

# 5. Consultation and Coordination

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## 5.1 Public Scoping

The BLM published a Notice of Intent “To Prepare an Environmental Impact Statement (EIS) for the Renewal of the Federal Agreement and Grant of Right-of-Way (ROW) for the Trans-Alaska Pipeline System (TAPS)” in the *Federal Register* (Vol. 66, No. 147) on July 31, 2001. The Notice of Intent initiated the public scoping process and invited public comments on the content and issues that should be addressed in the EIS. The BLM conducted scoping for the proposal to renew the TAPS ROW grant from July 31 to October 19, 2001. During that period, the BLM invited the public and interested groups to provide information and guidance, suggest issues that should be examined, and express their concerns and opinions on all aspects (past, present, and future) of the proposal to renew the Federal Grant.

During the scoping process, seven ways were provided for the public to submit comments to the BLM on the proposal to renew the TAPS ROW:

- Open public meetings held in Anchorage, Barrow, Delta Junction, Fairbanks, Glennallen, and Valdez, Alaska;
- Traditional mail;
- Hand delivery;
- Toll-free facsimile transmission;
- Toll-free voice message;
- Electronic mail; and
- Directly through a Web site on the Internet.

This variety of ways to communicate issues and submit comments was provided so as to encourage maximum participation. All comments, regardless of how they were submitted, received equal consideration.

More than 1,700 people participated in the scoping process by providing comments,

requesting information, attending public or tribal consultation meetings, or visiting the TAPS Renewal EIS Web Site. In addition, more than 100 organizations, including Alaska Native organizations; environmental organizations; private industry; and local, state, and federal government agencies, provided comments. Several comments were documented during conversations and facilitated discussions at the public meetings. More than 230 individuals and organizations provided comments. Those comments were submitted in the following ways:

- 53% via the TAPS Renewal EIS Web Site,
- 15% orally at public meetings,
- 11% by fax,
- 9% by regular mail,
- 7% by e-mail,
- 4% delivered by hand, and
- 1% by telephone.

Comments originated from 37 states and the District of Columbia. Of those comments, 48% were from Alaska and 52% were from the other states. States with the most commentors were Alaska, 100; California, 19; Wisconsin, 8; and Texas, 6. Georgia, New York, and Pennsylvania each had 5 commentors. Other states had 4 or fewer commentors, with 11 states having just one commentor. No comments were received from other countries. During the scoping period, a total of 2,411 visits were made by 1,370 visitors to the TAPS Renewal EIS Web Site.

The BLM published a scoping report (BLM 2001) that summarized and categorized the major themes, issues, concerns, and comments expressed by private citizens, government agencies, Alaska Natives, private firms, and nongovernmental organizations. The BLM considered the comments in developing the alternatives and analytical issues that are contained in this EIS.

## 5.2 Public Comment on the DEIS

The Notice of Availability (NOA) of the DEIS was published by the Environmental Protection Agency in the *Federal Register* on July 5, 2002 (Volume 67, Number 129). Publication of the NOA began the required 45-day public comment period on the DEIS. The public comment period closed at 5 P.M. (ADT) on August 20, 2002.

The BLM made a concerted effort to publicize the availability of the DEIS and the schedule and locations for public hearings. As an example at how public hearings were publicized, notices for the Cordova public hearing appeared in a variety of formats, including the following:

- June 24, 2002: The TAPS Renewal EIS Newsletter was mailed to more than 400 subscribers (signup for TAPS Renewal EIS information was throughout the scoping process and continues) announcing public hearing dates and locations.
- July 3, 2002: Draft EISs mailed to the Cordova Public Library, the Cordova Mayor's office, and pre-identified directly affected Tribes. The DEIS included a letter that listed the public hearing dates and locations.
- July 5, 2002: *Federal Register* Notice of DEIS Availability and public hearing locations and times.
- July 5, 2002: Anchorage Daily News, Fairbanks Daily News-Miner, and Juneau Empire display ad for DEIS availability and public hearings.
- Public notices for the DNR Commissioner's Proposed Statement of Reasons and Written Determination in the Anchorage Daily News (July 3 and 10, 2002), Fairbanks Daily News-Miner (July 5, 2002), and Juneau Empire (July 5, 2002).
- July 5, 2002: 4-page comprehensive news release sent to all newspapers in Alaska, to include the Cordova Times, the Valdez Vanguard, the Arctic Sounder, Anchorage Daily News, Fairbanks Daily News-Miner.

