the original due date. Alyeska noted, and JPO does not disagree that many of these should be coded to Priority 05. Alyeska plans to designate less important preventive maintenance work orders as *Priority 05* to better prioritize the work. Better use of the *Priority 05* tasks should improve efficiency by better separating the less critical from the more critical tasks. JPO closed this finding and will continue to monitor the status of this work during 1999.

Change Management Related to Preventive Maintenance. JPO found new projects were turned over and accepted by pipeline operating personnel without preventive maintenance procedures or project records. These deficiencies could be prevented by effective "change management" as discussed in JPO's recent *Operations CMP Report*. As mentioned above, Alyeska revised their TAPS engineering and quality assurance manuals to ensure that preventive maintenance procedures and project records are provided to the operators before turning the projects over to pipeline operating personnel. Asset Team Leads (lead persons at pump stations and adjacent sections of TAPS) are currently not accepting ownership of completed modification projects without all the preventive maintenance procedures or project records. JPO concurs that these preventive actions should address incomplete project turnover. JPO's project monitoring for 1999 will concentrate on verifying whether system modifications have accurate drawings, correct procedures and current specifications.

What is "change management?"
Change management on TAPS refers to those processes, controls, and records used to track system changes used to safely operate and shut down the pipeline. When a system is changed, all the relevant drawings, maintenance procedures, part lists, test procedures and operating instructions are revised prior to operation. Change management ensures that no test routine, system interaction, calibration specification, or other parameter escapes evaluation--something that is too easy to do on the complicated technology that comprises TAPS.

Corrective and Supplemental Work Orders. JPO reviewed *Passport* data containing overdue corrective and supplemental work orders. A supplemental work order is initiated to correct deficiencies found on other priority work orders. Corrective work orders are separate from preventive and supplemental work orders, in that they correct deficiencies not previously tied to any other work order. The data base identified 1,673 overdue work orders. Many of these open work orders were not critical and were unrelated to preventive maintenance. Alyeska responded they would define a realistic backlog and reduce the number of outstanding work orders. Alyeska has allocated resources to reduce the number of outstanding *Priority 04* preventive maintenance tasks and the backlog identified in the *Passport* system. The CMP addresses work orders related to safe operation and shutdown of TAPS and excludes the myriad business tasks that Alyeska must manage.

TAPS Mainline Valve Maintenance

- **Alyeska is meeting their commitments for the mainline valve testing and repair program. Recent planning, preparation, and execution of mainline valve repair projects achieved a high standard of performance. Maintenance goals included 1) tests of mainline valve performance to check for internal leak-through, 2) repairing Check Valve 122, and 3) replacing Remote Gate Valve 80.**

- **Mainline valve sealing performance for all critical valves is now known or "determinate" for the first time since construction. The performance of all mainline valves will be determined by the year 2000.**

- **Alyeska is behind their schedule for below ground investigations and the mainline valve maintenance review. They plan to accelerate their 1999 schedule to work on below valve investigations.**

The TAPS Mainline Valve Maintenance Program

What's the Purpose and Function of the Valves Along TAPS?

The Trans-Alaska Pipeline System includes a number of valves that can isolate sections of pipeline in the event of a leak. Properly operating valves are important elements in pipeline oil spill prevention and response. Mainline "block valves" are positioned at strategic locations along the main pipeline to block the flow of oil and isolate sections of the pipeline. A total of 177 mainline block valves are situated along TAPS to control and block the flow of oil when necessary. The mainline system includes 81 check valves and 96 gate valves, of which 86 are above ground and 91 are below ground. The remote gate valves require communication from the pipeline controllers in Valdez to close or open and can stop pipeline flow in both directions. Check valves operate one way and prevent the reverse flow of oil. They are designed to be held open, either mechanically or by flowing oil and to drop closed automatically when oil flow stops or is reversed.

The Importance of Valve Maintenance

Valves must be maintained to 1) minimize and limit potential spills, 2) provide overpressure protection, and 3) isolate sections of the pipeline. Alyeska developed a valve maintenance program consisting of testing and evaluating valves and making any necessary repairs or replacements. The primary objective of the mainline valve maintenance and testing programs is to assure the sealing capability of TAPS mainline valves, by testing and repairing all valves as necessary. Repair options consist of removing and replacing the entire valve, repairing or rebuilding the valve in place, or using sealing agents to re-establish the seal. Valve sealing standards are necessary because valves may lose their ability to seal over time. Minimum valve sealing performance standards are unique for each block valve depending on the valve's location along the pipeline.

The Valve Maintenance Program. Until 1996, the key objective of Alyeska's maintenance for remote gate valves was to keep the valves operating and functional. This means mainline valves would open and close on command when controlled either manually or from the Operations Control Center at the Valdez Marine Terminal. In 1996, Alyeska conducted a review of their mainline valve maintenance program. The review determined improvement was needed in valve preventive maintenance, inspection, operational testing, and personnel training. Several things needed to be done, including 1) a risk assessment, 2) integrity testing of the valves, and 3) development of an aggressive valve sealing plan. After the review, Alyeska modified their valve maintenance program to evaluate the condition of TAPS mainline valves. In 1998,

Alyeska developed an overall TAPS valve maintenance management plan. The intent of this maintenance program was to inspect and test valve operation, including sealing capabilities and operation of valve actuators, with the goal of ensuring reliable operation of valves.

Mainline Valve Testing Program. Alyeska began testing the performance of mainline valves in 1996. They confirmed Remote Gate Valve 60 would not seal completely when it closed. Information from performing winterization maintenance suggested the problem might not be limited to Remote Gate Valve 60. Corrective maintenance procedures were attempted, including sealants to the seat surface through internal passages designed for this purpose. This failed to mitigate the sealing problems. Four agencies entered into a memorandum of agreement with Alyeska, referred to as the *Valve MOA,* which established a valve testing program to determine the sealing performance of mainline valves and require as necessary interim oil spill contingency plans. Valve testing identified two valves, Remote Gate Valve 80, and Check Valve 122 that had a greater leak-through rate and lower performance than Remote Gate Valve 60. In 1998, Remote Gate Valve 80 was replaced and Check Valve 122 was repaired in place. Remote Gate Valve 60 is currently scheduled for 1999 repair. Although additional testing has identified valves with some leak through, the performance degradation is so slight they may not be candidates for repair and replacement.

Why Is It Important to "Winterize" Mainline Valves?

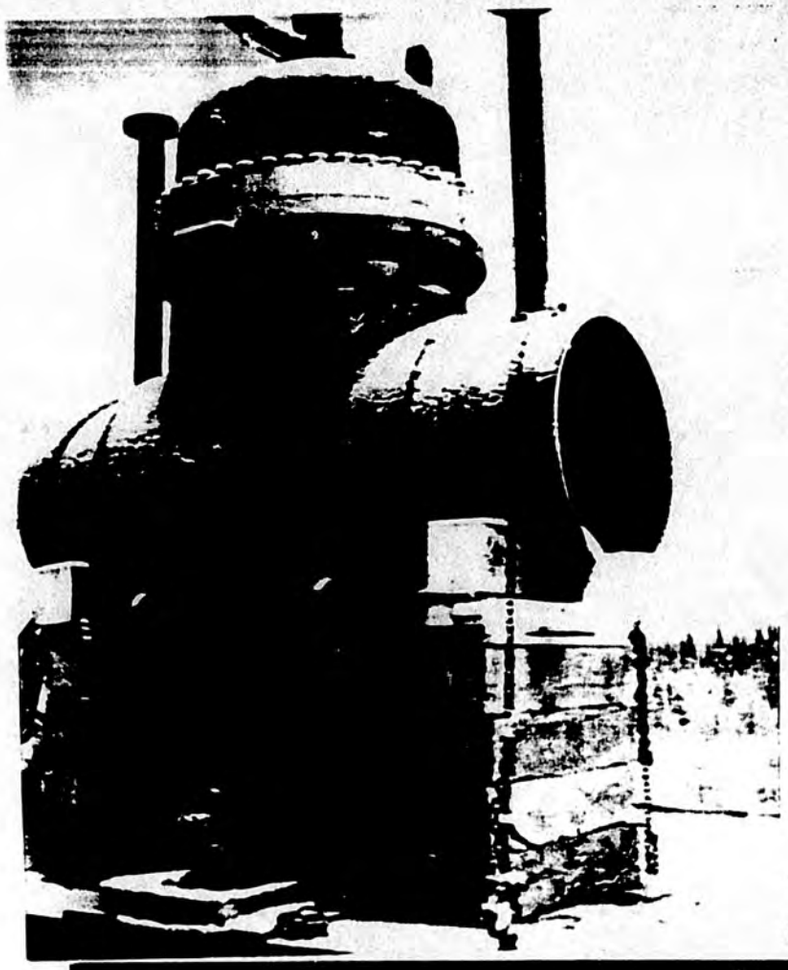
The purpose of winterization maintenance on remote gate valves is to inhibit internal corrosion. During this maintenance procedure, water is drained from the valve body and glycol, an antifreeze solution, is pumped in. When internal valve seals perform properly, the contents of the valve body can be drained without the loss of oil from the pipeline. If an internal seal does not perform properly, oil can flow directly into the valve body.

Annual Winterization Finds Valve Problems

During their annual winterization maintenance, Alyeska noted that many mainline gate valves had internal sealing problems. More than half of the remote gate valves showed pressure in the valve body during winterization and testing, which suggested possible internal seal leakage. Alyeska has been defining actual operating performance of all mainline valves.

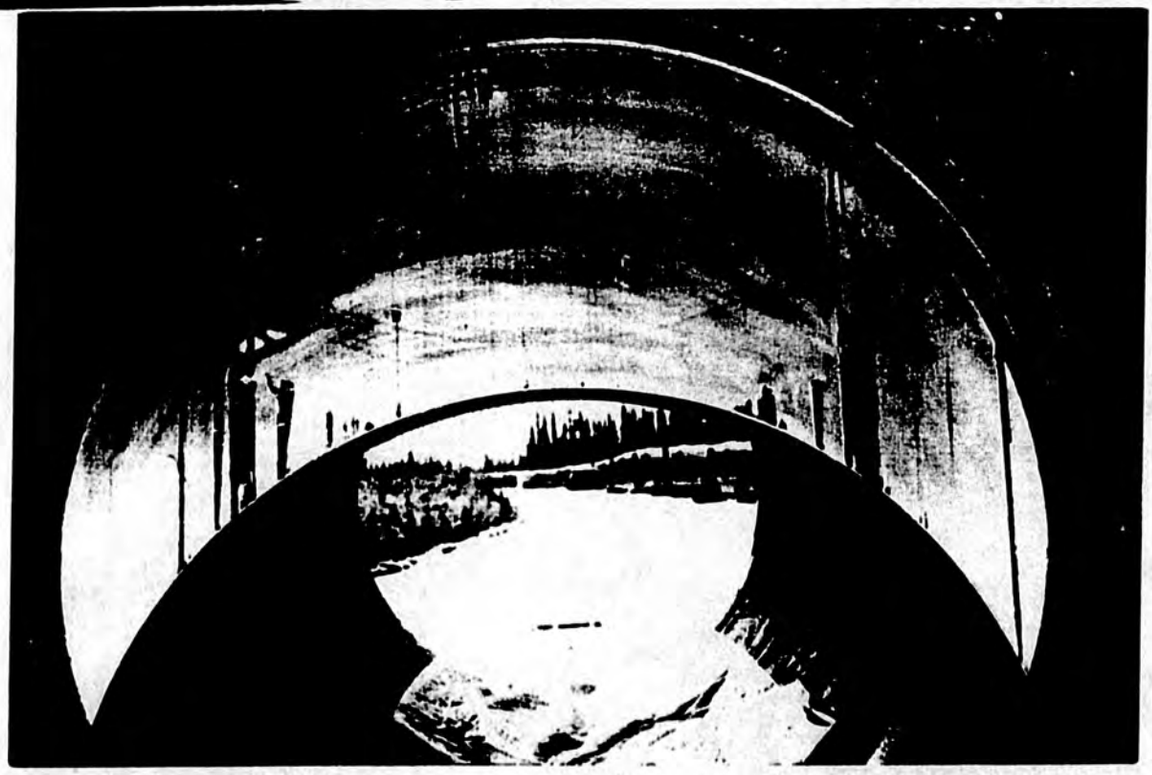
The valve maintenance program and the mainline valve testing program are subsets of the overall TAPS valve program. The development of the TAPS valve program which integrates elements of the TAPS quality program, maintenance program, configuration management, operations and documentation is a landmark effort for Alyeska. Within Alyeska, different disciplines with different perspectives provide tools and linkages between programs and disciplines to address hardware issues or operations issues in a more comprehensive manner. Alyeska is meeting their goals and commitments with the high priority, high visibility items related to valve maintenance, tests of mainline valve performance with respect to leak through, repairing Check Valve 122 and replacing Remote Gate Valve 80. The preparation and execution of the valve repairs achieved a very high standard.

Remote Gate Valve 80

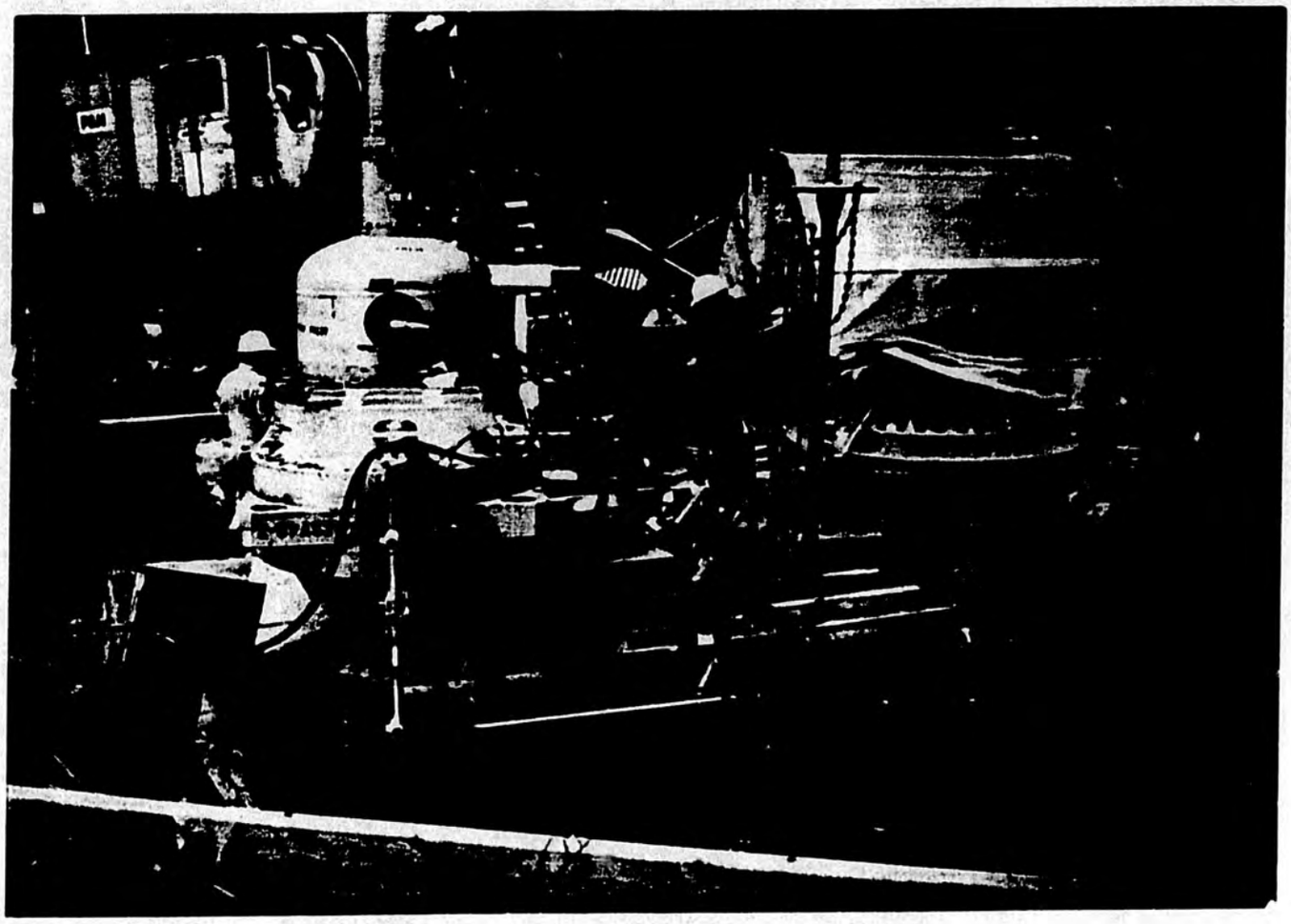


View of Remote Gate Valve that was removed from the mainline due to internal seat leakage. This is a 48-inch slab gate valve and weighs 67,000 lbs.

