



disruption will not occur at any place from soil instability. Effects and their interaction, which are to be analyzed on a mile by mile basis to justify the proposed Construction Mode, shall include but not be limited to, thaw plug stability, differential settlement, seismic loading and weakening, and possible movement resulting from slope instability.<sup>3</sup>

As a prerequisite for the use of this criterion, an acceptable comprehensive monitoring system of the Pipeline shall be developed which will include but not be limited to making deformation measurements sufficiently sensitive and prompt to detect the approach to operational tolerance limits (which shall be clearly specified) of the Pipeline; design specifications, operational requirements, and feasibility analysis of such monitoring system shall be submitted in accordance with Stipulation 1.7. Such system shall be operational prior to transmission of Oil through the Pipeline.

**3.4. Earthquakes and Fault Displacements**

**3.4.1. Earthquakes**

**3.4.1.1.** The Pipeline System shall be designed, where technically feasible, by appropriate application of modern, state-of-the-art seismic design procedures to prevent any Oil leakage from the effects (including seismic shaking, ground deformation and earthquake-induced mass movements) of earthquakes distributed along the route as follows:

Zone:	<i>Richter magnitude</i>
Valdez to Willow Lake.....	8.5
Willow Lake to Paxson.....	7.0
Paxson to Donnelly Dome.....	8.0
Donnelly Dome to 67 deg. N.....	7.5
67 deg. N. to Prudhoe Bay.....	5.5

**3.4.1.2.** Where such design is not technically feasible, the potential damage from an Oil spill shall be minimized by special design provisions that shall include, but shall not be limited to: (1) a network of ground-motion detectors that continuously monitor, record and instantaneously signal the occurrence of ground motion in the vicinity of the Pipeline reaching the Operational Design Level<sup>4</sup> (the critical levels of ground mo-

<sup>3</sup> Because of soil variability and/or unique hydrologic conditions in active flood plains, some of the requirements of Stipulation 3-3.1 may not be met in those locations. In such cases proposed designs including special design and/or construction procedures where required by these conditions must be submitted with justification to the Authorized Officer for approval in accordance with Stipulation 1.7.

<sup>4</sup> Highest level that would not produce general pipe deformation sufficient to limit operations.

tions shall be approved in writing by the Authorized Officer); (2) rapid programmed shut-down and prompt close inspection of system integrity in the event of ground motion reaching the Operational Design Level; and (3) a special contingency plan for Oil Spill Control for each such seismically hazardous area which shall be filed in accordance with Stipulation 2.14. This plan shall specifically consider expected field conditions in the particular area in the aftermath of a destructive earthquake.

**3.4.2. Fault Displacements**

**3.4.2.1.** Prior to applying for a Notice to Proceed for any Construction Segment, Permittees shall satisfy the Authorized Officer that all recognizable or reasonably inferred faults or fault zones along the alignment within that segment have been identified and delineated, and that the risk of Oil leakage resulting from fault movement and ground deformation has been adequately assessed and provided for in the design of the Pipeline for that segment. Evaluation of said risk shall be based on geologic, geomorphic, geodetic, seismic, and other appropriate scientific evidence of past or present fault behavior and shall be compatible with the design earthquakes tabulated above and with observed relationships between earthquake magnitude and extent and amount of deformation and fault slip within the fault zone.

**3.4.2.2.** Minimum design criteria for a segment of the Pipeline traversing a fault zone that is reasonably interpreted as active, shall be: (1) that the Pipeline resist failure resulting in leakage from two feet of horizontal and/or vertical displacement in the foundation material anywhere within the fault zone; and (2) that no storage tank or pump station be located within the fault zone.