- July 10, 2002: The Valdez Vanguard and the Valdez Star half-page display ad with hearing schedule.
- July 10, 2002: The Valdez Vanguard public notices for the DNR Commissioner's Proposed Statement of Reasons and Written Determination.
- July 11, 2002: The Cordova Times and the Arctic Sounder half-page ad (page 9) with hearing schedule.
- July 11, 2002: The Cordova Times public notices (page 11) for the DNR Commissioner's Proposed Statement of Reasons and Written Determination.
- July 24, 2002: The Valdez Vanguard half-page display ad reminding the public about the hearing.
- July 25, 2002: The Cordova Times, the Valdez Vanguard, and Copper Valley Weekly half-page display ad reminding the public about the hearing.

In early June, the TAPS Renewal EIS web site (<http://tapseis.anl.gov>) posted the public hearing dates and locations. An electronic news release was sent to more than 430 subscribers throughout Alaska and the nation announcing the information. The subscription list was built from the names of people who attended or spoke at public scoping meetings or who throughout the past year asked to be added to the list.

During the public comment period, six ways were provided for the public to submit comments on the DEIS:

- Open public hearings were held in Cordova, Valdez, Glennallen, Fairbanks, Minto, Anchorage, and Barrow. The meetings were facilitated by a hearing officer and all testimony was captured verbatim by a court reporter.
- Traditional mail.
- Hand delivery.
- Toll-free facsimile transmission.

- Toll-free voice message.
- Directly through a Web site on the internet.

This variety of ways to provide comments was intended to encourage maximum participation. All comments, regardless of how they were submitted, received equal consideration.

More than 580 people and organizations participated in the public comment process by providing letters, oral testimony, Internet-based comments, faxes, or voice message comments. More than 100 recognized organizations (public and private), including Alaska Native organizations, provided comments on the DEIS. The breakdown of comment documents (sets of comments from an individual or organization) by mode of submittal was as follows:

- 47% by fax,
- 30% orally at public hearings,
- 15% by regular mail,
- 7% via the TAPS Renewal EIS Web Site,
- 1% by phone, and
- Less than 1% hand delivered.

Approximately 460 individuals and organizations provided state and country locations. Based on that information, comments were received from a minimum of 32 states, the District of Columbia, and two foreign countries. Of those commentors, 55% were from Alaska and 45% were from the other states. States with the most commentors included Alaska (252), California (33), New York and Ohio (14 each), Illinois (13), Washington and Pennsylvania (12 each), Texas (11), Oregon (9), New Jersey (7), and Virginia, Florida, and Massachusetts (6 each).

Based on the documents received during the public comment period, comment categorization resulted in approximately 3,200 individual comments. Responses to comments are in Volume 6 of the FEIS.

## 5.3 Government-to-Government Consultation

The federal government works on a government-to-government basis with Alaska Native Tribes. The government-to-government relationship was formally recognized on November 6, 2000, with Executive Order 13175. As a matter of practice, the BLM coordinates with all tribal governments, associated Native communities, Native organizations, and individuals who are interested in the TAPS ROW renewal process. The BLM has given substantial consideration to the proper conduct of government-to-government consultations for this project in order to provide for multiple opportunities for Tribal consultation.

The BLM developed an explicit consultation process that offers specific opportunities to “directly and substantially affected” Tribes as required under the government-to-government provisions. Executive Order 13175 stipulates that Tribes identified as “directly and substantially affected” be consulted by federal agencies during the NEPA process. In May 2001, 19 Tribes (later increased to 21) were identified by the BLM as being “directly and substantially” affected by the TAPS ROW renewal process. The BLM applied the following decision method in determining “directly and substantially affected” Tribes.

**Step 1:** The BLM first sent letters to all recognized Tribes (223) within the state on April 26, 2001 (the list was provided by the Bureau of Indian Affairs). These letters provided tribes with basic information regarding the proposed renewal and the process the BLM was following to renew the ROW grant. Tribes were invited to contact the BLM if they were interested in further discussions on the topic. Two responses were received in response to the April letter.