View of the downstream side of the gate, showing damaged areas.



Check Valve 122 Repair



View of Check Valve 122 repairs. Check Valve 122 is a normally buried valve and is blue in the above photo. The green machine above was used in isolating the check valve from the mainline.

Mainline Valve Maintenance and Repair Projects

In September 1998, TAPS was shut down for two extensive valve maintenance projects. One mainline valve was repaired and another was replaced. Alyeska estimated a down time of 30 to36 hours, but was able to restart the pipeline within 29 hours after valve work was completed. The planning, preparation and execution of the valve repair and replacement projects achieved a high standard.

Remote Gate Valve 80 **was removed from the mainline and replaced with a refurbished gate valve. After Alyeska removed the valve from the pipeline system, the internal parts of the valve were inspected and extensive seat and gate damage was observed. The damage was most severe on the downstream side of the gate and seat. Remote Gate Valve 80 was successfully replaced ahead of schedule.**

Check Valve 122 **had experienced internal leak through of oil. Damage to the valve parts was minimal, and it is believed that the debris and sludge found at the bottom of the check valve was the reason why it had not sealed properly. It was repaired in place by replacing the seat ring and clapper assembly.**

Remote Gate Valve 60 **will be removed from the mainline in 1999 and replaced with a refurbished gate valve.**

Alyeska has not met the goals for addressing other significant valve concerns, including the below ground valve investigations and the mainline valve maintenance review. This delay is partially due to the reassignment of key personnel in support of Check Valve 122 and Remote Gate Valve 80 projects. While these efforts are important for maintaining integrity of the system in the long term, slippages in these schedules do not result in immediate or significant threats to TAPS integrity or safety. The valve maintenance review will benefit from examination of the components of Remote Gate Valve 80 and Check Valve 122. Maintenance procedures will improve as more is understood about the mechanisms that cause valve deterioration. Full commitment of adequate resources will be needed for the future progress of the TAPS valve program.

TAPS Workpad Surveillance, Monitoring, and Maintenance

- **Alyeska's maintenance records only partially documented some workpad and above ground maintenance repairs. This hinders the trending of damage caused by flood, erosion and thawing. JPO considers this to be an instance of noncompliance with Grant and Lease Stipulation 1.18, *Surveillance and Maintenance*. Although Alyeska disagrees that this deficiency is an area of noncompliance, they are working to improve tracking of civil maintenance repairs.**

- **JPO found that instrumentation along the pipeline that monitor and collect data was not being maintained and repaired. Alyeska is currently working to replace malfunctioned monitoring instrumentation.**

- **Alyeska has not coordinated well with JPO's regulatory agencies during the planning, scheduling, and design of a number of maintenance projects along the TAPS right-of-way. This, coupled with Alyeska's lack of internal coordination, resulted in delays in the permitting and execution of some projects.**

What Is the Purpose of the Workpad?

The workpad is the portion of the TAPS right-of-way which encompasses 1) the gravel fill on which the pipeline is located, 2) the travel lane adjacent to the pipeline, and 3) additional fill required for construction. The workpad was constructed to provide a traffic surface for access and work platforms for the heavy equipment required to install the pipe. It serves as the primary means of access for doing work and inspections to both prevent and respond to any oil or chemical spills on or near the workpad, pipeline, and supporting facilities. The workpad width varies, depending on the pipeline mode, terrain, and soil conditions. Maintaining the workpad is important to provide access to the pipeline system.

JPO conducted surveillances and assessments in 1997 and 1998 to determine whether Alyeska's work pad surveillance, monitoring and maintenance programs complied with the Grant and Lease. JPO conducted surveillances at the pump stations, reviewed the work pad and above ground mainline conditions, reviewed the annual line walk data from 1997-1998, and reviewed right of way surveillance system records. Some of the records JPO reviewed in *Passport* lacked necessary detail of workpad maintenance work Alyeska had completed. JPO found problems with the record keeping of up-to-date workpad maintenance records and coordination of the project permitting process.

Up-To-Date Workpad Maintenance Records. Section 9 of the Grant and Lease requires Alyeska to maintain quality records of natural resource rehabilitation and tangible property repairs. Grant and Lease Stipulation 1.18 requires complete and up-to-date records on maintenance performed along the pipeline system. Some surveillances had documented actions taken but the results were inconsistent. Much of the work pad maintenance is done by Alyeska contractors using a blanket work order for each asset area. The maintenance coordinators for each asset area should provide descriptions of the task to be done under the blanket work order, but some maintenance coordinators did not provide the description. Without the description of each task completed under the blanket work order, it is difficult to track what work pad maintenance has been done, and even more difficult to put today's civil maintenance problems in context with historical performance.

Project Permitting Process. Coordination of projects and permitting is an area where Alyeska has typically excelled. During the past year, however, Alyeska did not coordinate the permitting process with JPO and regulatory agencies during planning, scheduling and design of some maintenance projects. In addition, some of Alyeska's internal teams were not involved in the project development process. JPO had requested Alyeska on several occasions to contact regulatory agencies about potential projects well ahead of proposed construction. Alyeska's lack of overall coordination resulted in delays issuing the permits.

Good coordination and advance planning for the project permitting process is beneficial for Alyeska, JPO, and the regulatory agencies. Projects must be planned and scheduled with JPO and regulatory agencies to ensure both protection of pipeline integrity and the environment. Alyeska did not consider protection of environmental values during the earliest stages of project feasibility and design for a planned project along the Dietrich River at Remote Gate Valve 34. JPO's concern is the protection of pipeline integrity and the environment. The lack of consideration of environmental values forced JPO to weigh issues of pipeline integrity against avoidable environmental damage. This resulted in fewer measures to mitigate adverse

environmental impacts in Alyeska project plans and specifications. To ensure pipeline integrity, JPO granted Alyeska approval to use temporary erosion control measures at Remote Gate Valve 34 on the Dietrich River.

The Importance of Advance Planning for Project Permitting

Workpad erosion is occurring along the Dietrich River, next to Remote Gate Valve 34 at pipeline milepost 185. The erosive forces of the river are undercutting the bank and threatening the workpad surrounding the Remote Gate Valve 34 control facility. JPO granted approval for Alyeska to use temporary erosion control measures. Alyeska plans to divert the main channel of the Dietrich River to install a riprap revetment to prevent further erosion. JPO requested Alyeska to complete the repairs in the fall of 1998. However, Alyeska did not apply for the necessary permits until late February 1999. The permits were originally delayed for several months due to fishery issues, which have been addressed. Alyeska will build the planned revetment before the Dietrich River thaws, which is the time of concern for further erosion.

Why Is the Timing of Maintenance Projects Along Streams So Important?

The Alaska Department of Fish and Game is concerned about the effect of winter construction in streams that support over-wintering of fish populations. Winter is a critical and sensitive time for survival of fish populations in arctic streams. To survive the extreme cold, fish metabolism slows to a state of dormancy, where oxygen decreases to lower levels. Minimal disturbance to this winter fish habitat at this time is critical to survival of fish in northern areas. The part of the river where Alyeska plans to work was determined to be a critical over-wintering fish habitat by the Alaska Department of Fish and Game.

Controlling and Preventing Soil Erosion

Soil erosion is a naturally occurring geologic process, which Alyeska may not always control or prevent, but requires appropriate action to protect the pipeline system. The erosion that occurred along the banks of the Dietrich River, allowed the river to come within 10 feet of Remote Gate Valve 34. Once discovered, this situation required Alyeska to immediately respond to protect the river bank from further erosion, and protect the gate valve facility. The Grant and Lease require that Alyeska conduct surveillance and monitoring to avoid, control, or minimize erosion along the pipeline corridor, especially near water bodies where erosion potential is the highest.

JPO Surveillance of Erosion for Grant and Lease Compliance

In 1998, JPO conducted surveillance and engineering reviews of erosion and its resulting effects in the areas near Pump Stations 1 and 3. The areas included 1) the route of the fuel gas line from Pump Station 1 to Pump Station 4, 2) a washout of a culvert on Coldfoot Hill, and 3) effects of river and floodplain erosion on the Dietrich River, Chena River, Sag River, Marion Creek, Hess Creek, Jarvis Creek, Darling Creek, Miller Creek, Tazlina River, Tsina River, Glacier Creek, and Abercrombie Creek. Before making repairs in these natural areas, Alyeska must obtain land use and environmental permits.

Alyeska uses management control guidelines for the repair of erosion: 1) *Monitoring Procedures* (MP-166), *Surveillance and Monitoring Manual* (MS-31), the design basis, and the 49 Code of Federal Regulations. These guidelines are used for inspection of rights-of-way and crossings under navigable waters. A test of Alyeska's compliance in addressing erosion problems will be their success in planning, permitting, funding and implementing necessary repairs in response to the natural occurrence of erosion. Future monitoring will ensure erosion problems are fixed as they occur. Monitoring Alyeska's response to the specific erosion problems identified in 1998 will be a part in JPO's work planning for 1999 and 2000.

Erosion

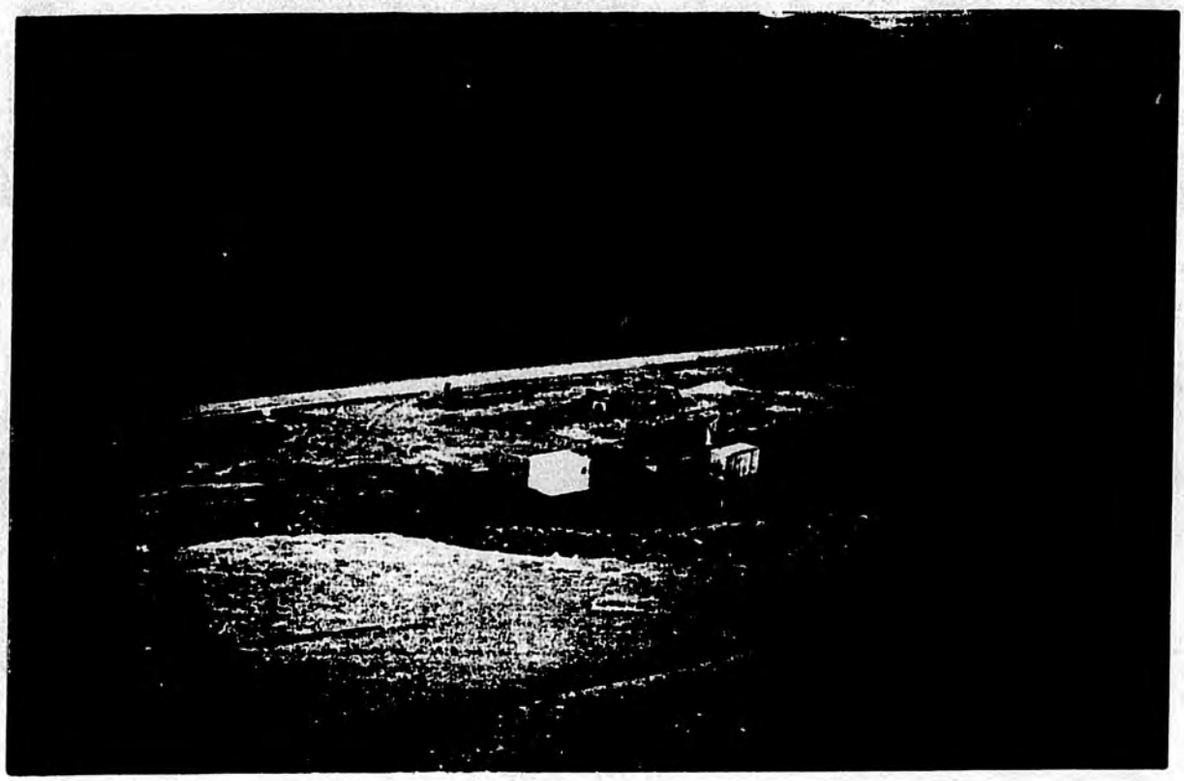


View of Erosion at pipeline milepost 229.

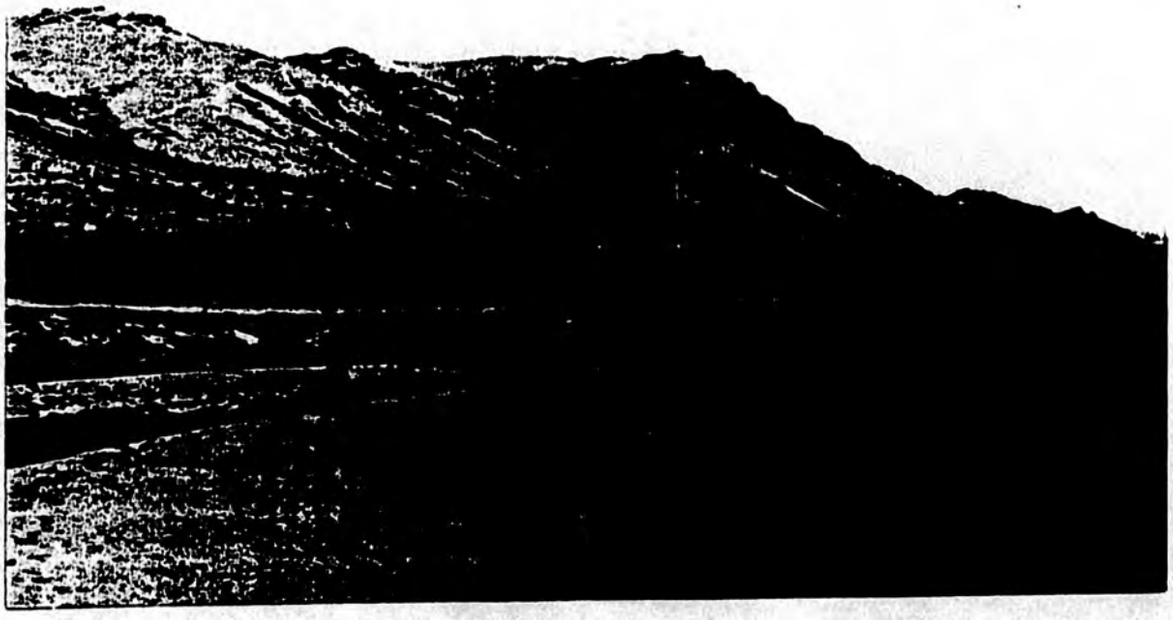


Erosion here was caused when a drain culvert on the Dalton Highway became blocked during heavy rains.

Remote Gate Valve 34 Erosion



Remote Gate Valve 34 erosion. The top view is from the air, the bottom view is a winter view. The erosion discussed is in the left of the photos.



Maintenance Manual Revisions. JPO's workpad assessment noted Alyeska revised the critical manuals that affect surveillance, monitoring and maintenance: *Surveillance and Monitoring Manual* (MS-31), *Monitoring Program Procedures* (MP-166), and *Maintenance System Manual* (MP-167). Alyeska committed to use their *Passport* system to record maintenance work activities, and conduct action tracking. JPO's concern has been Alyeska's inability to historically track completed work for TAPS maintenance programs. Alyeska's use of *Passport* to document maintenance work should satisfy JPO's concern in this area.

Changes to the MP-166 and MP-167 Manuals will also rely on the *Passport* system to provide a single, integrated information management system that includes work materials, documentation, and engineering change management to achieve maintenance objectives.

Since major workpad repairs are documented by project records, are small repairs covered?
Maintenance work done under blanket work orders was not adequately documented in *Passport*. Trends on cumulative maintenance work can predict problems or indicate complications.