**3.4.2.3.** Where the Pipeline crosses a fault or lies within a fault zone that is reasonably interpreted as active, Permittees shall monitor crustal deformation in the vicinity of the Pipeline. Such monitoring shall include annual geodetic observation of permanent reference marks established on stable ground. Said reference marks shall be positioned so as to form closed figures and to provide for detection of relative horizontal and vertical displacements as small as 0.10 ft. across principal individual faults within the fault zone and to provide for monitoring of crustal strain with an absolute error of two parts per million within the fault zone. Further, where annual slip on a fault exceeds 0.10 ft. for two successive years,



Permittees shall install recording or telemetering slip-meters. Data obtained from the monitoring shall be provided to the Authorized Officer at specified regular intervals throughout the operational life of the Pipeline. Said data shall be used by the Permittees to aid in the initiation of corrective measures to protect the Pipeline from failure caused by tectonic deformation that would result in leakage.

### **3.5. Slope Stability**

**3.5.1.** Areas subject to mudflows, landslides, avalanches, rock falls and other types of mass movements shall be avoided where practicable in locating the Pipeline. Where such avoidance is not practicable, the Pipeline design, based upon detailed field investigations and analysis, shall provide measures to prevent the occurrence of, or protect the Pipeline against, the effects of mass movements.

### **3.6. Stream and Flood Plain Crossings and Erosion**

#### **3.6.1. General**

**3.6.1.1.** For each region through which the Pipeline passes, the Pipeline shall be designed to withstand or accommodate the effects (including runoff, stream and flood plain erosion, meander cutoffs, lateral migration, ice-jams, and icings) of those meteorologic, hydrologic (including surface and subsurface) and hydraulic conditions considered reasonably possible for the region. The following standards shall apply to such Pipeline design:

**3.6.1.1.1.** For stream crossings and portions of the Pipeline within the flood plain.

**3.6.1.1.1.1.** The Pipeline shall cross streams underground unless a different means of crossing is approved in writing by the Authorized Officer.

**3.6.1.1.1.2.** The design flood shall be based on the concept of the "Standard Project Flood" as defined in Corps of Engineers Bulletin 52-8, Part 1.

**3.6.1.1.1.3.** The depth of channel scour shall be established by appropriate field investigations and theoretical calculations using those combinations of water velocity and depth that yield the maximum value. At the point of maximum scour, the cover over the pipe shall be at least twenty (20) percent of the computed scour, but not less than four (4) feet.

**3.6.1.1.1.4.** For overhead crossings comparable analysis shall be made to ensure that support structures are adequately protected from the effects

of scour, channel migration, undercutting, ice forces and degradation of permafrost.

**3.6.1.1.1.5.** In flood plains, appropriate construction procedures shall be used wherever there is potential channelization along the pipe.

**3.6.1.1.1.6.** The pipe trench excavation shall stop an adequate distance from the water crossing to leave a protective plug (unexcavated material) at each bank. These plugs shall be left in place until the stream bed excavation is complete and the pipe laying operation is begun. The plugs shall not be completely removed until absolutely necessary. The trench shall be backfilled with stable material as soon as the pipe is laid.

#### **3.6.1.2. Culverts and Bridges.**

**3.6.1.2.1.** Culverts and bridges necessary for maintenance of the Pipeline shall be designed to accommodate a fifty (50)-year flood in accordance with criteria established by the American Association of State Highway Officials and the Federal Highway Administration and endorsed by the State of Alaska Department of Highways.

#### **3.6.2. Erosion**

**3.6.2.1.** Where necessary because of outfall erosion, stilling basins shall be constructed at the outflow end of culverts. To prevent erosion the pool sides shall be stabilized by appropriate methods; e.g., by the use of riprap.

**3.6.2.2.** Slopes of cuts through stream banks shall be designed and constructed to minimize erosion and prevent slides.

**3.6.2.3.** Erosion control procedures shall accommodate and be based on the runoff produced by the maximum rainfall rate and snow melt rate combination reasonably characteristic of the region. The procedures shall also accommodate effects that result from thawing produced by flowing or ponded water on permafrost terrain.