**Step 2:** The BLM then identified and applied the following criteria to determine whether a Tribe might be “directly and substantially affected.”

**Criterion 1: Potential Effects on Subsistence.** Potential effects on subsistence that could be directly attributed to the TAPS or indirectly through North Slope development (current or reasonably projected), road development associated with the TAPS, or the shipment of oil from Valdez. Potential impacts from these activities were determined by:

- Overlaying their subsistence use areas on the TAPS or on the oil fields,
- Determining whether the TAPS or oil fields intersected traditional subsistence areas,
- Determining whether TAPS-associated roads (principally the Dalton Highway) intersected and allowed access to traditional subsistence areas,
- Determining whether the TAPS, TAPS-associated roads, and North Slope oil fields intersected the migratory patterns of wildlife important to subsistence, and
- Determining whether potential or actual oil spills from the TAPS, related oil fields, or tankers could affect subsistence use and/or resources.

**Criterion 2: Potential Effects on Employment.** The TAPS and the North Slope oil fields are major employers in the state. The TAPS may affect Tribes directly through employment by APSC or one of its contractors. In addition, there are indirect effects through employment in the North Slope oil fields or through TAPS-related work conducted in the vicinity of a village that influences the volume of business in local stores and other enterprises.

**Criterion 3: Effects on Culture.** The improved access that TAPS-related facilities (e.g., access roads and transportation corridors) provide to formerly isolated villages and the economic impact of the TAPS and North Slope oil development have ramifications on the sociological, political, and other cultural aspects of Tribes and local villages.

**Criterion 4: Effects on Land Selection.** ANCSA corporations in some

instances did not select certain lands in order to facilitate the initial construction of the TAPS. Foregoing these selections may have affected Tribe members who are also shareholders in these ANCSA corporations.

**Criterion 5: ANCSA Section 7(i) and Grant Section 29.** These provisions define effects on Tribe member employment.

Applying the criteria to all 223 Tribes resulted in the identification of 19 Tribes as “directly and substantially affected.” One of these Tribes was found to not be federally recognized and was dropped from the list. Three other Tribes were added later on the basis of information provided by the Tribes. Several other Tribes asserted that they were affected but did not provide requested information to help the BLM substantiate the appropriateness of the designation.

The 21 identified Tribes were afforded explicit consultation opportunities throughout the renewal process to ensure that they had ample opportunities for meaningful participation. In addition to carrying out the public scoping and DEIS review and comment steps, the BLM conducted more intensive consultation activities with the 21 Tribes identified as “directly and substantially affected,” as well as other interested Native organizations. Table 5.3-1 shows consultation activities that were undertaken in addition to or in combination with the other public outreach efforts.

Table 5.3-1 does not include the regular phone contacts and information exchange conducted by the project’s Native Liaison Officer, an Alaska Native and former President of the Tanana Chiefs’ Conference.

Throughout the renewal process, the BLM and the EIS team provided special presentations or further information exchange (see Table 5.3-1). The BLM listened to the concerns of the Native people. The majority of concerns were related to employment opportunities, possible impacts on a subsistence life style, the importance of preserving the subsistence-oriented aspects of traditional culture, and spill response activities.