Why hasn't this been a practical problem before?
Because this knowledge was possessed and trended by key right-of-way maintenance managers formally called "pipeline and civil maintenance (P&CM) managers now called maintenance coordinators. JPO's concern is that as individuals leave, the institutional memory of maintenance work will be lost due to lack of documentation.

JPO believes some improvement is needed in Alyeska's maintenance of the instruments along the pipeline that monitor and collect data. Instrumented data is essential as it provides analysts with critical information to identify problems before they become serious or unmanageable. It is important to maintain this instrumentation in good working order. Specific instruments include the piezometers on the back slopes of the Valdez Marine Terminal, monitoring rods at mainline refrigeration units, inclinometers on steep slopes, thermistor strings to measure ground temperature, and other measuring instruments. JPO concluded that Alyeska's lack of complete and up-to-date documentation of maintenance work and not keeping field instrumentation in working order constitutes a noncompliance with Stipulation 1.18. (See chapter 3, Grant and Lease Compliance).

Slope Stability

- **Instrumented and monitored pipeline slopes at Treasure Creek and Klutina Hill meet design basis criteria.**

- **The Pump Station 11 slope is not in compliance with design basis requirements and Stipulation 3.5, *Slope Stability* of the Grant and Lease. The *dynamic* factor of safety, or earthquake contingency for this slope is less than 1.0. JPO is currently reviewing the Pump Station 11 risk assessment. Alyeska agreed to submit a request for a design basis change for the *static* factor of safety on the Pump Station 11 slope.**

- **The slopes at Squirrel Creek are not in compliance with design basis requirements and Stipulation 3.5, *Slope Stability* of the Grant and Lease. Instrumented thermistor data shows the Squirrel Creek slopes are thawed, resulting in a degradation of permafrost and a noncompliance with Stipulation, 3.9, *Construction and Operation*. The degree of integrity of the Squirrel Creek slopes under design contingency earthquake conditions is in question and under review by JPO and Alyeska. If these slopes cannot be demonstrated as being safe, civil improvements must be**

completed. The slope stability issues are being aggressively worked by both Alyeska and JPO. Alyeska has scheduled a risk assessment later this year to evaluate the Squirrel Creek slopes.

The Importance of Design Basis and Factors of Safety for Slope Stability

What is the Design Basis?
The design basis is a compilation of current engineering criteria for facilities within the Trans-Alaska Pipeline System (TAPS). These criteria determine the engineering standards for the facilities that comprise TAPS. Design basis standards represent quantitative and qualitative values for facilities and have been agreed upon by the TAPS owners, Alyeska Pipeline Service Company, and the Joint Pipeline Office. The design basis serves as a collection of technical standards and requirements for the purpose of construction, operation and maintenance of the pipeline system.

How is the Design Basis used for slope stability?
The pipeline traverses many slopes along its route. Some of these slopes are steep, and some have ice-rich soils or other soil conditions that make them susceptible to down slope movement. The TAPS design basis considers all slopes greater than 10% significant slopes. These slopes must be designed to withstand a "design contingency earthquake," which is a rare earthquake of extreme magnitude which may occur at intervals of several hundred years. For *static* conditions, the calculated factor of safety for the slope must be at least 1.5. For *dynamic* conditions, the slope must be capable of resisting dynamic stresses with a factor of safety no less than 1.0, or total slope movements no greater than 5 inches.

Are the slopes safe?
At the present time JPO questions the degree of integrity of the Squirrel Creek and Pump Station 11 slopes. The Squirrel Creek risk assessment will address this issue.

Is Alyeska working this issue aggressively?
The slope stability issues are being aggressively worked by both Alyeska and JPO. Nothing in this report should suggest lack of responsiveness by Alyeska. Rather, this report presents a "mid-course" status report of an activeiy, evolving technical evaluation.

Monitoring Slope Stability. At the time of TAPS construction. any slopes greater than 10% that the pipeline traversed, were studied for the potential occurrence of mass movement. Of the slopes studied, Alyeska identified 49 slopes that would need continuous future monitoring. Four of the 49 monitored slopes posed enough of a concern for Alyeska and JPO to warrant instrumented monitoring. Alyeska maintains detailed historical records of their monitoring of these slopes. JPO evaluated the safety and integrity of the above ground pipeline for slopes at: 1) Treasure Creek, 2) Pump Station 11, 3) Klutina, and 4) Squirrel Creek. The question JPO addressed was whether the pipeline is safe on these slopes, under both *static* and *dynamic* factors of safety. For *static* conditions, the calculated factor of safety for the slope must be at least 1.5. For *dynamic* conditions, the slope must be capable of resisting dynamic stresses with a factor of safety no less than 1.0, or total slope movements no greater than 5 inches.

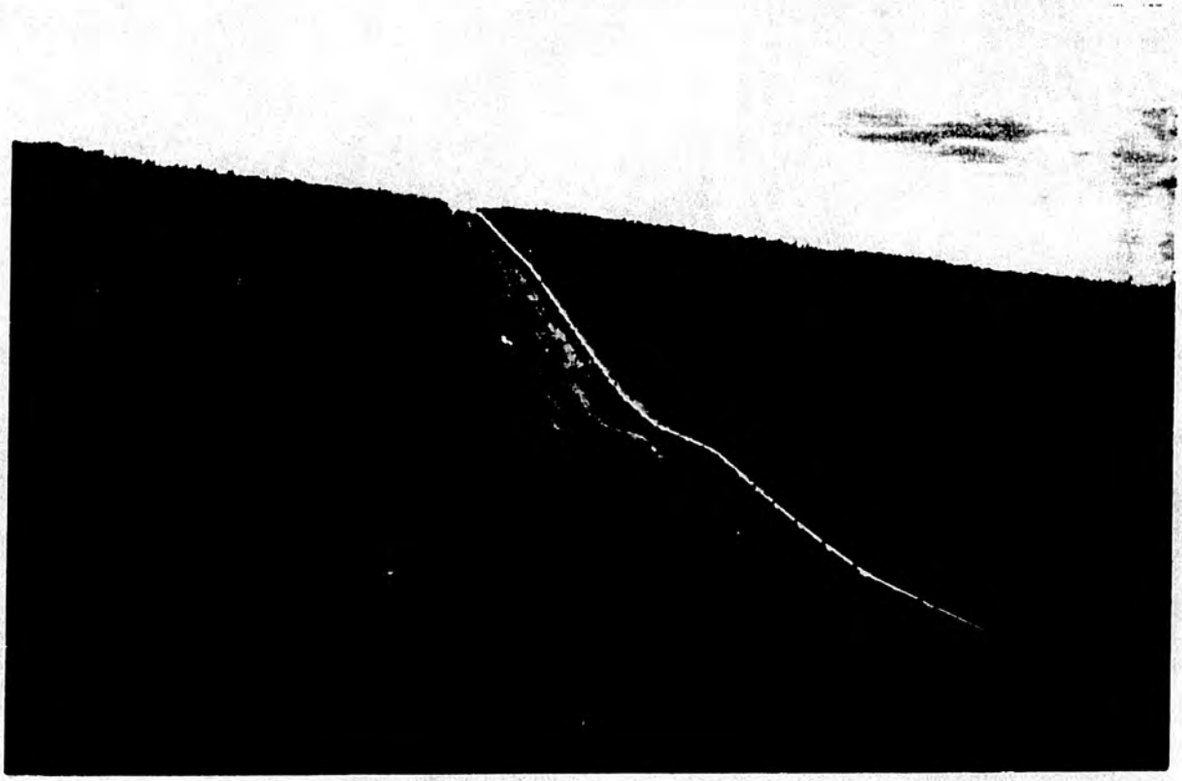
JPO's review of actual ground conditions based on surveillance, literature reviews, a risk assessment of the Pump Station 11 slope, and a recent report on slope stability by Alyeska shows that slope stability depends on the soil remaining in a frozen state. Golder Associates Inc., Alyeska's contractor, determined the Treasure Creek and Klutina slopes remained frozen, but the Pump Station 11 and Squirrel Creek slopes have partially thawed since TAPS construction. JPO concluded the above ground pipe on the Treasure Creek and Klutina slopes is safe. Factors

of safety for Treasure Creek and Klutina slope continue to meet design basis requirements because these slopes remain frozen and stabilized. However, Alyeska reports show the factors of safety for the Pump Station 11 and Squirrel Creek slopes do not meet design basis requirements.

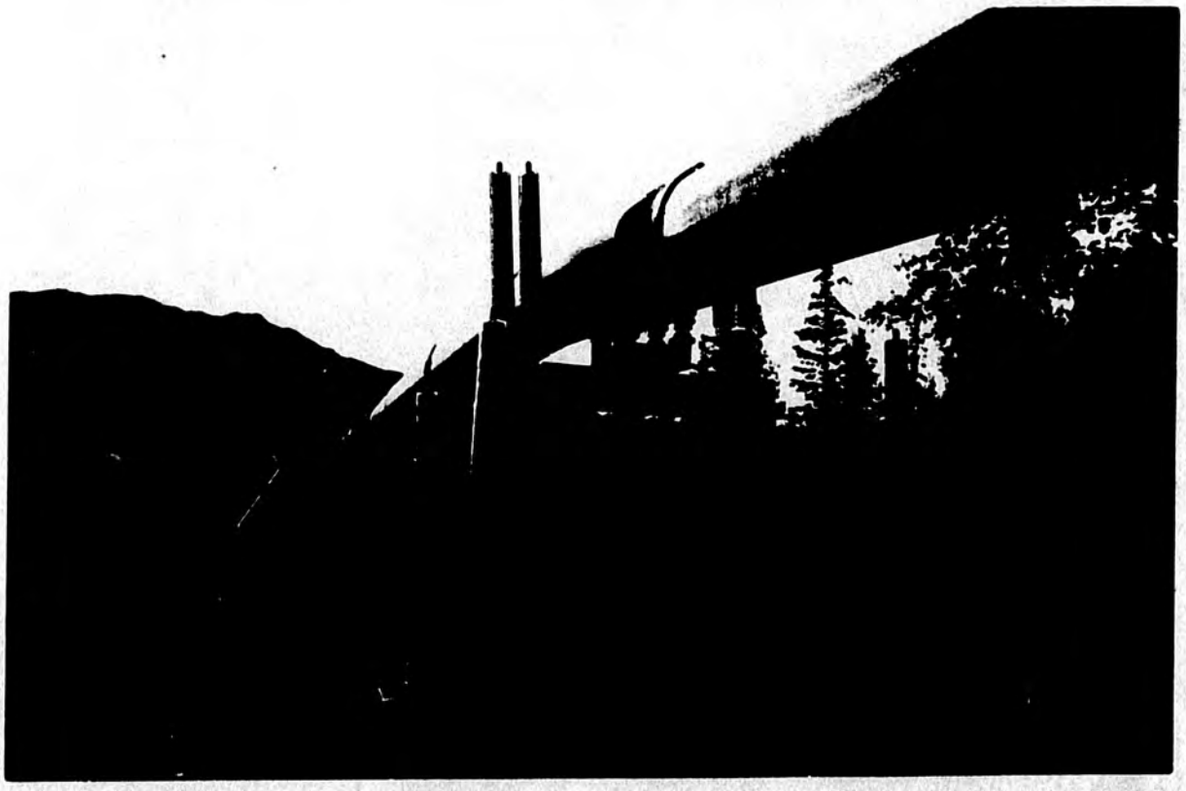
Squirrel Creek Slope Stability. JPO's field surveillance of two Squirrel Creek slopes along with the cumulative evidence in the Golder Associates report, suggest that slope movement is occurring and will continue to occur in this area. Alyeska's most recent report on slope stability shows the calculated dynamic movement for Squirrel Creek's south slope is seven inches. This exceeds the design basis requirement of five inches, and therefore does not meet design basis requirements for the dynamic factor of safety. The *static* factor of safety is marginal, and the *dynamic* factor of safety does not meet design basis requirements, since the Squirrel Creek slopes have thawed from the time of TAPS construction. This represents a changed geotechnical environment from the original design basis.

The factors of safety for the Squirrel Creek slope are less than the design basis requirements, and therefore do not comply with Stipulation 3.5 of the *Federal Agreement and Grant and State Right-of-Way Lease* (discussed in chapter 3). JPO requested Alyeska to conduct a risk assessment for the Squirrel Creek slopes to clarify additional mitigation possibilities. Alyeska recently agreed to do a risk assessment later this year, preceded by a meeting with JPO to visit the slopes.

Slopes



View of Klutina Slope at pipeline mile post 698.

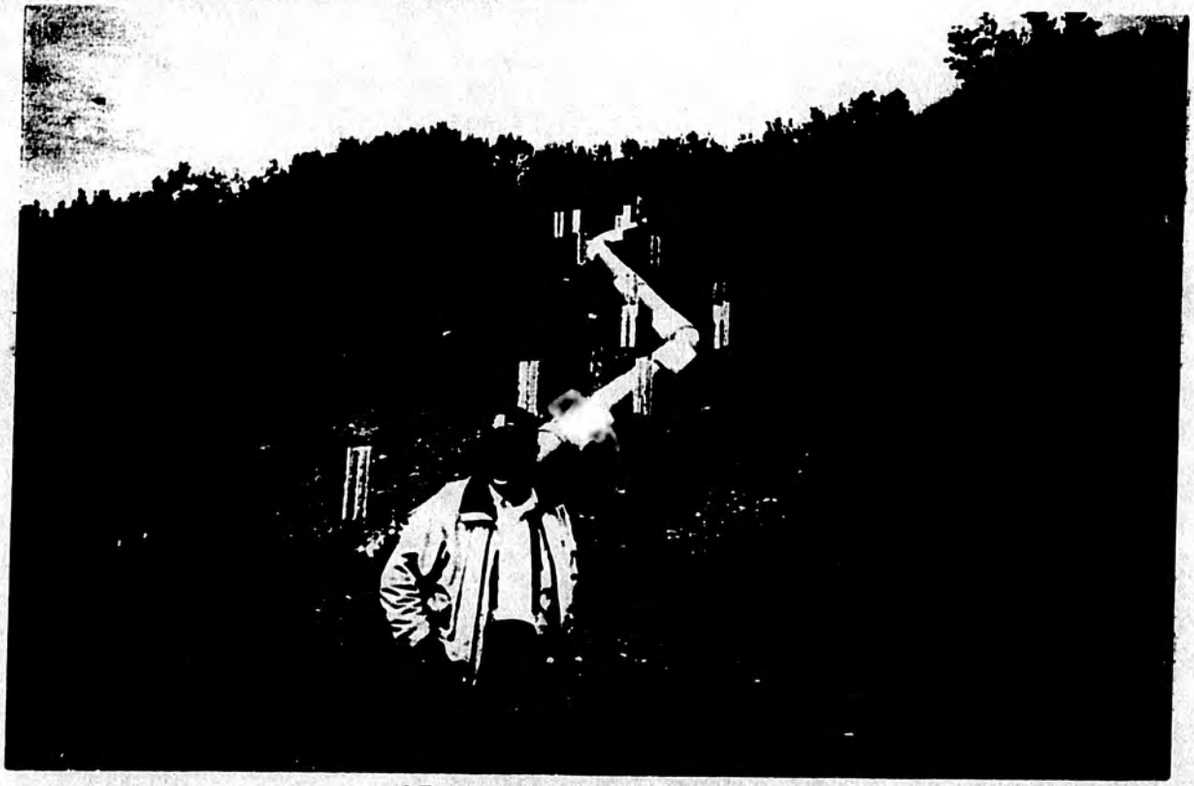


View of Squirrel Creek Slopes at pipeline mile post 717. The slopes of concern are on both sides of Squirrel Creek.

Slopes



View of Treasure Creek Slope at pipeline mile post 442.



View of Pump Station 11 Slope at pipeline mile post 686.

The Importance of Slope Stability for TAPS

What Causes Slope Failure?
Slope failure is normally caused by a combination of factors, including slope angle, amount of soil moisture, and gravity. Although some slope failure is attributed to the amount of moisture the soil is able to hold before giving way, slope failures do occur with dry soil conditions on excessively steep slopes. In Alaska, an additional factor is permafrost which normally stabilizes frozen soils on steep slopes. When permafrost thaws on steep slopes, the soil becomes moisture-laden, less stable, and gravity moves it down slope. Another factor is seismic activity or a design contingency earthquake, which can induce slope failure in some areas under certain conditions.