#### **3.7. Sea Waves**

**3.7.1.** Oil transfer facilities at the Valdez terminal shall be protected by cut-off devices designed and located to prevent major Oil leakage from breaking of pipes by destructive sea waves comparable to those generated in Port Valdez by the March 27, 1964 earthquake. Design for such protective features shall be submitted in accordance with Stipulation 1.7.

#### **3.8. Glacier Surges**

**3.8.1.** Surveillance systems sufficient to give adequate warning of impending surges on any glacier that could damage the Pipeline shall be instituted prior to transmission of Oil through the pipe. Pro-



cedures for initiation and operation of such surveillance systems and protective procedures in the event of such surges shall be submitted in accordance with Stipulation 1.7.

### **3.9. Construction and Operation**

**3.9.1.** All construction, operation, maintenance, and termination activities in connection with the Pipeline System shall be conducted so as to avoid or minimize thermal and other environmental changes and to provide maximum protection to fish and wildlife and their habitat, and people. 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.

**3.9.2.** Acceptable plans, procedures and quality controls that ensure compliance with Stipulation 3.9.1 shall be submitted in accordance with Stipulation 1.7.

### **3.10. Pipeline Corrosion**

**3.10.1.** Permittees shall provide detailed plans for corrosion resistant design and methods for early detection of corrosion. These shall include: (1) pipe material and welding techniques to be used and information on their particular suitability for the environment involved; (2) details on the external pipe protection to be provided (coating, wrapping, etc.), including information on variation of the coating process to cope with variations in environmental factors along the Pipeline route; (3) plans for cathodic protection including details of impressed ground sources and controls to ensure continuous maintenance of adequate pro-

tection over the entire surface of the pipe; (4) details of plans for monitoring cathodic protection current including spacing of current monitors; (5) provision for periodic intensive surveys of trouble spots, regular preventive maintenance surveys and special provisions for abnormal potential patterns resulting from the crossing of the Pipeline by other pipelines or cables; and (6) information on precautions to be taken to prevent internal corrosion of the Pipeline. Permittees shall also provide for periodic internal pitting surveys by electro-magnetic or other means.

### **3.11. Containment of Oil Spills**

**3.11.1.** Permittees shall provide Oil spill containment dikes or other structures around storage tanks at pump stations and at the Valdez terminal. The volume of the containment structures shall be at least: (1) one-hundred ten (110) percent of the total storage volume of the storage tanks in the relevant area, plus (2) a volume sufficient for maximum trapped precipitation and runoff which might be impounded at the time of the spill. Such structures shall be constructed to withstand failure from earthquakes in accordance with Stipulation 3.4 and shall be impervious so as to provide seepage-free storage until disposal of their contents can be effected safely without contamination of the surrounding area.

**3.11.2.** Permittees shall provide containment dikes or other structures to minimize effects of Oil spills at critical locations along the Pipeline in accordance with Stipulation 2.14.





**EXHIBIT E**

**COOPERATIVE AGREEMENT**

*between*

**UNITED STATES DEPARTMENT OF THE INTERIOR**

*and*

**STATE OF ALASKA**

*regarding the*

**PROPOSED TRANS-ALASKA PIPELINE**

THIS AGREEMENT, effective this 8th day of January, 1974, by and between the United States Department of the Interior (hereinafter referred to as the "Department") and the State of Alaska (hereinafter referred to as the "State"), which together are hereinafter referred to jointly as "Parties,"

WITNESSETH

WHEREAS, the State has the authority pursuant to AS 38.05.020 to enter into this agreement with the Department in order to protect the lands, waters and natural environment of Alaska;

WHEREAS, the Secretary of the Interior (hereinafter referred to as the "Secretary") has the authority to enter into agreements involving the improvement, management, use and protection of the public lands and their resources pursuant to Section 102 of the Public Land Administration Act, 74 Stat. 506 (1960), 43 U.S.C. § 1363 (1970);