**TABLE 5.3-1 Government-to-Government Consultation Summary**

Activity	Period in Renewal Process	Date
Held two meetings with the AFN Right-of-Way Subcommittee and the JPO and the BLM prior to application having been submitted.	Pre-application	
Sent certified letter to 223 Tribes in Alaska notifying them that the BLM expected to receive an application to renew the TAPS. The letter described and explained the process envisioned and invited further questions or dialogue.	Pre-application	April 26, 2001
Filed the application to renew the TAPS ROW Grant. In May, the BLM identified the directly affected Tribes.	Application review and pre-scoping	May 2, 2001
Met with Chugach Alaska Native shareholders and Tribal representatives in Valdez.	Pre-application	May 12, 2001
Met with Tribal/First Nations Oil and Gas Coalition.	Pre-application	May 21, 2001
Mailed certified Letters to "directly and substantially affected" Tribes (with CD-ROM, <i>Federal Register</i> Notice, and process explanatory materials) notifying them of application receipt, that they would receive a notification of scoping, and offered a visit by staff to explain the application or to provide further information. Requested if they would assist in planning for a convenient scoping meeting.	Application review and pre-scoping	May 25, 2001
Met with AFN and TAPS owners renewal representatives to share information on government-to-government provisions.	Application review and pre-scoping	June 13, 2001
Mailed 50 background and renewal information packets to Tanana Chiefs Council at its request.	Application review and pre-scoping	June 20, 2001
Met with Tanana Chiefs' Conference to discuss scoping and overall process.	Application review and pre-scoping	July 2001
Met with Copper River Native Association Chiefs to discuss scoping and overall process.	Application review and pre-scoping	July 16, 2001
Mailed letters to "directly and substantially affected" Tribes notifying them of scoping locations, dates, and times. Offered extra help to ensure meaningful participation in scoping.	EIS scoping	Aug. 3, 2001
Provided information of TAPS renewal to Copper River Native Association.	EIS scoping	Aug. 6, 2001
Responded to Mentasta request for inclusion in the "directly and substantially affected" category.	EIS scoping	Aug. 7, 2001
Contacted each Tribe by phone to inquire if they had any questions.	EIS scoping	Aug. 20, 2001
Mailed letter to N. Cesar, Bureau of Indian Affairs, regarding public scoping for TAPS Renewal EIS.	Application review and pre-scoping	Aug. 16, 2001
Sent letters to the three Alaska Native regional corporations (AHTNA, Chugach Alaska, and CIRI) that own land along the TAPS corridor to invite them to participate in the renewal process.	EIS scoping	Aug. 17, 2001

TABLE 5.3-1 (Cont.)

Activity	Period in Renewal Process	Date
Conducted Tribal scoping meetings in some “directly and substantially affected” villages, plus urban areas. Met face-to-face and briefed other Tribes as requested by the Tribes. Distributed handout materials. Met with Allakaket, Hughes, Evansville (Bettles), Alatna, and Minto (and not “directly and substantially affected” Huslia, Tanana, Manly Hot Springs, and Hughes).	EIS scoping	Sept. 5 and 6, 2001
Mailed letter to Qutecak Native Council regarding invitation to participate in public scoping for TAPS Renewal EIS.	EIS scoping	Sept. 6, 2001
Met with Nuiqsut Mayor.	EIS scoping	Sept. 9, 2001
Sent letter to Tanana Tribal Council regarding “directly and substantially affected” status in TAPS Renewal EIS.	EIS scoping	Sept. 21, 2001
Sent certified letters to the “directly and substantially affected” Tribes explaining the extension of the scoping period and the rescheduled scoping meetings.	EIS scoping	Sept. 26, 2002
Met with Eyak Tribal Council.	EIS scoping	Sept. 27, 2001
Met with Alaska Inter-Tribal Council staff.	EIS scoping	Sept. 30, 2001
Met with Tazlina Tribal Council.	EIS scoping	Oct. 2, 2001
Sent letters to Villages of Mentasta and Copper Center about TAPS Renewal EIS.	EIS scoping	Oct. 2, 2002
Briefed the Yukon-Kuskokwim Regional Advisory Councils (subsistence) on the renewal process.	EIS scoping	Oct. 11, 2001
Briefed Alaska Inter-Tribal Policy Council on the renewal process and government-to-government consultation.	EIS scoping	Oct. 11, 2001
Briefed Chugach Alaska Regional Corporation (and Tribes) on the renewal process.	EIS scoping	Oct. 11, 2001
Conducted public scoping meeting for EIS in Barrow.	EIS scoping	Oct. 12, 2001
Met with Stevens Village.	EIS preparation and prior to review	late Oct. 2001
Sent letter to Stevens Village about TAPS renewal process.	EIS preparation and prior to review	Dec. 3, 2001
Sent certified letters to all “directly and substantially affected” Tribes transmitting “Results of Scoping” report and second EIS newsletter.	EIS preparation and prior to review	Dec. 21, 2001
Sent letter to Native Village of Eklutna about Alaska Inter-Tribal Council scoping comments.	EIS preparation and prior to review	Jan. 8, 2002
Communicated (Argonne National Laboratory) with Native Village of Eklutna regarding Alaska Inter-Tribal Council resolution to establish trust fund related to the TAPS.	EIS preparation period	Jan. 8, 2002
Sent letter to Tanana Chief’s Conference about cooperating agency status.	EIS preparation and prior to review	Jan. 16, 2002

TABLE 5.3-1 (Cont.)