Squirrel Creek and Pump Station 11 Slopes: Factors of Safety
Slope stability is an issue on the Squirrel Creek slopes because the calculated factors of safety are not in compliance with the design basis requirements of 1.5 for the static, and 1.0 for the dynamic factors of safety. The factor of safety is a measurement of the degree of safety on a slope. A safety factor of 1.0 means the natural forces pushing down slope equals the resisting forces. The Pump Station 11 slope *static* factor of safety is 1.3 and the *dynamic* factor of safety is less than 1.0, neither of which meets the design basis standard.

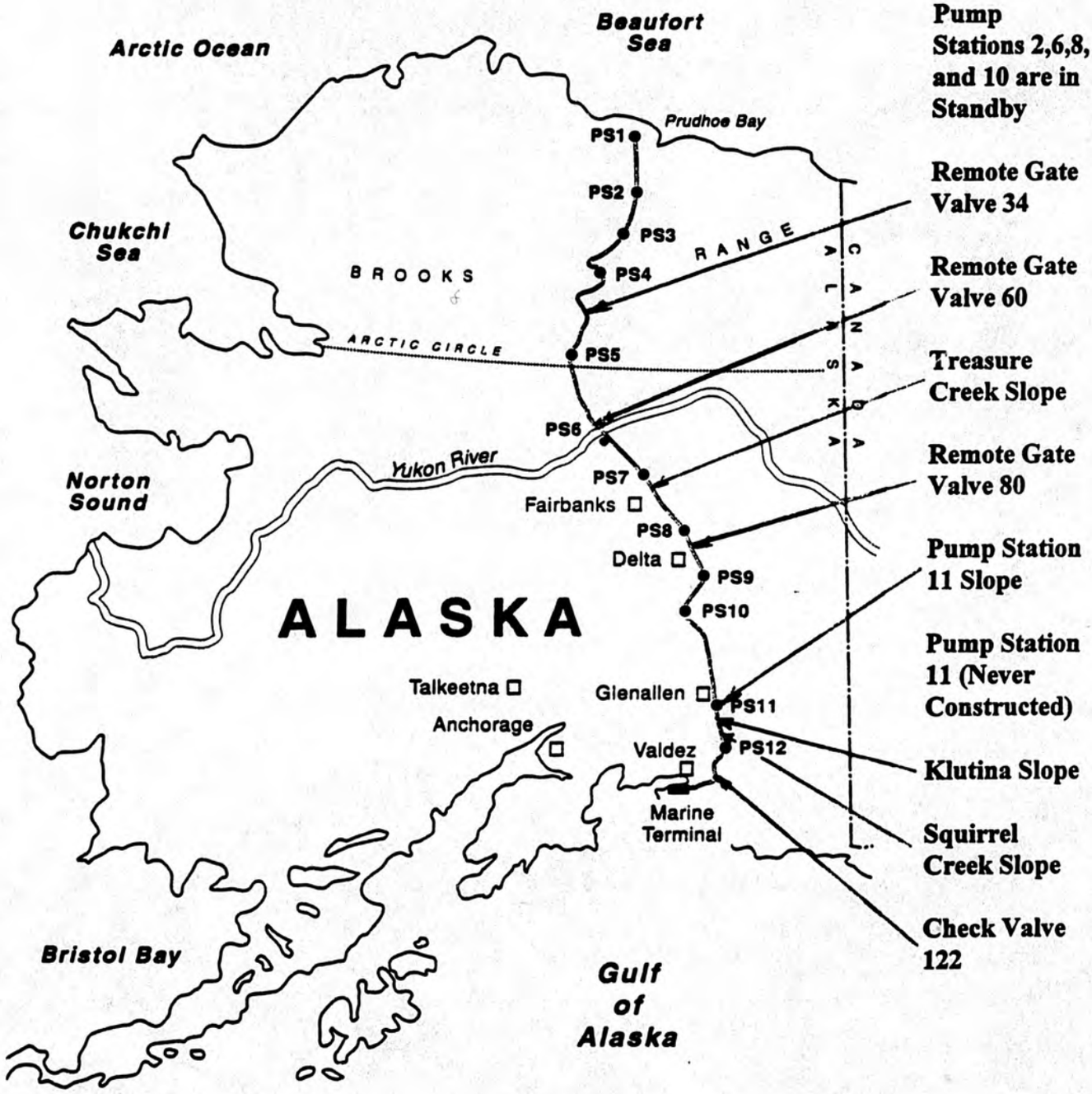
How Did JPO Approach the Slope Stability and Design Basis Issues?
The approach to evaluating the integrity of the Treasure Creek, Pump Station 11, Klutina, and the Squirrel Creek slopes was similar to how JPO studies other issues:

1) Determine whether the slopes and above ground pipe are safe.
2) Conduct detailed surveillance and assessment work to identify significant findings to be resolved.
3) Resolve findings using the risk assessment process.
4) Require the system to comply with the design basis or adjudicate engineering supported waivers or modifications.
5) Verify that corrective and preventive actions have been completed.

Pump Station 11 Slope Stability. Alyeska performed a risk assessment for the slope at Pump Station 11. The objective of the risk assessment was to determine whether the slope immediately north of Pump Station 11 posed an unacceptable level of risk for the continued safe operation of the pipeline. The items that were considered during the risk assessment were 1) potential hazards that could cause the slope to fail, 2) probable results of those failures, and 3) possible options that could prevent the failures or mitigate the consequences. The risk assessment presented an analysis of three scenarios of slow slope creep, a minor slope failure affecting less than 180 feet of pipe, and a major slope failure affecting more than 180 feet of pipe. In all scenarios, Alyeska's study team concluded that the possibility of a spill or leak of crude oil was very remote. JPO is currently reviewing the final risk assessment received from Alyeska in March 1999.

What does "very remote" really mean?
Very remote means the occurrence of some event is possible but not very probable. For example, the occurrence of earthquakes are often viewed as possible events with varying degrees of probability of occurrence depending on magnitude, location and other factors. The design basis for the TAPS pipeline system contains considerable information regarding the potential and likelihood of occurrence of various magnitude earthquakes. TAPS was designed for the occurrence of large design contingency earthquakes.

Geographic Location of the Trans Alaska Pipeline in Alaska



Locations of Slopes and Valves on the Trans Alaska Pipeline.

Alyeska also concluded that continued monitoring and maintenance was necessary. Further, any maintenance or project work conducted on the Pump Station 11 slope would need a prior engineering evaluation. JPO suggested that Alyeska conduct a study of how to improve drainage on this slope. JPO also recommended that Alyeska request a waiver from the design basis to account for the discrepancy of the static safety factor of 1.3 for the Pump Station 11 slope that doesn't meet the specified value of 1.5. Alyeska recently agreed to prepare and request a waiver and plans to enter it into the design basis for future reference, once it is granted. Alyeska committed to completing the update of the design basis by June 30, 1999.

Continued Monitoring and Maintenance. JPO accepted Alyeska's commitment to implement their 1998-1999 slope stability work plan. Alyeska agreed with JPO that monitoring and continued maintenance of the above ground pipe on all the slopes at the Pump Station 11, Squirrel Creek, Klutina, and Treasure Creek locations is necessary to ensure the safety and integrity of the pipeline.

TAPS Mineral Material Sites

- **The material sites Alyeska uses are clean and well maintained. Erosion was not evident at any of the sites. However, not all the material sites met regulatory requirements. Two sites had excessive vegetation damage, and six sites had slopes that exceeded requirements for steepness. JPO requested Alyeska to submit plans for restoring these sites and corrections will be verified in 1999.**

What are Material Sites and What Are They Used For?

Alyeska has mining contracts to use sites along the pipeline right-of-way to obtain granular material for maintenance and construction. The U.S. Bureau of Land Management and the Alaska Department of Natural Resources require Alyeska to follow a *Mining and Reclamation Plan,* that is attached to every material sale mining contract. Additionally, Alyeska must follow the terms of any accessory permits that may be required, depending on the particular site. The removal of gravel and related construction materials from non-permitted locations is not allowed. The sites must be mined and maintained according to agency regulation. Alyeska uses the materials for:

- New construction
- Repairing the pipeline work pad to fill cracks, depressions, and washouts.
- Bedding and road surface materials for building and maintaining access roads.
- Flood damage control and revetment projects for rivers and streams along the pipeline.

State and Federal inspections are required annually for all active material sites along the TAPS corridor. Both the U.S. Bureau of Land Management and Alaska Department of Natural Resources administer material site programs for lands under their jurisdiction, including sites along TAPS. Alyeska uses 76 material sites on public lands along TAPS for materials mining, and of those, 43 are located on Federal land and 33 are under State jurisdiction.

In July and August 1998, JPO inspected the material sites along TAPS to determine whether Alyeska complied with the Grant and Lease. Stipulation 2.6 of the Grant and Lease specifies that 1) the permittee must apply to purchase gravel and other construction materials taken from public lands, 2) submit a mining plan for removal, and 3) obtain written approval of the Federal

Authorized Officer or the State Pipeline Coordinator at JPO for removal of all materials. Material site boundaries are required to blend with surrounding natural land patterns, and soil erosion and vegetation damage must be prevented.

JPO inspected 72 of the 76 active sites Alyeska uses to mine material. Four of the sites were not inspected due to time and access constraints. JPO assessed whether Alyeska followed the provisions of the material sale contracts and the mining and reclamation plans for each site. The assessment included surveillances from Prudhoe Bay to the Valdez Marine Terminal. JPO inspected each material site and looked at the associated records at the pump stations and concluded the material sites Alyeska uses are clean and well maintained. Erosion was not evident at any of the sites. However, not all the material sites met material sale requirements. Two sites had excessive vegetation damage, and six sites had slopes steeper than allowed by the mining and reclamation plans.

Steep Slopes. JPO found six sites near Pump Stations 5 and 9 where Alyeska may have violated their mining and reclamation plans. All sites had side slopes steeper than the maximum measurement listed in the requirements of the mining plans. JPO recommended that Alyeska bring the slopes of the six sites into compliance with the current mining and reclamation plans. The noncompliance with the mining plans constitutes a noncompliance with the material sale contracts.

Excessive Vegetation Damage. Two sites near Pump Station 5 had excessive vegetation damage where the clearing area boundaries may have expanded to exceed the working limits, causing unnecessary damage t vegetation. This is a noncompliance with Stipulation 2.6.2.1 of the Grant and Lease. Both sites have clearing areas that may be excessive for the amount of material that can be mined under the current material sales contracts. These areas appear to extend beyond the working limits of Alyeska's current mining plan, which doesn't meet their mining plan requirements.

Up-to-Date Records. JPO found deficiencies with material sites paperwork maintained at the pump stations. Twenty-three current material sale contracts and five current mining and reclamation plans were missing from the operations material site files. The material sale contracts do not require that a current copy of the contracts or mining and reclamation plans be retained at the pump stations. However, these documents provide invaluable information to the maintenance coordinators when writing pipeline work permits for material extraction, and efforts in meeting the terms of the contracts and mining plans. These deficiencies were remedied soon after the JPO surveillance.

JPO concluded the overall quality of the sites had not significantly changed since the 1997 inspection. Except for the findings noted in the field inspections, JPO found the sites met the requirements for well maintained, high quality mineral material sites. JPO determined Alyeska complied with all Grant and Lease requirements, except for the sites with vegetation damage and steep slopes. Alyeska provided JPO, 1) the results of their field work after they assessed the vegetation damage for the 2 affected sites, 2) an explanation of the reasons for the excessively cleared areas, and 3) plans for resolving both the material sites vegetation damage and the steep slopes to bring them back into compliance. JPO is reviewing the information.

Chapter 3. Grant and State Lease Compliance

- **Five of the ten stipulations evaluated contained some aspects of noncompliance with the Grant and Lease. The five stipulations containing aspects of noncompliance include 1) Surveillance and Maintenance, 2) Conduct of Operations, 3) Material Sites, 4) Slope Stability, and 5) Construction and Operation. The areas of noncompliance relate to maintaining up-to-date records for both system modifications and civil maintenance and inconsistency between existing conditions and design requirements.**

- **All areas of noncompliance except the material sites represent recurring deficiencies similar to those found in the 1993 audits of TAPS. Alyeska and JPO have met on the underlying issues and Alyeska has efforts underway to address each. JPO will monitor progress and verify all completed corrections.**

- **The first two areas of noncompliance overlap substantially with those reported in JPO's *CMP Operations Report.* Improved change management as well as timely updating of documents and records will improve performance in both TAPS operations and TAPS maintenance.**

Approach To Compliance

JPO's view is that issues of noncompliance remain until corrected, but it is fair to say that none of the issues have required the Authorized Officer or State Pipeline Coordinator to issue a formal order to engage corrective action. All are believed to be correctable in the short term, with the exception of the management of change as it relates to pipeline system maintenance.

What is New? Reporting noncompliance with some stipulations of the Grant and Lease in the CMP reports.

What is Not New? Aspects of noncompliance. Before the CMP report process, JPO identified concerns and deficiencies, which Alyeska corrected. Past JPO monitoring reports and letters seldom related issues with specific stipulations. JPO pursues issues under the Grant and Lease proactively with Alyeska to maintain compliance, and uses the strategic approach of "compliance partnership." This involves frequent communication, proactive problem resolution and a no surprises approach to achieve oversight objectives. JPO's objectives include:

- Continued safe movement of oil through TAPS,
- Compliance with the *Federal Agreement and Grant and State Right-of-Way Lease.*
- Adequate spill and response capability,
- Reduction of TAPS risk by requiring knowledge of hardware condition, effective management controls, protection of the environment, and worker safety.

The Grant and Lease stipulations are divided into three categories, General, Environmental and Technical. Most stipulations of the Grant and Lease contain separate elements, or sub-stipulations. Each sub-stipulation is sometimes broken down into even more separate elements. When JPO identifies noncompliance with one or more elements of a stipulation, it doesn't necessarily mean there is noncompliance with the entire stipulation. This report discusses aspects of the stipulations related to pipeline system maintenance that JPO evaluated in 1997 and 1998. Where instances of noncompliance were reported, this report does not imply that all other aspects of the stipulation are compliant. Instances of noncompliance do not have to be widespread or of long standing significance to be noted.

Construction Plans and Quality Assurance Program

Note: To minimize redundancy, all of the issues and findings discussed in Chapter 2 are not repeated here. This chapter reports the status of stipulation compliance. A complete evaluation of all aspects of stipulation compliance is beyond the scope of this report.

Section 9C, of the *Federal Agreement and Grant of Right-of-Way,* and Section 16C of the *State Right-of-Way Lease* requires Alyeska to maintain quality determination records of natural resource rehabilitation and tangible property repairs. Alyeska's work pad maintenance records lack the necessary information to document the completion and location of repairs, which JPO considers to be an instance of noncompliance with the Grant and Lease. As a result, Alyeska revised three of their maintenance manuals, the *System Integrity Monitoring Manual* (MP-166), the *Maintenance System Manual* (MP-167), and the *Surveillance Manual* (MS-31). JPO will verify whether 1) the manuals are consistent with one another, since they were not before the revisions, 2) whether Alyeska is in compliance with their *Surveillance Manual*, and 3) whether missing maintenance information was added to Alyeska's electronic tracking system, *Passport*.

General Stipulations

1.18 *Surveillance and Maintenance*

Stipulation 1.18.1. This first stipulation requires the permittee to conduct a surveillance and maintenance program applicable to the subarctic and arctic environment. It should be designed to (1) provide for public health and safety, (2) prevent damage to natural resources, (3) prevent erosion, and (4) maintain pipeline integrity.

The maintenance of Alyeska's electrical work and fire alarm and suppression systems falls under this stipulation. Since the National Electric Code violations were corrected and the fire systems were properly maintained (with only one exception), JPO concluded Alyeska is in compliance with the part of Stipulation 1.18.1, that relates to electrical work, as discussed in chapter 2.

