



## Comprehensive Monitoring Program - Maintenance Executive Summary

### Purpose

The Joint Pipeline Office (JPO) 1999/2000 Maintenance Comprehensive Monitoring Program (CMP) was developed to provide oversight of the Trans-Alaska Pipeline System (TAPS), focusing on the maintenance requirements and strategies necessary to ensure long term operational safety and reliability of TAPS systems and equipment. This program was designed to measure compliance to requirements for maintenance of TAPS, as well as to evaluate the pipeline system's integrity to determine long term viability and "useful life". JPO considers the useful life of TAPS to be directly related to system condition monitoring and resulting maintenance activities.

### Scope/Methodology

The 1999/2000 JPO CMP programs have attempted to establish a "systems based" approach to TAPS oversight. As such, the JPO maintenance oversight efforts have been designed to address the maintenance needs of particular TAPS systems, how those systems are monitored, and how the results of monitoring are transitioned into maintenance work activities.

The 1999/2000 Maintenance CMP work is broken into three major elements: (1) TAPS Monitoring and Maintenance Program Reviews; (2) TAPS Maintenance Baseline Assessments; and (3) 1997/1999 Maintenance CMP Issues. A summary discussion of each of these elements follows:

#### TAPS Monitoring and Maintenance Program Review

This element provides for (1) review of the various TAPS monitoring and surveillance program(s); (2) analysis of any emerging issues, concerns, and associated corrective actions; (3) assessment of the process by which issues, concerns and recommendations are tracked through to closure (either justification for no work required or development of a work activity such as baseline maintenance or project development); and (4) JPO field monitoring to track identified issues, concerns or corrective actions.

#### TAPS Maintenance Baseline Assessments

This element provides a comprehensive evaluation of (1) the maintenance program for TAPS; (2) the integrity of critical TAPS systems; and (3) the useful life of TAPS. To accomplish this, the JPO is in the process of conducting (1) an Asset Maintenance Management (AMM) assessment; and (2) Reliability-Centered Maintenance (RCM) analyses of critical TAPS systems. The AMM assessment is to provide a relative measure of the current approach to TAPS maintenance. The RCM analyses are to facilitate identification of the critical system(s) current functional state and the maintenance requirements necessary to ensure long term (30 year) operational safety and reliability. This work element is of particular importance today as TAPS is a declining asset and the expert workforce is aging.

#### JPO 1997/1999 Maintenance CMP Issues

This element provides for tracking resolution of the following issues identified in the 1997/1999 Maintenance CMP review.

1. TAPS Electrical Systems
2. Preventive Maintenance
3. Slope Stability
4. Erosion Control
5. Valve Maintenance
6. Work Pad Maintenance
7. Material Sites
8. Change Management (AAI 1955)

#### Results/Conclusions

##### TAPS Monitoring and Maintenance

The subject of maintenance and the definition of what might be considered "successful" or "adequate" for a particular piece of equipment, or its parent system, is subjective and thereby open to interpretation. However, over the period of this review, JPO has accumulated data which evidences some inadequacies in maintenance management and opportunities for Alyeska Pipeline Service Company (APSC) to improve its maintenance practices on TAPS. The following provides a summary conclusion regarding APSC management of TAPS maintenance:

**APSC Corrective Action Process:** The corrective action process at APSC whereby the results of systems monitoring efforts transition into maintenance work activities (or documented justification for no work required) is inconsistent, ill defined, and in some cases absent. A clearly defined and integrated corrective action process, which considers all the maintenance needs of TAPS in a comprehensive manner, in order to make work funding and scheduling decisions, is not apparent within the APSC maintenance management process. This was concluded from not only JPO oversight efforts, but APSC audits as well.

##### TAPS Maintenance Baseline Assessments

The work associated with this element, over the period covered by this report, has primarily involved (1) researching industry maintenance management strategies; (2) planning and scoping the integration of JPO agency participation; (3) briefing APSC on the intent of this effort and expectations

for APSC participation; and (4) procurement of consulting maintenance management experts. Implementation of this work element commenced in November 2000. Initial work has consisted of criticality analyses of TAPS systems, and training of JPO and APSC personnel to the RCM process.