Activity	Period in Renewal Process	Date
Sent letter to Bureau of Indian Affairs regarding Native allotments and the TAPS Renewal EIS.	EIS preparation period	March 8, 2002
Sent certified sacred sites and traditional knowledge information request letter from Argonne National Laboratory.	EIS preparation and prior to review	April 3, 2002
Obtained final decision by Stevens Village that it did not want a public hearing in the village.	EIS preparation and prior to review	April 15, 2002
Met with AFN Right-of-Way Subcommittee to brief on how Native issues were captured and the methodology for addressing them in the EIS.	EIS preparation and prior to review	April 17, 2002
Sent certified letters to “directly and substantially affected” Tribes discussing the upcoming DEIS review. The following assistance was offered: (1) meetings in Valdez and Fairbanks to brief the Native issues coverage in the DEIS (middle of June time frame); (2) village briefings to assist in comment focus during DEIS 45-day review period; and (3) announcement of hearing locations and dates for the DEIS.	EIS preparation and prior to review	April 23, 2002
Sent letters to 10 Native allotment owners in the vicinity of the TAPS about TAPS renewal information.	EIS preparation and prior to review	April 23, 2002
Sent certified letters to “directly and substantially” affected Tribes inviting participation in meetings to discuss TAPS Renewal EIS issues of particular interest to Alaska Natives before release of the DEIS; facilitated workshops to help organize and submit comments on the DEIS; and held public hearings on the DEIS.	EIS preparation period	April 25, 2002
Sent letter to Native Village of Eyak about a DEIS briefing.	EIS preparation and prior to review	May 30, 2002
Conducted DEIS “Roll-Out” meetings in Cordova, Fairbanks, and Tazlina (three Tribes represented at Tazlina).	EIS preparation and prior to review	June 4, 6, and 25, 2002
Briefed Chugach Regional Resources Commission (six Tribes represented) on the renewal process and the status of the DEIS.	EIS preparation and prior to review	June 19, 2002
Mailed early “VIP” mail-out of DEIS from Argonne National Laboratory to 21 Tribes. This included notification of public hearing dates, times and locations, and comment solicitation.	DEIS Review	July 3, 2002
Held “facilitated review” meetings with Minto (included Manley Hot springs) and Allakaket (included Alatna and the Tanana Chiefs Conference) Tribes, as requested.	DEIS Review	July 15 and 16 2002
Prepared and distributed to 21 Tribes a <i>Guide to Reading for Subsistence in the DEIS</i> . Posted on Web sites.	DEIS Review	July 19, 2002
Conducted a facilitated DEIS review meeting for Ahtna people, as arranged.	DEIS Review	July 23, 2002
Met with Eyak Native Village to discuss DEIS and renewal.	DEIS Review	July 26, 2002

**TABLE 5.3-1 (Cont.)**

Activity	Period in Renewal Process	Date
Participated in one-hour nationally broadcast talk show "Native America Calling" as panelist with AFN and APSC.	DEIS Review	July 30, 2002
Conducted seven public hearings that specifically included Alaska National Interest Lands Conservation Act (ANILCA 810) "Subsistence Impact" proceedings at: Cordova, Valdez, Glennallen/Copper Center, Anchorage, Fairbanks Minto, and Barrow.	DEIS Review	July 26, 2002 July 30, 2002 July 31, 2002 Aug. 5, 2002 Aug. 6, 2002 Aug. 7, 2002 Aug. 9, 2002
Sent Draft Programmatic Agreement review letter to all 21 Tribes		Oct. 22, 2002

### 5.4 State of Alaska Coordination

The BLM, through the JPO, maintains close cooperation and communication with the State of Alaska in the renewal process for the TAPS ROW. The ADNR is the State of Alaska lead agency for renewal of the State Lease component of the TAPS ROW. The ADNR and BLM are working together in an integrated renewal process that satisfies both federal and state requirements. The coordination specifically addresses the production of the federal EIS and the state compliance report. By scheduling the coincident preparation of these two documents, the BLM and ADNR can coordinate public comment and publication cycles. It is expected that this coordination will allow for more efficient public input and permit a coordinated approach to interactions with the applicant.