This stipulation does not specify or qualify the amount of civil surveillance and field monitoring instrumentation for the work pad areas between the pump stations and the Valdez Marine Terminal. As discussed earlier in chapter 2, JPO concludes Alyeska does not fully comply with these aspects of Stipulation 1.18.1. Alyeska disagrees they are in noncompliance, but is working to tighten their procedures and improve their trending. There is general agreement between JPO and Alyeska about what should be done, so JPO is currently less concerned with the actual point of noncompliance, and more concerned with corrective action. The ultimate test of compliance with Stipulation. 1.18 will be Alyeska's follow through by pump station and Valdez Marine Terminal personnel in adequately documenting maintenance, monitoring, and surveillance information in the upgraded version of *Passport*. Civil maintenance and surveillance will remain an area of JPO vigilance.

Stipulation 1.18.3. This stipulation requires maintenance of complete and up-to-date records on pipeline system maintenance activities and specifically references modification of records. (Stipulation 1.18.3 was also noted in the previously released *CMP Operations* report as an area of noncompliance). JPO surveillances and Alyeska's quality assurance activities showed that modification records, including as-built drawings, were not updated within required time frames. In addition, the work packages JPO reviewed were incomplete. JPO determined that the record keeping of civil maintenance tasks in Alyeska's *Passport* system was inadequate. This constitutes a noncompliance with Stipulation 1.18.3. JPO informed Alyeska of this noncompliance and will track Alyeska's progress to bring this stipulation into compliance.

Stipulations 1.18.2 and 1.18.4. JPO plans to evaluate the second and fourth aspects, Stipulations 1.18.2 and 1.18.4, in future reports. Stipulation 1.18.2 requires a communication system that ensures the transmission of information necessary for the safe operation of the pipeline. The fiber optics project, discussed in JPO's *CMP Operations* report, should improve the pipeline communications system once the project is completed and fully operating. Stipulation 1.18.4 involves access roads and airstrips, which JPO did not evaluate this year. However, JPO has no indication of a noncompliance with this fourth aspect of the stipulation.

1.21 *Conduct of Operations*

Stipulation 1.21.1 requires the permittee to perform all TAPS operations in a safe and workmanlike manner to ensure the safety and integrity of TAPS, and always employ and maintain personnel and equipment sufficient for that purpose. The issues with this stipulation stem from inattention to procedural requirements and poor change management, rather than direct threats to system integrity or safety. The change management issues previously discussed in the *CMP Operations Report* are inconsistent with operating the system in a safe and workmanlike manner. The turnover of projects without preventive maintenance procedures is another manifestation of this problem. The recent changes in relevant managerial control manuals should address the aspect of this stipulation noncompliance cited in this report. However, JPO believes improvement is needed for the delivery of up-to-date drawings, current maintenance and operating procedures and correct material and parts lists for modified TAPS systems.

2.4 Erosion Control

This stipulation has several elements that address the avoidance and minimization of erosion in and around the pipeline system and related facilities. In 1998, JPO conducted surveillance and engineering reviews of erosion and its resulting effects in the areas near Pump Stations 1 and 3. The areas included 1) the route of the fuel gas line from Pump Station 1 to Pump Station 4, 2) a culvert washout on Coldfoot Hill, and 3) effects of river and floodplain erosion on the Dietrich River, Chena River, Sag River, Marion Creek, Hess Creek, Jarvis Creek, Darling Creek, Miller Creek, Tazlina River, Tsina River, Glacier Creek, and Abercrombie Creek. A test of Alyeska's compliance in addressing erosion problems will be their success in planning, permitting, funding and implementing necessary repairs in response to the natural occurrence of erosion. JPO has not seen anything to evidence noncompliance with this stipulation. Future monitoring will ensure erosion problems are fixed as they occur.

2.6 Material Sites

This stipulation specifies the permittee must 1) apply to purchase gravel and other construction materials taken from public lands, 2) submit a mining plan for removal, and 3) obtain written approval of the Federal Authorized Officer or the State Pipeline Coordinator at JPO for removal of materials from water bodies or other areas. Material site boundaries are required to blend with surrounding natural land patterns. Regardless of the layout of materials sites, soil erosion and vegetation damage must be minimized.

Of the 72 sites inspected in 1998, all but two were found to comply with all aspects of Stipulation 2.6. Two material sites had an excessive amount of vegetation damage. Both sites, which are shared by the Alaska Department of Transportation and Public Facilities, had clearing areas which may be excessive for the amount of material which can be mined under the current material sale contracts. These areas appeared to extend beyond the working limits as identified in the current mining plans. This is a violation of Alyeska's mining and reclamation plan requirements. Alyeska plans to do on-site inspections and survey work on these two sites to determine if the clearing areas extend beyond the working limits.

JPO found six sites that violated Alyeska's mining and reclamation plans. All sites had side slopes steeper than the maximum measurement listed in the requirements of the mining plans. The noncompliance with the mining plans constitutes a noncompliance with the provisions of the Grant and Lease, which specify that all applicable laws and regulations must be followed.

Technical Stipulations

3.5 *Slope Stability*

This stipulation specifies that areas subject to mudflows, landslides, avalanches, rock falls, and other types of mass movements shall be avoided where practicable in locating the pipeline. Where it is not practicable, measures shall be taken to prevent the occurrence of or protect the pipeline against the effects of mass movements.

JPO evaluated this stipulation for the entire pipeline system and concluded the factors of safety for the Squirrel Creek south slope are not within the requirements of the design basis. The original design was based on frozen ground, and the slope has thawed since construction. The Squirrel Creek south slope is not in compliance with stipulation 3.5, regarding protection of the pipeline against the effects of mass movement. Additional work on Squirrel Creek is needed to bring the slopes into compliance with the design basis. JPO recommended that Alyeska provide a corrective action plan to fix the conditions on this slope and bring it into compliance, starting with a risk assessment. In 1999, Alyeska plans to do a risk assessment for the Squirrel Creek slope with JPO's participation.

In addition, the Pump Station 11 slope does not meet the requirements of the design basis. The *dynamic* factor of safety for this slope is less than 1.0. JPO recommended that Alyeska request a waiver from the design basis to account for the discrepancy of the static safety factor of 1.3 for the Pump Station 11 slope that doesn't meet the specified value of 1.5. Alyeska recently agreed to prepare and request a waiver, and plans to enter it into the design basis for future reference, once it is granted. Alyeska committed to completing the update of the design basis by June 1999.

3.9 *Construction and Operation*

Stipulation 3.9.1. Compliance with Stipulation 3.9.1 requires that all construction, operation, maintenance, and termination activities in connection with TAPS shall be conducted so as to avoid or minimize thermal and other environmental changes; and to provide maximum protection for the public, fish and wildlife habitat. All working platforms, pads, fills and other surface modifications shall be planned and executed in such a way that any resulting degradation of permafrost will not jeopardize the pipeline foundations. Since the factors of safety for the south slope of Squirrel Creek are not within design basis requirements, this constitutes a noncompliance with the Grant and Lease. Thermistor data shows this slope has thawed, and degradation of permafrost has occurred, which is a noncompliance with the first aspect of this stipulation. This instance of noncompliance is directly linked to and is not distinct from the noncompliance with Stipulation 3.5.

Chapter 4. Employee Concerns and Audit Item Resolution

The Employee Concerns Resolution Program

An employee concern is an assertion of impropriety or deficiency related to the construction, operation, maintenance or management of TAPS. Employee concerns can affect the quality, safety, environmental protection, and integrity of the pipeline.

A critical part of JPO's oversight is to ensure that employees of Alyeska Pipeline Service Company or employees of Alyeska's contractors can voice their concerns about technical and business practices in an atmosphere that promotes free and open communication. Alyeska established the Employee Concerns Program to investigate, resolve and document employee concerns that were not otherwise being resolved. The program is available to all people working on TAPS, including Alyeska and contractor management, supervisors, and employees and other interested persons. Alyeska has several avenues for the expression of employee concerns. Employee concerns should be promptly investigated to gather and analyze facts to determine a course of future action. The Joint Pipeline Office has a toll-free telephone hotline for the anonymous reporting of concerns.

Employee Concerns Related to TAPS Maintenance

- **As discussed in earlier chapters, JPO received several employee concerns related to electrical maintenance and fire alarm and suppression systems. Two concerns were validated.**

Electrical Maintenance

Several maintenance related concerns were filed directly with JPO. JPO investigated a concern that not all electrical work received third party inspections, as required. This concern was validated. The State electrical inspector issued six notices of violation for this and other items. Alyeska agreed the electrical deficiencies were a problem, and issued corrective action. The action specified that all new electrical installation work done on TAPS would be inspected by a third party inspector. The violations were corrected and verified by the state electrical inspector. These concerns were all closed. JPO agreed with the corrective action and closed the concern. JPO plans to do a field surveillance later this year to verify the corrections.

JPO investigated another maintenance related concern about electrical work proceeding without a work order at a specific location. This is a noncompliance with the work order requirements of Alyeska's Quality Assurance Program. These concerns were reported directly to JPO. Upon investigation, JPO found the work had been completed in compliance with the Quality Assurance Program. After interviewing Alyeska employees and reviewing work orders and permits, JPO did not validate this concern and closed the case.

A third concern was expressed to JPO that electrical work was completed by individuals that did not have a valid and required *Certificate of Fitness*. This concern was not validated and JPO closed this case.

Fire Alarm and Suppression Systems

JPO reviewed several employee concerns related to fire alarm and suppression systems on TAPS. One concern was validated, which included the design installation and maintenance of the fire alarm and suppression systems at Pump Station 7 without appropriate permits from the state fire marshall. With one exception, all locations met state fire marshall regulations concerning permits. The exception was Pump Station 7, where one individual on the site had a permit for alarm systems only. Preventive maintenance work orders were completed by individuals without the proper permits or not working under the direction of a permit holder. Pump Station 7 personnel responded their work was an exception to the Alaska Administrative Code for owner maintenance contrary to the policy for the rest of TAPS. Although not required by the state fire marshall, but for purposes of consistency, the pipeline manager directed Pump Station 7 to follow overall TAPS policy and secure the necessary fire system permits. JPO will follow up with surveillances to validate Alyeska's directive and verify that fire system permits were obtained.

Audit Action Item Resolution

- **Alyeska closed the remaining 1993 maintenance related audit action items. One purpose of JPO's Comprehensive Monitoring Pprogram process is to continually monitor the more significant audit deficiencies to detect recurrence. JPO's concern is that some previously closed audit action items recurred in 1998, such as the six National Electric Code violations discussed in earlier chapters.**

TAPS Audits

In 1993, the U.S. Bureau of Land Management (BLM) contracted with Quality Technology Company to conduct an audit of TAPS operations and maintenance. This audit, which was inspired by testimony of TAPS "whistle blowers" at Congressional oversight hearings, uncovered many systemic deficiencies, including:

- An ineffective Alyeska quality program,
- Questionable electric code compliance, and
- A pipeline that, after 17 years of accumulative modifications, could no longer be shown to be able to withstand major earthquakes or other possible contingencies.

The TAPS owners and Alyeska Pipeline Service Company contracted with Arthur D. Little in 1993, to do an independent assessment of the entire pipeline, which essentially validated the BLM audit. The audit identified several more deficiencies. Most of the problems occurred inside the fences of the pump stations and the Valdez Marine Terminal, rather than along the pipeline itself, where JPO had previously placed monitoring focus. Similarly, few of these deficiencies were environment related, or involved the oil spill contingency plan, two key areas of JPO emphasis.

JPO's CMP Maintenance review shows a trend toward the recurrence of some audit action items. Through ongoing surveillance JPO will continue to monitor Alyeska's progress in preventing the recurrence of these audit items. Although Alyeska closed all maintenance related audit action items, there are still some areas where JPO found some audit items to be recurring:

National Electrical Code Violations

The Alaska Department of Labor electrical inspector found several National Electrical Code violations on TAPS. Electrical work was completed without the required supervision of a journeyman electrician, and third party inspections were not performed for electrical work. Alyeska corrected the violations and JPO verified the corrections. Alyeska made corrective actions to ensure electrical work is being accomplished according to the National Electrical Code. If the cause of these violations remains uncorrected, National Electrical Code violations will continue to occur, repeating audit items identified in the 1993 audits. JPO recommends that Alyeska's quality audits and surveillances vigorously review whether electrical work is indeed inspected, given that this problem has been resistant to solution.

Up-to-Date Maintenance Records

Some records JPO reviewed in *Passport* lacked the detail of maintenance work that had been completed. The Grant and Lease requires Alyeska to maintain quality records of natural resource rehabilitation and tangible property repairs, and to keep current records of maintenance performed along the pipeline system. Alyeska's records lack the necessary detail to document completed maintenance. This is a recurring audit action item.

Valve Maintenance

Alyeska has not met their goals for significant valve concerns, including below ground valve investigations and the mainline valve maintenance review. This delay is partially due to the reassignment of some key personnel in support of Check Valve 122 and Remote Gate Valve 80 projects. While these programs are important for maintaining integrity of the system in the long term, slippages in these schedules do not present immediate, significant threats to TAPS integrity or safety. However, full commitment of adequate resources will be needed for the future progress of these programs, and to prevent this audit item from recurring.

Chapter 5. Future JPO Work Commitment

- **JPO will continue to monitor and evaluate Alyeska's maintenance performance for inclusion in future CMP reports based on TAPS maintenance activities.**

New Contractor Compliance

The Alyeska Alliance contractors, *Price Ahtna,* and *Alaska Petroleum Contractors* were replaced with a new Alliance contractor, *Houston Nana.* During future maintenance tasks, JPO will evaluate whether the new contractor's maintenance activities meet approved plans, associated permits, and compliance with the *Federal Agreement and Grant and State Right-of-Way Lease.*

JPO Oversight for 1999

JPO will continue to closely monitor Alyeska's compliance with the stipulations of the Grant and Lease for TAPS maintenance performance. Future work plans include follow-up surveillances for maintenance tasks completed in 1998 and tasks planned for completion in 1999.

Grant and Lease Compliance

JPO will follow Alyeska's progress in correcting the areas noncompliances with some elements of the stipulations included in the *Federal Agreement and Grant and State Right-of-Way Lease.* Alyeska has been informed that all areas of noncompliance must be corrected and is working to bring them into compliance.

TAPS Electrical Systems

JPO will monitor new TAPS electrical installations in 1999 to verify that Alyeska has implemented corrective action and resolved the electrical code violations. JPO will do surveillances later this year to verify that 1) new electrical installations undergo third party inspections, and 2) new electrical installation work is completed according to the National Electrical Code. Existing facilities are inspected according to Alaska Occupational Safety and Health Administration regulatory requirements.

Employee Concerns Related to Maintenance

Alyeska has directed their staff to follow TAPS policy and obtain the necessary fire system permits. JPO will follow up with surveillances in 1999 to validate Alyeska's directive and verify that fire system permits were obtained.

Preventive Maintenance

Alyeska changed their engineering procedures so that necessary project documentation accompanies turnover of completed projects to the pipeline operators. JPO will monitor future projects to verify preventive maintenance procedures and required documentation is turned over to pipeline operators for completed projects. JPO will monitor the backlog of overdue preventive maintenance tasks and Priority 03 work orders.

Slope Stability

JPO will complete surveillances for 49 other slopes along the TAPS corridor. Resulting conclusions will be based on Alyeska's 1998-1999 slope stability work plan for the problem areas evaluated in this report. Alyeska completed their risk assessment for the Pump Station 11 slope, and JPO is currently reviewing it. JPO will participate in a risk assessment for the Squirrel Creek slope later this year.

JPO recognizes that Alyeska is currently working to stabilize slopes in problem areas. For example, Alyeska has filled depressions in the ground containing vertical support members on the Squirrel Creek slope. In addition, they completed projects on the Pump Station 11, Squirrel Creek, and Tazlina slopes that centered and leveled the support shoes on the vertical support members. JPO will continue to monitor Alyeska's progress on these sites and others that have required slope stability maintenance, such as Wilber Creek and Coldfoot slopes.

Erosion Control

JPO plans to conduct an assessment of erosion in different locations along the pipeline, and will continue to monitor areas already identified as having erosion problems. The work pad that has been threatened by the erosive forces of the Dietrich River will be one area JPO will closely monitor.