WHEREAS, the Parties have been requested to issue rights-of-way and other authorizations for the construction of an oil pipeline system from Prudhoe Bay to Valdez, Alaska;

WHEREAS, the Congress of the United States has determined that early construction of such an oil pipeline system is in the national interest and has authorized and directed the Secretary and other appropriate Federal officers and agencies to issue and take all necessary action to administer

and enforce rights-of-way and other authorizations that are necessary for or related to the construction of the Trans-Alaska oil pipeline system;

WHEREAS, the Legislature of Alaska, in special session, has enacted legislation to establish authority and guidelines for a right-of-way lease for that system;

WHEREAS, the Secretary will designate a Federal Authorized Officer and the Governor of Alaska will appoint a State Pipeline Coordinator who will, respectively, have general supervision and control over the functions in Alaska of the Department and the State with respect to the construction of the pipeline system;

WHEREAS, it is anticipated that detailed technical and environmental stipulations relating to construction of the pipeline system will be incorporated in the right-of-way and other authorizations of each of the Parties, and that the State and Federal stipulations will be similar in all major respects;

WHEREAS, it is necessary to provide for review and approval of designs and surveillance of construction activities in order to assure compliance with the aforesaid stipulations; and

WHEREAS, it is the purpose of this agreement to promote an effective working relationship between the Parties in order to provide maximum



protection for the environment without unnecessary delays in construction of the pipeline system;

NOW, THEREFORE, the Parties agree as follows:

### I. LANDS—LEASE AND PERMIT

1. The State and Department recognize the following categories of land to be made subject to the rights-of-way and other authorizations of the State or the Department and that such lands constitute all of the land along the proposed pipeline right-of-way that is not owned by private parties and therefore is subject to the authority of either the Department or the State to authorize rights-of-way.

- (a) Lands patented to the State.
- (b) Lands selected by and tentatively approved to the State and not withdrawn under section 11(a)(2) of the Alaska Native Claims Settlement Act, 85 Stat. 696, 43 U.S.C. § 1610 (1970).
- (c) Lands selected by the State and not tentatively approved and not withdrawn under section 11(a)(2) of the Alaska Native Claims Settlement Act.
- (d) Lands selected by the State and not tentatively approved and which were withdrawn under section 11(a)(2) of the Alaska Native Claims Settlement Act but which are not available for village or regional selection under section 22(1) of the Alaska Native Claims Settlement Act, 85 Stat. 713, 43 U.S.C. § 1621 (1970).
- (e) Lands selected by the State, both tentatively approved and not tentatively approved, and withdrawn under section 11(a)(2) of the Alaska Native Claims Settlement Act.
- (f) Lands beneath navigable waters as defined in Section 2 of the Submerged Lands Act, 67 Stat. 29, 43 U.S.C. § 1301 (1970).
- (g) Lands in Federal ownership that have not been selected by the State.

2. The State will issue its right-of-way and other authorizations for lands in categories 1(a), 1(b), and 1(f). The Department will issue its rights-of-way and other authorizations for lands in categories 1(e) and 1(g).

3. Both the State right-of-way lease or other grant and the Federal right-of-way authorization will include the lands in categories 1(c) and 1(d)

and each will be effective in accordance with the following terms:

- (a) Lands in category 1(c) will be tentatively approved or patented to the State no later than fifteen (15) days after compliance by the Parties with all applicable regulations. The Parties will immediately initiate and expeditiously complete such compliance. The State will thereupon immediately proceed to issue a right-of-way lease or other grant and such authorizations as are necessary for construction and operation of the pipeline system on said lands.
- (b) The Department will take all necessary action preparatory to tentatively approving or patenting the lands in category 1(d) to the State within twenty-five (25) days from the effective date of this agreement and will tentatively approve or patent those lands promptly upon receipt of notice from the Commissioner of Natural Resources that the State is prepared to issue a right-of-way lease or other grant and such other authorizations as are necessary for construction and operation of the pipeline system on said lands.
- (c) The Federal right-of-way in and to lands in categories 1(c) or 1(d), or both, will vest in the Parties receiving it on the date it is issued by the Department but only upon the occurrence of one of the following events, whichever occurs first:
  - (i) The Commissioner of Natural Resources notifies the Secretary in writing that it is essential for the expeditious construction of the pipeline system that the Federal right-of-way in and to some or all of the lands in categories 1(c) or 1(d), or both, vest in the Parties receiving it; or
  - (ii) The lands in category 1(d) have not been tentatively approved to the State and a valid State right-of-way lease or other grant in and to those lands has not been issued for the construction and operation of the pipeline system by March 10, 1974; or



- (iii) The lands in category 1(c) have not been tentatively approved to the State and a valid State right-of-way lease or other grant in and to those lands has not been issued for the construction and operation of the pipeline system by June 1, 1974;

*Provided as conditions:* First, that the Federal right-of-way is made subject to the State's valid pre-existing rights, if any, in and to those lands; Second, that upon either valid tentative approval or valid patent of any of those lands to the State, the existence or subsequent issuance of a valid State right-of-way lease or other grant in and to those lands terminates the Federal right-of-way and other authorizations, and the State right-of-way lease or other grant thereupon applies in all respects to those lands; Third, that the parties who receive the Federal right-of-way and other authorizations agree in writing to the first and second conditions herein and that they will not challenge the validity of the State's right-of-way lease or other grant on the basis of the existence of the Federal right-of-way and other authorizations or their interest therein, and the Federal right-of-way recites these three conditions; and, Fourth, that the Department will make every reasonable effort to tentatively approve and patent the lands to the State expeditiously.

## II. SURVEILLANCE

1. While the Parties will establish and maintain separate organizations to assure compliance with the terms and stipulations of their respective right-of-way authorizations and with their respective statutes and regulations, they will seek to coordinate the activities of these organizations as fully as possible. In the execution of their respective responsibilities the Parties will seek to provide maximum protection for the environment without unnecessary delays in construction of the pipeline. Pursuant to this general agreement, it is further agreed that:

- (a) The Parties will endeavor, both in central offices and in the field, to locate all personnel in the surveillance effort, including agents and third party contractors, in common locations and to utilize, insofar as possible, common logistical support, with the objective of maximizing communication between the two organizations.

- (b) Except as prohibited by law or by the Department's pipeline right-of-way agreement with the owners of the Trans-Alaska pipeline, (but the owners will be required by the State right-of-way lease to make the same available to the State), the Parties will share fully all information concerning the construction of the pipeline system and the surveillance thereof. The State and the Federal organizations will have complete and immediate access to the information of the other, on request, and there will be regular exchange of information regarding design reviews, application for and issuances of notices to proceed, temporary suspension orders, modification orders, reports on compliance in the field, construction change recommendations, all submissions by the holders of the rights-of-way, all third party contractor reports, applications for and issuance of permission to resume activity, and all other similar information. The timing, location, method and type of information exchanged shall be governed by the objective of the fullest possible access to information practical in order to maximize the decision-making capability of the Parties.

- (c) The Parties will have full and free access to the lands of each other for all purposes relating to the surveillance of the pipeline system and the enforcement of all State and Federal statutes and regulations.

2. All applications for notices to proceed, together with supporting documents, will be reviewed by both the State Pipeline Coordinator and the Federal Authorized Officer.

The State right-of-way lease will contain provisions regarding notices to proceed that assure review by the Pipeline Coordinator within the same time period as provided in the Department's right-of-way authorizations. The Authorized Officer or his designee, on behalf of the Department, may issue notices to proceed involving construction of any portion of the pipeline system. The Pipeline Coordinator or his designee, on behalf of the State, may issue notices to proceed with respect to any construction of the pipeline system on State lands, and no notice to proceed on lands