### 5.5 Other BLM Planning Activities

The BLM has three multiple use land use plans that encompass portions of the TAPS. The Southcentral Management Framework Plan was issued in 1980 (BLM 1980). It covers portions of

the TAPS on BLM lands south of the Alaska Range but discusses no management decisions affecting the TAPS. The Fort Greely Resource Management Plan (RMP) was issued in 1994 (BLM and USARAK 1994). It acknowledges the prior existence of the TAPS and states that the BLM will protect "valid existing rights," which include the TAPS ROW through this military installation south of Delta Junction. The Utility Corridor Proposed RMP (BLM 1989) is the third plan. In this plan, the BLM makes the preeminence of the pipeline very clear for its lands north of the Yukon River. The 1991 ROD (BLM 1991) states that "the primary management direction and use of BLM-administered lands in the Utility Corridor is for energy transportation." The Utility Corridor Proposed RMP also states, "No proposed management action [in the plan] should be interpreted as limiting current or future energy transportation needs in the Utility Corridor. The need for the transportation of energy minerals supersedes all other uses of the Utility Corridor" (BLM 1989).

### 5.6 Agency Consultation

As required under Section 7 of the ESA, the BLM consulted with NMFS and USFWS on May 7, June 18, and July 1, 2002.

Section 305(b) of the Magnuson-Stevens Act requires federal agencies, including the BLM, to consult with NMFS if their actions may adversely affect designated essential fish habitat (EFH). During an EFH consultation, NMFS may recommend conservation measures that minimize the effects of the proposed action on EFH. In the present case, the BLM has prepared an EFH assessment and has determined that ROW renewal may result in short-term adverse effects to EFH under certain circumstances. Consequently, the BLM engaged in EFH consultation with NMFS to ensure its proposed action adequately minimizes the potential effects of ROW renewal and associated pipeline operations on designated freshwater and marine EFH. On October 17, 2002, NMFS issued a letter concurring that the proposed action adequately minimizes the potential effects on designated EFH.

NMFS concluded that on the basis of the information provided by the BLM in the EFH assessment, the NMFS concurred with the BLM finding that the proposed action of renewing the ROW for TAPS may result in short-term adverse effects on EFH. However, NMFS concurred with the BLM finding that these effects can be adequately avoided, minimized, and mitigated by the conservation measures associated with the proposed action. NMFS stated that EFH consultation requirements under the Magnuson-Stevens Fishery Conservation and Management Act have been satisfied.

The BLM has consulted with the Alaska SHPO and the 21 directly affected Tribes regarding the TAPS renewal EIS. The BLM, along with the Alaska SHPO and the Advisory Council on Historic Preservation, is also developing a programmatic agreement (PA) that clarifies the procedures pertaining to cultural resources in association with future TAPS operation. A PA defines the procedures for considering historic properties with respect to an entire agency program within the framework of Section 106 of the NHPA and formalizes the relationships between the various agencies responsible for compliance with Section 106 (16 USC §470f).

In a letter dated October 31, 2001, the BLM advised the applicants that the filing of a Coastal Zone Questionnaire with the State of Alaska

would be required for TAPS renewal (under the provisions of CFR 15, Part 930, Subpart D). On the basis of the filing of this questionnaire and other information, a coastal zone management consistency determination for TAPS renewal was issued by the State of Alaska, Division of Governmental Coordination, on September 5, 2002 (including technical revision dated September 10, 2002). On October 10, 2002, the BLM notified the applicants that this was sufficient.