Valve Maintenance

Alyeska has begun to address a wide spectrum of valve issues and is meeting high priority goals with acceptable performance. Other related programs of less concern have fallen short of Alyeska's valve maintenance goals. These programs include below ground valve investigations and the valve maintenance review, including the pump stations and the Valdez Marine Terminal. Reaching these goals will require a renewed commitment by Alyeska and continued oversight by JPO in 1999.

Work Pad Maintenance

Alyeska revised three of their maintenance manuals, the *System Integrity Monitoring Manual* (MP-166), the *Maintenance System Manual* (MP-167), and the *Surveillance Manual* (MS-31). JPO will verify whether 1) the manuals are consistent with one another, since they weren't before the revisions, 2) whether Alyeska is in compliance with their *Surveillance Manual*, and 3) whether necessary maintenance information was added to the *Passport* system. JPO's verification will include pipeline surveillance reports and action tracking.

Material Sites

Since annual material site inspections are required by State and Federal regulations, JPO will conduct another annual inspection of all material sites in 1999. JPO will monitor the progress toward correcting the areas of noncompliance relating to vegetation damage and steep slopes. JPO will verify that pump station files contain current material sale contracts and mining and reclamation plans for each operations material site.

LEGISLATIVE TELECONFERENCE NETWORK

90808

SIGN-IN SHEET

SPONSOR: Jt Special Committee on Merger

SUBJECT: Proposed BP/ARCO Merger

START/END TIME: 1 pm **DATE:** 7-28-99

PLEASE PRINT

	Name/Representing	Address	Zip	Phone No.	Testify	Observe	Bill No.
1.	Floyd E Heimbuch	2140 Saratoga Ave Anch	99517	276 8563	✓		
2.	Christy McCormick / Backbone	5412 W. Dimond #4 Anc 99515	99515	243-4816	✓		
3.	Karen Gowen	4220 B St Ste 200 Anc 99	99503	563-2226		✓	
4.	Matthew Morford	550 W 7th Ste 1100	99501	263-8208		✓	
5.	Geri Sakelgake	PO Box 196601 Anch, Ak 9	99519	564-3756		✓	
6.	James Eason	8611 Leeper Circle Anchorage AK	99504	337-3515		✓	
7.	Kevin Banks	DNR-DOG	07	269 8781		✓	
8.	Steve Conn / AK PIRG	PO Box 101093 Anc	99510	278-3661	✓	✓	
9.	Jim Syphax	Box 101553 Anchorage	99510	277-8910	✓	✓	
10.	Denali Daniels - Commonwealth North	810 N St. Ste 202	99501	~~277~~ 276-1414		✓	
11.	HAROLD HEINZE	1336 STAUBACH CIR ANCH	99508	561-6273	✓		
12.	Vic FISCHER			276 7626	✓		
13.	~~STEVE COWPER~~ BARBARA WILLIAMS	603 W. 18TH ANCH	99503	276 3669	✓		
14.	Nick Begich	1619 Marcus ER, AK 9	99577	694-1277	✓		
15.	R-A Fineberg	PO Box 46 Esra	99725			✓	

LEGISLATIVE TELECONFERENCE NETWORK

SIGN-IN SHEET

SPONSOR: Jt. Special Committee on Mergers

SUBJECT: BP/ARCO merger

START/END TIME: _____ **DATE:** 7/28/99

PLEASE PRINT

	Name/Representing	Address	Zip	Phone No.	Testify	Observe	Bill No.
1.	Tom Lakosh	POBox 100698 Anchorage	99510	5637380	X		
2.	JERRY BROOKMAN	715 MUIR AVE. KENAI	99611	283-9329		✓	
3.	Barbara Williams	PO Box 771754 Eagle River	99577	6887708	X		
4.	Laura Waldon	4120 Resurrection Rd.	99504	333-7584	X		
5.	R. A. FINEBERG (CHANGE)				(X)	←	
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Tell
Tony Knowles
to
STAND UP FOR ALASKA

Back in April we learned that BP Amoco would purchase Arco, Inc.

Along with purchasing ARCO, BP will get the rights to control Alaska's future!!

BACKBONE, a broad-based group of Alaskans came together then to address the many negative consequences of this takeover of Alaska. We are very concerned and want you to join us.

We have sent letters to Governor Knowles that have so far been ignored. We think this means that he is ignoring the wishes of the people who elected him and that he will pay attention only to the wishes of British Petroleum.

We think this is unacceptable. 83% of you have said you agree.

Tell Tony Knowles you want him to stand up and protect our interests, not the interests of the shareholders of BP. Tell him you want him to act to place strong conditions on this takeover that include:

- Ensuring that Alaskans get maximum production and value for North Slope oil and guaranteeing the sale of our gas now.
- Protecting our land and marine environments and our fishing industry.
- Eliminating a monopoly on the Trans Alaska Pipeline System (TAPS) and getting back our Dismantling, Removal, and Restoration (DR&R) Funds. ($5 billion that should be in our pocket, not theirs.)
- Maximizing competition and return to Alaskans on North Slope facilities, pipelines, and fields.

Tell Governor Knowles that he must guarantee that we will not have to use our permanent fund to finance the state's budget so that he can give BP shareholders a break on their taxes and royalties.

Call Governor Knowles today at 907-465-3500 and tell him to stand up for Alaska's future, not BP's bottom line.

NO CONDITIONS – NO MERGER

JOIN BACKBONE TODAY AND PUT ALASKA'S INTERST FIRST!

Backbone

Standing Up For Alaska's Future

5412 West Dimond #4 Anchorage, AK 99515 ◆ 243-4816 ◆ Fax 243-5555 ◆ backbone@alaska.net

Standing Up For **Alaska's Future**

Christy McGraw, Director

Testimony
BP Amoco - ARCO, Inc. Merger
Joint Special Committee on Mergers
July 28, 1999

Over the past two months, BACKBONE - Standing Up for Alaska's Future has worked hard to bring the issues of this merger to the minds and hearts of Alaskans.

Our membership and recognition is steadily increasing, and happily, the understanding of Alaskans about the issues involved in this deal is also increasing.

Over the next several weeks, BACKBONE will be mounting a media campaign, sponsoring conferences in two cities, Anchorage and Fairbanks, and writing, publishing and doing a weekly radio show in order to focus support for right action in getting the best deal for Alaska.

In the past week, we published an op-ed piece in the Anchorage Daily News that received wide response. In that article we stated that in a recent poll by Alaska Conservation Alliance, 83% of those 300 folks polled statewide think there should be conditions placed on this takeover. We heard from many of them confirming the seriousness of the matter in their minds. I would like to quote you one response from an insider that came in yesterday's mail. It really struck home.

> "Officially I can't say anything - but unofficially this merger is terrible for Alaska. BP will control all the infrastructure and prospective leases on the slope. No one will be able to compete in the future.
>
> As your article stated - Alaska could become a company state.

5412 West Dimond #4 Anchorage, AK 99515 ◆ 243-4816 ◆ Fax 243-5555 ◆ backbone@alaska.net

Please let me know what you are up to and what hope you have for making a difference with this terrible merger.

BP stands for broken promises. They tell soft truths and will change their story after the deal is completed. It will be ugly!"

We have certainly seen the soft truths in BP's media blitz of late. They have asked us to take them at their word that they have the best interests of Alaska at heart. We find this a bit curious.

First, the world's second largest non-governmental oil company *will have no heart, as evidenced by the Wall Street Journal article concerning the Amoco takeover by BP.* And second, it is the nature of huge multinational corporations to have the interests of their shareholders first and foremost in their motivation for development, *not the best interests of Alaskans.*

We don't question BP motives. BP stated clearly under oath before a joint hearing of the Alaska Department of Natural Resources and Alaska Department of Revenue in 1995 that if a project were economic for the Prudhoe Bay Unit (that is, maximized the revenue for the PBU and thus the state of Alaska), but not for BP, then BP would not pursue the project.

As I just quoted from our reader, if we do nothing to protect our interests, "It will get ugly." Especially since Tony Knowles, our chief executive and principal investment manager, is conspicuously absent in our fight for the best deal for our future. He has to date not given us even the courtesy of a response to BACKBONE's letter of May 22, 1999.

In tomorrow's Daily News, and through the next few weeks, we will tell the people of Alaska that we think this means that he is ignoring the wishes of the people who elected him and that he will pay attention only to the wishes of British Petroleum. We think this is unacceptable. 83% of the voters polled said they agree.

We will ask the voters to tell Tony Knowles they want him to stand up and protect our interests, not the interests of the shareholders of BP. We will ask the voters to tell him they want him to act to place strong conditions on this takeover that include:

- Ensuring that Alaskans get maximum production and value for North Slope oil and guaranteeing the sale of our gas now.

- Protecting our land and marine environments and our fishing industry.

- Eliminating a monopoly on the Trans Alaska Pipeline System (TAPS) and getting back our Dismantling, Removal, and Restoration (DR&R) Funds. ($5 billion that should be in our pocket, not theirs.)

- Maximizing competition and return to Alaskans on North Slope facilities, pipelines, and fields.

Since our governor seems unwilling to act, it is up to you to uphold our constitution and maximize return on our natural resources for the benefit of Alaskans. BACKBONE will do all it can to assist in your endeavors. We have formed committees who will meet to develop specific recommendations on the 9 points we have identified for consideration. They will examine issues of Access, Competition and the State's Position, Natural Gas, and the Environment.

It has been said that a people elects the government it deserves. If Tony Knowles does not act to protect Alaska's interest, BACKBONE asks that you work with us and the people of Alaska to prove we deserve better.

BP could turn Alaska into a company state

By CHRISTY McGRAW

BP's proposed purchase of the Atlantic Richfield Co. presents one of the most serious economic and political crises Alaska has faced since statehood.

It threatens many things Alaskans care about: clean air and water; schools, social services and public safety; property values; worker safety; high-paying jobs and your Permanent Fund dividend. It threatens our very quality of life. We all must speak up now so that our elected and appointed officials will put the interests of Alaskans and our future before those of the shareholders of BP Amoco.

Alaska's constitution requires that the state's resources be developed for the maximum benefit of Alaska's people. The framers of our constitution were very concerned that one or more companies could gain control over Alaska's resources and then use this control to extract unfair fiscal concessions from the state. It seems they were wise in their vision for our future.

As they foresaw, this takeover would give BP a control over North Slope oil and gas production and transportation, the biggest sources of revenue funding our state budget. This effective monopoly puts BP in the position of being able to dictate to the state the terms and conditions under which they will produce our oil and gas.

The framers were also concerned that these companies might refuse to develop their Alaska holdings until they'd marketed their resources in other parts of the world. This is called warehousing, and it is exactly why Alaska hasn't been able to market its North Slope natural gas. While it may be good for BP Amoco's bottom line, it is not good for Alaska, our communities and peoples.

As we have seen in the past, BP has again hinted that it may demand reductions in the royalties and taxes it pays. Reductions in the state revenue these produce could lead to:

- weaker safety, health and environmental regulations
- using the Permanent Fund to pay for government
- property tax increases
- statewide sales and income taxes.

There is a way out. State and federal governments often place conditions on mergers, and that's exactly what must be done on this takeover. We, as owners of our resources, must demand that conditions be placed on this sale that will prevent BP from gaining controlling interests over Alaska's oil and gas resources and their related production and transportation systems.

Sound familiar? It is. While we may be threatened now, once BP acquires Arco, it could get a whole lot worse. The proposed takeover threatens to turn Alaska into a company state. If this takeover happens without significant conditions, BP's monopolistic influence will effectively dictate how we do business and how we run our state.

To get you to accept this deal, BP has mounted an extraordinary media campaign. It has spent a small fortune. But, it is a great investment, because — if it works and we don't speak out — it stands to lock oil and gas competitors out of Alaska.

Fortunately, Alaskans aren't buying it. According to a recent statewide poll, Alaskans are both very concerned and paying attention. A whopping 83 percent of those polled said that significant conditions and limitations should be put on the proposed takeover.

Interestingly for their media efforts, the poll also showed that we distrust big oil. When Alaskans statewide were asked to rate whom they trust for information, oil companies finished last in a field of 11 choices.

There is a way out. State and federal governments often place conditions on mergers, and that's exactly what must be done on this takeover. We, as owners of our resources, must demand that conditions be placed on this sale that will prevent BP from gaining controlling interests over Alaska's oil and gas resources and their related production and transportation systems.

The governor and the Legislature are studying the proposed Arco buyout. That's a good start. But given what's at stake and how much money BP and Arco are spending to influence the outcome, the state needs to commit much greater resources to investigating the acquisition. Our elected officials also need to communicate their findings to the public so that we can all understand what kind of a deal we are getting.

If the Knowles administration negotiates a backroom deal in secret with BP and ARCO, Alaska will lose big. The way to get the best deal for Alaska is to open up the process, to make sure that every Alaskan has a chance to know what's at stake. Alaskans must have opportunities to discuss the problems and potential solutions and then speak as never before.

Our course of action is not that difficult. Alaska needs your help. It could go a long way toward securing Alaska's independence for decades. Alaskans have to tell our elected officials that we are counting on them to enforce the constitution that they have sworn to defend. We need to be able to guarantee that:

- BP can't monopolize the use of facilities, pipelines and ships
- BP can't warehouse our resources
- BP can't control our future financial well-being.

To help retain Alaska's ability to protect its future from control by one oil company, contact your congressional representatives, legislators and the governor today. Tell them you want conditions on the Arco takeover to guarantee Alaska's independence.

❑ Christy McGraw is the director of BACKBONE, an organization of Alaskans from all walks of life and all political stripes formed in the face of the Arco buyout to advocate for and protect Alaska's interests. To learn more about the group, contact BACKBONE via e-mail at backbone@alaska.net or call Christy McGraw at 243-4816.

NORTH

810 N Street, Suite 202
Anchorage, Alaska 99501
907-276-1414
Fax 907-276-6350

June 1, 1999

Senate President Drue Pearce

Dear Senator Pearce:

The proposed BP Amoco/ARCO merger will result in a major change in the ownership of the largest oil fields in Alaska and in the ownership of exploration acreage across the North Slope. Worldwide the oil industry is consolidating. This merger presents BP Amoco the opportunity to enhance its global competitiveness and that of its Alaska assets, in large part by achieving efficiency savings in its North Slope operations. The increased efficiencies and enhanced global competitiveness may also benefit Alaska. However, absorption of ARCO, a major oil and gas competitor on the North Slope, will also affect the state's interests in maximizing the exploration, production, and value of North Slope oil and gas. Accordingly, the merger is a matter of utmost importance to Alaska.

Over our 20-year history, Commonwealth North has stood for responsible resource development and sound public policies to achieve that end. We have consistently urged the state and federal governments, owners of Alaska's natural resources, to make these resources available for exploration and development. We have also urged the state and federal governments to fulfill their obligations to collect the revenues to which they are entitled. We have pushed for the removal of the oil export ban, the opening of ANWR, and the marketing of North Slope gas, just to mention a few positions this organization has taken. The common thread throughout all of our study groups and recommendations has been our quest to identify what is best for Alaska in the long term.

Commonwealth North has also been a consistent champion of competition and the market economy. We encourage Alaska to review the BP Amoco/ARCO merger with the goal of preserving competition. Market forces, rather than negotiation and regulation, should be the primary mechanism for developing Alaska's oil and gas resources.

To appropriately address both the opportunities and challenges of the merger, Commonwealth North applauds the formation of teams of internal and external advisors who can review the merger and advise the state of its implications and the state's best interests. We also encourage you to clearly define Alaska's overall goals for its North Slope oil and gas properties. The sooner these goals can be formulated and articulated, the more likely the review of the merger and any related negotiations will be understandable and constructive.

Because change in the oil and gas industry is occurring rapidly, and Alaska relies so heavily on oil and gas related revenues, we believe it would be best for the state to publicly discuss how the merger will affect Alaska's interests. Interested parties, including the public, should be invited to participate in the debates and dialogue regarding the merger and in the development of the state's position. It is important that proponents as well as critics of the merger be included in this discussion.