JPO has emphasized to APSC, as well as the owner companies, the need for this effort to meet the TAPS maintenance and right-of-way requirements discussed in section 4.0 Requirements of this report. APSC has recognized the benefits of this effort and formally agreed to support its implementation through the signing of a Memorandum of Agreement (MOA), dated January 9, 2001. A copy of this MOA is provided as attachment (1) to this report.

APSC has conducted their own Asset Maintenance Management (AMM) assessments, one for the Pipeline Business Unit (PBU) and one for the Valdez Business Unit (VBU). APSC procured a team of maintenance management consultants, headed by BP Amoco, to conduct these assessments, and has shared the associated philosophy, methodology, scope, and results with the JPO. APSC has begun implementation of the results of these assessments and has maintained an open relationship with JPO throughout these efforts.

#### Grant/Lease and Regulatory Compliance

JPO has implemented a systems based oversight structure which provides for evaluation of compliance to Grant/Lease and regulatory requirements as they pertain to the systems which comprise TAPS. The non-compliances and potential non-compliances identified through this CMP effort are entered into the JPO CMP database to facilitate tracking their resolution and development of a history of deficiencies identified on TAPS. It should be noted that many of the cited non-compliances have been corrected, yet they are still listed here in order to provide completeness in describing JPO maintenance oversight results for 1999/2000. The current status for each will be maintained in the CMP database. The Grant/Lease and regulatory non-compliances and potential non-compliances identified through this CMP effort are listed below. For each cited non-compliance, the affected TAPS system is identified, along with the applicable section of this report which provides the results discussion.

#### **Principle 3 'Permittees Management of Pipeline System Maintenance':**

System: Linewide (programmatic)  
(sections 5.1.1, 5.1.2.3, 5.1.4, 5.1.5, 5.1.8, and 5.4)

#### **Stipulation 1.17 Fire Prevention and Suppression:**

Systems: VMT Fire Suppression System (section 5.4)

#### **Stipulation 1.18 Surveillance and Maintenance:**

Systems: Aboveground Mainline Pipe (section 5.1.4)  
Belowground Mainline Pipe (section 5.1.5)  
Pipeline River and Stream Crossings (section 5.1.2.3)  
Pipeline Bridges (section 5.1.8)  
VMT Fire Suppression System (section 5.4)

#### **Stipulation 1.20 Health and Safety:**

Systems: VMT Operations Control Center (OCC) (section 5.4)  
VMT Tanker Vapor Control System (TVCS) (section 5.4)  
VMT Fire Suppression System (section 5.4)

#### **Stipulation 1.21 Conduct of Operations:**

Systems: Linewide - Cold Restart (Section 5.4)

VMT OCC (section 5.4)  
VMT TVCS (section 5.4)  
VMT Fire Suppression System (section 5.4)

**Stipulation 2.2 Pollution Control:**

Systems: VMT TVCS (section 5.4)

**Stipulation 2.5 Fish and Wildlife Protection:**

Systems: Pipeline River and Stream Crossings (sections 5.1.2.3 and 5.4)

**Stipulation 2.6 Material Sites:**

Systems: Material Sites (section 5.3.7)

**Stipulation 2.8 Disturbance of Natural Water:**

Systems: Pipeline River and Stream Crossings (section 5.4)

**Stipulation 2.14 Contingency Plans:**

Systems: Pipeline Bridges (section 5.4)

**Stipulation 3.2 Pipeline System Standards:**

Systems: Belowground Mainline Pipe (section 5.1.5)

Additionally, USDOT/OPS identified regulatory non-compliances to the following:

Systems: Pressure Control Systems  
Mainline Valve Maintenance  
External Corrosion Control  
Internal Corrosion  
General Safety requirements  
Pipeline Repairs

**Stipulation 3.3 Construction Mode Requirements:**

Systems: Belowground Mainline Pipe (section 5.1.5)

**Stipulation 3.5 Slope Stability:**

Systems: Aboveground Mainline Pipe (sections 5.1.4 and 5.4)

**Stipulation 3.9 Construction and Operation:**

Systems: Aboveground Mainline Pipe (sections 5.1.4 and 5.4)  
Pipeline River and Stream Crossings (section 5.4)