The BLM has consulted with several land management agencies in the U.S. Department of Defense (DOD). The U.S. Army Alaska, Eielson Air Force Base, and the U.S. Army Corps of Engineers, Alaska District, all manage lands the TAPS crosses. The U.S. Army Space Missile Defense Command has also recently accepted custody of certain lands on Ft. Greely that contain TAPS ROW. A list of DOD-BLM consultation activities is as follows:

- June 1, 2001: Letter from BLM State Director (SD) to RADM Tom Barrett, USCG; concerning the upcoming TAPS renewal EIS with enclosures: *Federal Register* Notice, Renewal Process Chart, Renewal Application (15 volumes-separate cover). Identical letters also sent to U.S. Army Alaska (USARAK), Eielson Air Force Base (AFB), and U.S. Army Corps of Engineers (COE), Alaska District.
- August 16, 2001: Letter from BLM Authorized Officer (AO) Jerry Brossia to Brigadier General Bob D. DuLaney, Eielson Air Force Base, District Engineer, U.S. Army Corps of Engineers (COE), and Garrison Commander, USARAK Re: Scoping for TAPS Renewal EIS.
- October 24, 2001: Coordination meeting at JPO involving representatives of Eielson AFB, USARAK, COE, and JPO; TAPS Renewal Briefing.
- January 29, 2002: Letter from AO to Harold D. Hopson, Chief, Real Estate Division, U.S. Army Engineer District Alaska; Re: USAED/BLM Coordination for Trans-Alaska Pipeline System Right of Way Renewal with enclosures: National Energy Policy, TAPS Renewal Process flowchart.

- February 8, 2002: Letter from AO to Harold D. Hopson, Chief, Real Estate Division, U.S. Army Engineer District Alaska; Re: US Army Corps of Engineers' Requirements for Trans-Alaska Pipeline System Construction and Operations.
  - February 15, 2002: Letter from SD to Harold D. Hopson, Chief, Real Estate Division, U.S. Army Engineer District Alaska, Re: Trans-Alaska Pipeline System Right-of-Way Renewal on Chena River Lakes Project; asking for military concurrence.
  - February 15, 2002: Letter from SD to Col. Frederick Lehman, Garrison Commander, U.S. Army Garrison Alaska, Re: Trans-Alaska Pipeline System Right-of-Way Renewal on Forts Wainwright and Greely; asking them to forward concurrence to USCOE by mid-December 2002.
  - February 15, 2002: Letter from SD to Brigadier General Bob DuLaney, Eielson Air Force Base, Re: Trans-Alaska Pipeline System Right-of-Way Renewal on Eielson Air Force Base to Angi Gori by mid-December 2002.
  - April 17, 2002: Letter from Brigadier General Bob DuLaney stating that the Air Force will get their concurrence to Angi Gori by August 1, 2002.
  - April 24, 2002: Letter from Col. Frederick Lehman, Garrison Commander, U.S. Army Garrison Alaska, to Fran Cherry replying to SD's letter of February 15 stating that they want the signed ROD before processing the letter on non-objection.
  - May 3, 2002: Notes of telephone conversation between Martin Hansen and Angi Gori concerning upcoming Space and Missile Defense Command and Fort Greely land transfer.
  - May 31, 2002: Letter from Lt. Gen. Norton Schwartz, Commander, Alaskan Command (COMALCOM), to Secretarial Special Assistant Cam Toohey concerning request for a non-objection schedule.
  - July 18, 2002: Letter from James Helfinstine, USCG, to AO Re: Trans Alaska Pipeline System Compliance with Coast Guard Bridge Administration Regulations.
  - July 19, 2002: Letter from AO to Col. Steven P. Perrenot, District Engineer, U.S. Army Engineer District, Alaska; Re: Draft Environmental Impact Statement for Renewal of the Trans-Alaska Pipeline System; asking if the DEIS is sufficient to support the COE's NEPA compliance.
  - July 19, 2002: Letter from AO to Col. Frederick Lehman, Garrison Commander, U.S. Army Garrison Alaska; Re: Draft Environmental Impact Statement for Renewal of the Trans-Alaska Pipeline System; asking if the DEIS is sufficient to support USARAK's NEPA compliance actions.
  - July 19, 2002: Letter from AO to Brigadier General Bob DuLaney, Eielson Air Force Base; Re: Draft Environmental Impact Statement for Renewal of the Trans-Alaska Pipeline System; asking if the DEIS is sufficient to support AF NEPA compliance actions.
  - August 19, 2002: Letter from Harold D. Hopson Chief, Real Estate Division, U.S. Army Engineer District Alaska; concerning timing of the COE's review of the final EIS and concurrence to renewal on Chena River Lakes Project.
- In addition to the above, there have been scores of e-mails and phone calls to coordinate DOD input into the renewal process.