As we understand the BP Amoco/ARCO merger is currently structured, we are most concerned that the state's interest be protected in five areas. These issues stand out among a host of complex issues related to future exploration, production, and valuation, that we know you will thoroughly research. We encourage the state to produce position papers on these major issues:

1) The Commercialization of North Slope Gas. How will the BP Amoco and ARCO merger affect commercialization of North Slope gas resources?
2) Access to North Slope Facilities. How will a new or prospective explorer or operator trying to commercialize a discovery on the North Slope gain access to and benefit from the processing structure that has already been developed?
3) Access to Transportation System. Will the existing common carrier pipeline and marine transportation system be accessible at reasonable costs to a new operator or developer on the North Slope?
4) Valuation of North Slope Oil. How will the value of North Slope oil be determined for the purpose of calculating state revenues?
5) Leasing and Exploration. Will other companies be discouraged from participating in future lease sales because of the proportionally large size of the merged company relative to them?

There may be other issues that also require the state's attention. For example, we encourage the state to pay particular attention to the tools and resources necessary to exercise oversight responsibilities. These tools include: the Oil and Gas Conservation Commission, the Department of Natural Resources, the Royalty Board, and the Regulatory Commission of Alaska as well as its environmental, taxing, and anti-trust authorities.

The challenge Alaska faces is to resolve the concerns created by this proposed merger while preserving the productive working relationships with BP and ARCO that have evolved over the last 20 years. Alaska must treat its partners with respect and dignity, and vice versa, even when our interests may differ. Alaska should work with BP Amoco to produce at the highest values for both parties.

Commonwealth North looks forward to working with you in helping Alaska face these opportunities and challenges.

On behalf of the Commonwealth North Board of Directors,

Duane Heyman

Duane Heyman
Executive Director

Testimony of Harold Heinze

before the Joint Committee on Mergers --- July 28, 1999

My name is Harold Heinze and I am a thirty year resident of Alaska. In the 1980's I was the President of Arco Alaska and the President of Arco Transportation. In the early 90's I was Commissioner of Natural Resources for Gov. Hickel. I currently do consulting work for Ahtna Inc. I am here today as a private citizen to offer my personal perspective on what I think the legislature should do in regard to the BP-Amoco merger of Arco.

There are several parts to my perspective and they interweave.

The loss of Arco in the Alaskan oil industry is something that I don't particularly like. It certainly damages my own feelings of identity to know that the enterprise that I spent a career with will be no more. I have great empathy for the upheavel and uncertainty that the current employees of both Arco and BP in Alaska will face for a period of several months.

But regardless of those negative feelings, my conclusion is that it is best that the merger go forward. Rather than fearing the merged BP-Amoco company bolstered with Arco's Alaskan people and assets, I believe that the State of Alaska has an opportunity to forge an enhanced future for North Slope oil development. The small reduction of competitive momentum in Alaska is more than offset by the greatly strengthen competitive position of Alaska in the international oil industry.

The approach I see many people taking in reaction to the merger is far to negative and in its bitter rhetoric leaves no basis for a positive relationship. I don't believe that establishing a confrontal relationship with a major segment in the Alaskan economy does anyone good. There is a real danger that some will use this debate of "merger conditions" to erect barriers to oil development, the very oil development that has been and will continue to be in the best interest of the Alaskan people.

Not to say that there aren't issues related to the State of Alaska's interests. But I have taken some time to think it through, and my evaluation is that the real "threats" are limited in number, and manageable through existing mechanisms and agencies. For example, it's clear that Alaska loses when an economic oil field development project is delayed or not undertaken. IF (and underline if) that became an issue in the future, I think you will find that the AOGCC has sufficient authority legally to spotlight and correct that abuse.

I also am a strong believer that if any real abuses (as different from some of the conjured up things I've read) do occur, the public opinion reaction would be strong and I believe that BP-Amoco knows that its best interest aligns with the Alaskan public interest.

Finally my recommendation.

As I remember the Alaska State Constitution assigns the formulation of resource development policy to the legislature and I think you should. I think it is appropriate that this committee focus on defining and enunciating Alaska's development expectations and then communicate those directly and publicly to BP's executive management in Alaska and London. A side-effect of that effort will be a definition of ways to assure that this vision remains in front of all Alaskans and is publicly accountable on an ongoing basis.

Tom Lakosh
From: Tom Lakosh [lakosh@gci.net]
Sent: Monday, July 19, 1999 10:36 AM
To: 'tinak@atg.wa.gov'
Subject: restaint of trade in BP/ARCO merger

Dear Ms. Kondo;

Please review the attached e-mails and Word 97 file for your investigation of the BP/ARCO merger. I am also faxing the response of Governor Knowles as sent through Larry Dietrick of DEC.

There may already be sufficient evidence that BP has practiced restraint of trade through the unavailability of tankers. There has been a controversy regarding the use of vapor recovery systems at the Valdez Marine Terminal, (VMT). There was a "negotiated rule-making" between EPA, Alyeska Pipeline Service Co., (APSC), the state of Alaska, and Prince William Sound Regional Citizens Advisory Council, (PWS RCAC), regarding the amount of tanker loading that could take place at berths that did not have vapor recovery piping. They call this "uncontrolled loading", at berths 1&3, verses controlled loading at berths 4&5, which have vapor recovery piping. The Alaska Dept. of Revenue TAPS throughput projections were used to used to set the maximum average loading that could take place at uncontrolled berths. APSC said it could load 1.1 mbbl/day at the controlled berths and EPA granted them the difference between the projected throughput and the 1.1 mbbl/day that APSC said it could load. The allowable daily average for uncontrolled loading over the calendar year is as follows: '98- 275 kbbl/day; '99- 205 kbbl/day; '00- 1?? Kbbl/day; '01- 0 bbl/day. This shows projected throughput at '98- 1.375 mbbl/day; '99- 1.305 mbbl/day; '00- 1.2?? mbbl/day; '01- 1.1 mbbl/day.

The shippers, however, have only loaded approximately 1.03 mbbl/day since the vapor recovery has come on line in March of '98. They have proffered a number of excuses, including bad weather and problems with vapor control systems, but BP has refused to load except at controlled berths and at least some of the TAPS reductions in throughput have been accountable to the lack of available tankers. Both the refusal to load and the unavailability of tankers would qualify as restraint of trade. A closer examination of some of the other excuses may well show similar restraint of trade. These unlawful restraints will only be exacerbated as tankers are forced to retire under OPA '90.

Free trade requires that shippers construct additional vapor controls on Berth 3 and build enough tankers to ensure that maximum TAPS throughput can be timely carried to market. These tankers must also be built as good as, or better than, the Millennium Class design of ARCO or the merger would be restraining innovation and quality competition that was clearly occurring prior to announcement of the merger. This won't stop BP from restraining trade at the wellhead, but it would ensure that transportation facilities would be available to meet the projected throughput. Care should be taken to ensure that throughput projections account for all new/projected oil field discoveries and improved production techniques.

Please inform me of the distribution of these materials and your plans to investigate the shipping needs for the projected TAPS throughput. A full analysis of the TAPS trade will be necessary to pin down the exact number of replacement tankers that will be required to prevent restraint of trade. My contact information is on my letterhead in the letter to Governor Knowles below. My analysis concentrates on tanker retirements on the assumption that past retirements have already caused a restraint of trade, and that future retirements will far outstrip the ability of the 3 Millennium tankers to maintain pace with projected throughput. No other tanker replacements have been proposed.

Sincerely, Tom Lakosh

Govmerger.doc

DOUBLE-HULLED TANKERS IN THE TAPS FLEET

Last year, Arco announced its intention to construct state-of-the-art double-hulled tankers for transporting ANS crude oil from the TAPS terminal at Valdez. Arco ordered three "Millenium Class" tankers, with an option to purchase two more. These tankers exceed the standards for double-hulled vessels required by law, and were to be built in advance of the schedule for converting the U.S tanker fleet to double-hulled vessels mandated by the Oil Pollution Act of 1990 (OPA).

At the same time, BP announced its involvement in a joint project with Maritime Overseas Corporation to build three double-hulled tankers to transport its ANS crude. However, since BP announced its plans to acquire Arco, negotiations for the construction of these three tankers were abruptly terminated. BP has announced its intention to complete construction of the three Millenium Class tankers ordered by Arco once it acquires Arco, but it has made no mention of its own tanker construction project with Maritime Overseas.

As a result of the acquisition, it would appear that instead of six—and possibly eight—new double-hulled tankers joining the TAPS fleet, there will only be three new double-hulled ships plying the TAPS trade. Currently, the TAPS fleet is comprised of tankers averaging nearly 20 years of age, making it one of the oldest fleets operating in U.S. waters. Only three of the 27 ships currently in the fleet have double hulls. These three vessels were completed in 1978 and 1979. No new tankers have been added to the fleet since the Exxon Valdez oil spill.

CHANGES IN PATTERN OF OWNERSHIP FOR THE TAPS FLEET

Title I of OPA sets stringent liability standards for the transport of crude oil in U.S. waters. Since the passage of the Act, most major oil companies have divested themselves of their shipping divisions, which has had the effect of limiting their exposure to liability in the event of an oil spill. Arco did not divest itself of its fleet, deciding instead to retain ownership of Arco Marine.

By contrast, BP does not own the fleet of tankers it utilizes in the TAPS trade. The Merchant Marine Act of 1920 (commonly referred to as the Jones Act) prohibits BP—because it is a foreign company—from owning tankers which transport oil between U.S. ports. As a consequence, BP leases the fleet of tankers it uses to transport Alaska North Slope (ANS) crude to West Coast refineries.

BP recently helped to form a new joint venture from which it now leases the tankers it uses in the TAPS trade. The tankers operating under the auspices of this joint venture were transferred by their owners to independent holding companies that then leased them to the joint venture which in turn leased them to BP. This leasing arrangement has the possible effect of limiting the liability for oil spills from one of these ships to the value of the vessel involved. With the acquisition of Arco, BP will have to divest itself of Arco Marine pursuant to the Jones Act. It is likely that each tanker now owned by Arco Marine will be transferred to an independent holding company, leased to the joint venture, and then leased to BP. This new pattern of ownership for the TAPS fleet appears to significantly reduce corporate accountability, and creates a disincentive for maintaining current standards of marine safety and oil spill prevention.

Tom,

I haven't had time to review your analysis indepth, but I did notice that your list of tankers is different than mine. Missing from your list are the following vessels that are on my list (acquired from RCAC):

Cheasapeake Trader (S), Delaware Trader (S), Potomac Trader (DB), Chevron Mississippi (S, one of the re-measured vessels), Overseas Arctic (S), SeaRiver Long Beach (S, sister ship to the Exxon Valdez and one of the newest single-hulled vessels in the fleet), and SeaRiver Philadelphia (S, another of the re-measured vessels.) On your list but missing from mine are all the retired ships, which include three Arco ships and the three Lion boats, as well as the Overseas Juneau, SeaRiver San Francisco and Overseas Galveston. Also you have the Overseas Washington listed as a BP charter. I thought this vessel was on charter to the State of Alaska and delivers the state's royalty oil to the Tesoro refinery at Nikiski. (I see it every so often when I'm in Homer. It comes into Kachemak Bay to pick up and drop off its pilot.)

Just out of curiosity, where did you get your list? USCG?

Here's the analysis I came up with regarding the: retirement and replacement of TAPS tankers under OPA '90; retirement and replacement of escorts (DEC BAT regs); minimum escort combinations and operating procedures (DEC BAT regs, OPA 90 regs); maximum tanker speeds (DEC BAT regs, OPA 90 regs). I hope to explain all the abbreviations and the underlying logic behind the proposed requirements on the phone at 3 PM. If accurate data on cargo volumes and actual turnaround times is obtained a case could be made for restraint of trade action for controlling supply through a lack of ships. The object of the action would be to get the quantity and quality of tankers we need as part of a settlement . Part of the settlement would attach to a secondary action regarding the stifling of innovation and quality competition in BP's shredding of the plans for ARCO's projected construction of 6 to 10 Millennium tankers to replace retired tonnage. We could ask for Millenium class tanker design, or their safety equivalents, to replace both ARCO's and BP's retiring tonnage. One or more of the Western States would have to file their own suit or get the FTC to do it cause I don't see anybody chompping at the bitt to file as a private party. I'd like to chat about my VERP suits and maybe even the BAT suit as well.

Sincerely, Tom

June 1, 1999

Tom Lakosh
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Dear Governor Knowles:

One month ago I sent the attached e-mail requesting information regarding BP's long term plans for replacing the TAPS tanker fleet. Given the importance of this information to Alaska's future, I would have expected that this information would have been collected immediately and publicly disseminated to inform Alaskans of the impact of the merger on their future.

Unfortunately this information is still not publicly available. Please consider this message a request for all documents held by the state regarding the plans of TAPS shippers to construct or otherwise replace the retiring tanker fleet pursuant to the Public Documents Act.

I would have also expected the state to develop a position paper regarding an appropriate tanker replacement schedule. Would you please supply any state position papers on this matter pursuant to the Public Documents Act.

I have also attached a cursory analysis of the: retirement dates of TAPS tankers; proposed tanker replacement schedule; proposed escort retirement and replacement schedule; proposed escort combinations and procedures; proposed tanker speed limits. I hope that the state's position paper will compare favorably with these analyses.

Sincerely, Tom Lakosh

Dear Governor Knowles:

Would you please consider obtaining additional information from Sir John Browne regarding the long-term plans of BP/Amoco and its subsidiary Alaska Tanker Company for replacement of its tanker fleet and the plans for replacing the potential combined BP/ARCO tanker fleet. The pertinent questions to ask for each corporate combination are:

Please specify each date of tanker replacement and indicate:

1) the tanker that will be replaced;
2) the design of the replacement tanker;
   a) the distance between the double hull;
   b) the number of shafts;
   c) the number of rudders;
   d) the number of independent engine rooms;
   e) bow thruster and horsepower;
   f) navigation system design;
   g) tanker size and displacement.

The issue of concern to Alaskans is the effect that the merger will have on the quality of tankers that will be constructed and the resultant safety of oil transportation through Alaskan waters. As you

well know, ARCO Marine Inc. has adopted a corporate philosophy that placed tanker safety at a premium as evidenced by its embarking on plans to replace its fleet with a tanker design that far exceeds the requirements of OPA '90. This design, called the Millennium Class, employs a 10 ft. double hull instead of the 6 ft. required by OPA '90 in addition to a 3,000 hp bow thruster and redundant engine rooms, shafts and rudders. I have discussed this policy with an ARCO VP and other ARCO management and it was related that this policy was ARCO's plan to attract "green customers" on the West Coast where the population is particularly sensitive to environmental issues, particularly marine pollution.

BP has committed to finishing the three Millennium Class tankers already ordered by ARCO, but they have not committed to using this design for replacing the remaining ARCO tankers or their own proxy fleet. Although BP originally sought to compete with ARCO for "green customers" by securing an option to build two of its own Millennium tankers, now that BP has bought out its competition and owns the tanker design it has abandoned the option to build the two Millenium tankers and has sought exemption from the double hull requirements under OPA '90. If BP policies were to continue unabated, this merger would clearly reduce this type of environmentally friendly competition and substantially reduce the safety of oil transportation in Alaskan waters.

The State must recognize and protect this form of competition because of the effect the merger would have on Alaskan's rights under Article VIII of our Constitution. Unlike the "green customers" in the lower 48 who merely choose a "green company", we are guaranteed the highest degree of protection of our natural resources under our Constitution. I have reviewed the minutes of the Constitutional Convention and it clearly shows that Article VIII was specifically constructed to preclude this type of detrimental, monopolistic control of our resources.

Moreover, Alaskans were promised double hull tankers as a major part of the environmental protections to be provided in exchange for our support in passage of the Trans-Alaska Pipeline Act. These promises were again trotted out after EVOS but all of the shippers, except ARCO, reneged on this promise again.

Please do not be taken in by these empty promises again. Despite Sir John Browne's averments before the legislature that both BP and ARCO have the highest standards for environmental protection and safety, it is abundantly clear that only ARCO was willing to fully pursue this commitment. I therefor emplore you to get BP's plans for tanker replacement IN WRITING. If it becomes apparent that BP will not provide the level of tanker quality that ARCO was committed to, please consider seeking protection of Alaskan interests through prosecution of federal and state anti-trust laws.

Sincerely, Tom Lakosh

TOM LAKOSH P.O. BOX 100648 ANCHORAGE, AK 99510
Phone/fax (907) 563-7380 E-mail lakosh@gci.net May 25, 1999

TANKER RETIREMENT SCHEDULE

Vessel	Shipper	KDWT	OPA Date	Hull
ARCO ANCHORAGE	ARCO	120	6/98	S
ARCO FAIRBANKS	ARCO	120	1/99	S
ARCO JUNEAU	ARCO	120	1/99	S
ARCO SPIRIT	ARCO	262	4/00	S
ARCO INDEPENDENCE	ARCO	262	11/00	S
ARCO TEXAS	ARCO	90	11/04	DB
ARCO ALASKA	ARCO	188	12/07	DB
ARCO CALIFORNIA	ARCO	188	7/08	DB
Total	8	1,350	Average size 168k	
DENALI	BP	188	10/06	DB
BT ALASKA	BP	188	5/06	DB
OMI COLUMBIA	BP	136	11/06	S
SOUTHERN LION	BP	?	5/99	S
OVERSEAS JUNEAU	BP	120	12/98	S
NORTHERN LION	BP	?	1/99	S
WESTERN LION	BP	?	1/99	S
OVERSEAS ALASKA	BP	62	12/00	S
OVERSEAS BOSTON	BP	122	4/04	S
OVERSEAS CHICAGO	BP	90	6/05	DB
OVERSEAS OHIO	BP	90	10/05	DB
OVERSEAS NEW YORK	BP	90	12/05	DB
OVERSEAS *WASHINGTON*	BP	90	3/06	DB
Total	10-13?	1,176	average size 117k	
S/R SAN FRANCISCO	EXXON	76	12/00	S
S/R BATON ROUGE	EXXON	76	3/00	S
S/R BENICIA	EXXON	150	6/02	S
S/R NORTH SLOPE	EXXON	150	2/02	S
S/R GALVESTON	EXXON	27	?/05	S
Total	5	479	Average size 106k	

TOTALS for all shippers from 6/98 to 7/08: 23-26 tankers 3,005-3,750 kdwt Average size 131-144 dwt

TANKER RETIREMENT AND PROPOSED REPLACEMENT SCHEDULE

Year.....Total ..... kdwt	Retiring tanker Owner/size	Millennium Equivalents	Proposed M. E. tankers deployed	Total M. E. tanker kdwt operating by 12/31/0?
98 240	A/120, B/120,	A-1, B-1		
99 240?	A/120, A/120, B/?, B/?, B/?	A-2		
00 738	A/262, A/262, B/62, E/76, E/76	A-4, B-1, E-1	A-2	250 2ea.
01			A-2, B-1, E-1	750 6ea.
02 300	E/150, E/150	E-2	B-1, E-1	1,000 8ea.
03			B-1, E-1	1,250 10ea.
04 212	A/90, B/122	A-1, B-1	B-1	1,375 11ea.
05 297	B/90, B/90, B/90, E/27	B-3, E-1	B-1	1,500 12ea.
06 602	B/188, B/188 B/136, B/90	B-4	B-1	1,625 13ea.
07 188	A/188	A-1	A-1	1,750 14ea.
08 188	A/188	A-1		
98-08 Total 3,005 Total tankers-23 Average size-135k	A/8/1350/168 avg B/10/1176/117 avg E/5/479/106 avg All-23/3,005/131 avg	ARCO-10 BP-10 Exxon-4 All-24	ARCO-5 625 kdwt BP-6 750 kdwt Exxon-3 375 kdwt All-14 by 12/31/07	1,750 kdwt in 14 tankers or 14 million bbl. capacity, w/14 day avg. turnaround* can ship 1 mbbl/day TAPS

*Actual average tanker turnaround time is not known and this figure is only a "guestimate". Turnaround time will vary with weather and ports of call changes. The 1 million bbl/day throughput is also an estimate and allowances for throughput fluctuations should be considered.

PROPOSED ESCORT RETIREMENT AND REPLACEMENT SCHEDULE

Revised in C-plan Comments ff

Year	Retired Escorts	Replacement Escort	Duty Area
99	Protector, Sea Swift, Stalwart	Nanuq, Tan'erlic, Protector	VMT-HE for all tractors
00	Gulf Service	PRT	HE Sentinel
01	NI ERV	PRT	NI Sentinel
02	ERV, Protector, Sea Flyer	PWS	VMT-HE
04	As necessary		
04 Escort/tug Totals 10 total tugs	PWS-3ea., Guard-1ea.	PRT-2ea.	Theriot-2ea., Barge tugs-2ea.

YEAR 2001 MINIMUM ESCORT COMBINATIONS FOR LADEN SINGLE SHAFT TANKERS SMALLER THAN 150 KDWT

Y '06 T<150kdwt	VMT-BR Buoy	Central PWS	Hinchinbrook Ent.
Sea height greater than 2m	Tethered-PWS, Protector (close escort)	Tethered-PWS, NI PRT (sentinel)	Tethered-PWS, HE PRT (close escort)
Sea height less than 2m	Tethered Guard, Theriot (close escort)	Guard or Theriot, NI PRT (one fire tug must close escort)	Guard or Theriot (close escort), HE PRT (close escort)

YEAR 2001 MINIMUM ESCORT COMBINATIONS FOR LADEN SINGLE SHAFT TANKERS GREATER THAN 150 KDWT

Y '06 T≥150kdwt	VMT-BR Buoy	Central PWS	Hinchinbrook Ent.
Sea height greater than 2m	Tethered-PWS, Protector (close escort)	Tethered-PWS, NI PRT (sentinel)	Tethered-PWS, HE PRT (close escort)
Sea height less than 2m	Tethered PWS, Theriot (close escort)	PWS (close escort), NI PRT (sentinel)	PWS (close escort), HE PRT (close escort)

YEAR 2001 MINIMUM ESCORT COMBINATIONS FOR LADEN DOUBLE SHAFT TANKERS

Y2k Double Shaft	VMT-BR Buoy	Central PWS	Hinchinbrook Ent.
Sea height greater than 2m	Tethered-Guard	NI PRT (close escort)	HE PRT (close escort)
Sea height less than 2m	Tethered-Guard	NI PRT (sentinel)	HE PRT (close escort)

WINTER '99/00 MINIMUM ESCORT COMBINATIONS FOR LADEN SINGLE SHAFT TANKERS SMALLER THAN 150 KDWT

Winter '99/00 T<150kdwt	VMT-BR Buoy	Central PWS	Hinchinbrook Ent.
Sea height greater than 2m	Tethered-Guard, Protector (close escort)	Tethered-PWS, ERV (sentinel)	Tethered-PWS, Gulf Service (close escort)
Sea height less than 2m	Tethered-Guard, Theriot (close escort)	Guard (close escort), ERV (sentinel)	Guard (close escort), Gulf Service (close escort)

WINTER '99/00 MINIMUM ESCORT COMBINATIONS FOR LADEN SINGLE SHAFT TANKERS GREATER THAN 150 KDWT

Winter '99/00 T≥150kdwt	VMT-BR Buoy	Central PWS	Hinchinbrook Ent.
Sea height greater than 2m	Tethered-PWS, Protector (close escort)	Tethered-PWS, NI ERV (sentinel)	Tethered-PWS, Gulf Service (close escort)
Sea height less than 2m	Tethered PWS, Theriot (close escort)	PWS (close escort), NI ERV (sentinel)	PWS (close escort), Gulf Service (close escort)

PROPOSED MAXIMUM* ALLOWABLE TANKER SPEED IN KNOTS OVER GROUND

Maximum tanker speed	Valdez Narrows	Valdez Arm in outbound lane To Buoy 9,	Buoy 9,	to BR Buoy	Central PWS BR Buoy to HE	Hinchinbrook Ent. OB lane
Ebb tide	6	9	7	10	12	8
Flood tide	5	8	6	10	12	9
Ice within 1 nm		**Escort must remain tethered**		6	**Emrt** 6	

Maximum tanker speed	Valdez Narrows	Valdez Arm in separation zone To Buoy 9,	Buoy 9,	to BR Buoy	Central PWS BR Buoy to HE	Hinchinbrook Ent. Center Line Track
Ebb tide	6	10	8	10	12	9
Flood tide	5	9	7	10	12	10
Ice within 1 nm		**Escort must remain tethered**		6	**Emrt** 6	

*These speed limits presume compliance to the minimum tug combinations listed above with all other wind speed and sea height restrictions remaining in place. Each of these maximums could be raised by 1 knot if the secondary escort is a tethered tractor in addition to the minimum tethering requirements listed above.

Tom Lakosh

To: Senator Rick Halford, Chair
Date: July 21, 1999
Joint Special Committee on Mergers

Re: (I) Competion on TAPS; (II) TAPS DR&R

I. Competition on TAPS

Through 1995 no TAPS carrier filed a tariff below the maximum allowable under the 1985 TAPS Settlement Methodology; in other words there had been no competition on TAPS. The Amended Capacity Settlement Agreement of October 1997 was supposed to deal with the competition that became inevitable once shipments dropped below 1.42 million bpd. To assess competition on TAPS, it is necessary to know whether the TAPS carriers filed tariffs below the maximum allowable tariff under TSM since the completion of the Amended Capacity Settlement Agreement in October 1997.

The importance of this line of inquiry is underscored by several factors, including: (1) public and private statements by officials of non-TAPS owner Conoco that excessive TAPS tariffs played a significant role in that company's 1993 decision to abandon its Alaska interests to major TAPS owner BP; (2) the pattern of departure from Alaska of other companies with production interests in the North Slope but little or no stake in TAPS; (3) the Department of Law's claim that the Amended Capacity Settlement Agreement of October 1997 provides an adequate framework for competition; (4) Oxy's protest of that agreement (rejected by FERC), claiming that BP would tend to keep the tariff high to the detriment of non-owner shippers on TAPS such as Oxy; and (5) Tesoro's claim that excessive TAPS tariffs under TSM severely disadvantage non-owner shippers on TAPS.

TAPS tariffs since 1997 are summarized in the following table.

Table 1. Tariffs Filed With FERC (a)

Company	7/1/97	1998	1/1/99	7/1/99
Amerada Hess	$2.74	$2.69	$2.47	$2.45
Arco	$2.61	$2.73	$2.46	$2.46
BP	$2.76	$2.80	$2.85	$2.85
Exxon	$2.64	$2.78	$2.67	$2.66-$2.44(b)
Mobil (c)	$2.94/$2.63	$2.84/$2.75	$2.61	$2.56
Phillips	$2.73	$2.79	$2.79	$2.47
Unocal	$2.65	$2.72	$2.55	$2.55
Wghtd. Avg. (d)	$2.71-$2.70	$2.74/$2.74	$2.71	$2.70-$2.65

Notes:

(a) Tariff data from APUC.
(b) Exxon 7/1/99 tariff, filed 6/18/99, offers a volume incentive tariff of $2.44.
(c) Mobil's 1997 and 1998 tariffs offer a volume incentive tariff.
(d) Weighted averages are calculated based on owner's percentage; volume incentive tariffs assume all oil is shipped at volume incentive rate.

I understand that the Department of Law now wishes to treat each company's maximum allowable tariffs as confidential under the 1985 TAPS Settlement Agreement. However, the TSM worksheet, available publicly, contains weighted average data indicating the maximum allowable tariffs for 1997 through 1999 (aggregate data; not for any given company). Table 2 compares those weighted averages from these two sources.

Table 2. Weighted Average Filed v. TSM Maximum Allowable Tariffs

Wghtd. Avg.	7/1/97	1998	1/1/99	7/1/99
Filed Tariffs(a)	$2.71-$2.70	$2.74/$2.74	$2.71	$2.70-$2.65
TSM Tariffs (b)	$2.72	$2.66	$2.72	

Notes:

(a) See Table 1.
(b) Maximum allowable TAPS tariffs (calculated from TSMW99.WK4, Sheet E, lines 161-163.)

If these data are accurate, then tariffs filed under the Amended Capacity Settlement Agreement for 1998 and 1999 show very little rate reduction from the maximum allowable tariffs. (In fact, the 1998 tariffs appear to exceed the maximum allowable under TSM by $0.08 per barrel. From the limited data available, the reasons for this anomaly are not clear. One possible explanation is that the two data sets treat the annual "true-up" adjustment differently.)

>From another perspective, it is interesting - and perhaps very significant - that BP's filed tariffs increased between 1997 and 1999 despite (1) significant reductions in every elements of the tariff that comprises the total revenue requirement - operating expenses, depreciation, recovery of deferred return, DR&R, after-tax margin and income tax allowance and (2) the fact that every other TAPS owner reduced its tariffs over the same period (1997-1999). Under the aggregate TSM estimates for 1999, the total revenue requirement for TAPS was more than 16% lower than that of 1997; during the same period, the TSM production estimate declined by only 13%. On this basis, it is not readily apparent why BP's filed tariff increased. A variety of factors - for example, the "true-up" adjustment (mentioned above) and the difference between actual production and that used in the TSM worksheet - may explain why BP's tariff increased; the data available to the public are not sufficient to draw definitive conclusions. Nevertheless, the fact that most other TAPS owners reduced their tariffs between 1997 and 1999, while BP increased its tariff, may lend credence to Oxy's concern that under the Amended Capacity Settlement Agreement BP could set artifically high tariffs, thereby raising the level from which competing owners would reduce tariffs to attract shipments.

Continuing this line of analysis, it strikes me as arguably significant that, in contrast to BP, ARCO (a net shipper on TAPS) decreased its tariff in 1999; by mid-year, Exxon followed. I don't know whether Exxon has excess capacity on TAPS at this time (historically, Exxon was a net shipper, but only by a small margin and that position was slated to shift sometime around the turn of the century). While the availale data are too sketchy to permit definitive conclusions, these data raise significant questions in my mind as to whether the Amended Capacity Settlement Agreement is working as antipated by theory. Specifically:

* Why didn't BP cut tariffs, as the state and the owners' capacity cushion theory would dictate? Could Oxy have been correct in its concerns that BP would keep its tariff relatively high to reduce its royalties and severance?

* Why did ARCO, with its share of TAPS filled by its own production, reduce tariffs? Does ARCO's tariff cut demonstrate that the power of the tariff over the economics of the net shipper? (Again, maximum allowable tariff data are necessary to frame this

question properly; apparently carrier maximum allowable tariffs are confidential under TSM).

* With ARCO out of the picture, will there be any rate competition on TAPS? Without ARCO's lead, would Exxon have cut tariffs by offering a volume incentive at mid-year? (Note that small-percentage owners Phillips also cut to approximately the ARCO level, that Mobil cut its tariff and Am-Hess lowered its tariff to one cent under ARCO.)

The Amended Capacity Settlement was approved in 1997 with the understandings that the precise effects of the state's capacity cushion could not be anticipated and that Oxy disagreed with the state and the TAPS owners that the Amended Capacity Settlement Agreement would provide an appropriate level of tariff relief through competition. How TAPS owners will set tariffs is difficult to model for two principle reasons: (1) much of the oil is owned by the shipper and the trade-offs between increased tariff revenue and reduced taxes and royalties are difficult to analyze; and (2) each owner must guess what the other owners will do. As indicated here, analysis of how events turned out is handicapped by the fact that key data - maximum allowable tariffs, etc. - are held confidential.

To the extent that the policy-makers place a high value on competition, I believe the questions raised by the public data summarised here suggest that better data on the level of competition on TAPS - manifested by reduced tariffs - should be carefully examined before the state acquiesces to the take-over by the company with the largest stake in TAPS of the company with the second largest share.

II. TAPS DR&R

To provide the legal and quantitative bases for considering how to deal with TAPS dismantling funds, here is a copy of the June 24 report I completed recently for the Alaska Conservation Alliance.

This report assesses the value of the DR&R collections under TSM; the present value of DR&R collections is $4.5 to $4.9 billion, compared to an estimated present cost of dismantling of $2.3 billion. Note also the essential agreement between this analysis and three previous analyses (APUC Staff Expert Witness, 1986; Fineberg, 1992; Univ. Wis. Master's Thesis, 1996), as summarized in Table 8 (p. 20).

If I can provide additional information, please let me know.

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