## 5.7 Other Federal Agencies

The BLM also notified the U.S. Forest Service and the National Park Service of the receipt of the renewal application, the opening of the scoping period, and the issuance of the DEIS.

## 5.8 References for Chapter 5

BLM (Bureau of Land Management), 1980, *Management Framework Plan for the Southcentral Planning Area*, Anchorage District Office, Anchorage, Alaska.

BLM, 1989, *Utility Corridor Proposed Resource Management Plan and Final Environmental Impact Statement*, Arctic District Office, Fairbanks, Alaska.

BLM, 1991, *Utility Corridor Resource Management Plan/Environmental Impact Statement Record of Decision*, Arctic District Office, Fairbanks, Alaska, Jan. 11.

BLM, 2001, *Summary of Public Scoping Comments, Trans-Alaska Pipeline System Right-of-Way Renewal Environmental Impact Statement*, Joint Pipeline Office, Anchorage, Alaska, Nov.

BLM and USARAK (U.S. Army Alaska Command), 1994, *Fort Greely Proposed Resource Management Plan Final Environmental Impact Statement*, Anchorage, Alaska.



## **6. Review and Analysis of Comments Received on the Draft Environmental Impact Statement**

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Comments received on the DEIS and responses to those comments are contained in Volume 6 of the FEIS. Section 5.2 summarizes the public comment process on the DEIS. The FEIS contains many changes in the text, figures, tables, and maps that are based on

input received from the public during the comment period on the DEIS. Wherever possible, responses to comments point to the changes that have been incorporated into the FEIS.



## 7. List of Preparers

The following is the list of individuals who participated in the preparation of this EIS.

Name	Education/Experience	Contribution
<b>Joint Pipeline Office</b>		
Taylor W. Brelsford	M.A. Anthropology; 10 years experience in subsistence research and tribal program administration and 10 years with federal subsistence management	Subsistence; sociocultural systems
James H. Ducker	Ph.D. History, M.A. History; 6 years of experience in historical research, 15 years in planning and environmental assessment	TAPS renewal NEPA coordinator; introduction; alternative descriptions
<b>Argonne National Laboratory</b>		
Joseph J. Adduci	B.A. Geography; 7 years of experience in geographic information system (GIS) applications	GIS data acquisition, integration, management and analysis; preparation of maps and figures
Cynthia A. Adornetto	MEPM (Masters in Environmental Policy and Management), B.S. Natural Resources Management; 17 years of experience in environmental planning and permitting, 8 years in environmental assessment	Technical lead for land use and coastal management; and for recreation, wilderness, and aesthetics
Timothy Allison	M.S. Mineral and Energy Resource Economics, M.A. Geography; 14 years of experience in regional analysis and economic impact analysis	Technical lead for economics
Georgia A. Anast	B.A. Mathematics/Biology; 12 years of experience in environmental assessment	Comment/response management; glossary
Halil I. Avci	Ph.D. Nuclear Engineering; 21 years of experience in safety analysis; 17 years in environmental assessment and waste management	Technical lead for the spill team
Bruce M. Biwer	Ph.D. Chemistry; 12 years of experience in environmental assessment, 10 years involving transportation risk	Transportation systems
James P. Butler	Ph.D. Environmental Health Sciences; 21 years of experience in health risk assessment	Technical lead for human health and safety

Name	Education/Experience	Contribution
Brian L. Cantwell	B.S. Forestry; 20 years of experience in cartography and geographic research, 5 years in geographical information system (GIS) applications	GIS data acquisition, integration, management and analysis; preparation of maps and figures
Young-Soo Chang	Ph.D. Chemical Engineering; 20 years of experience in meteorology, air quality, and noise impact assessments	Climate and meteorology; air quality; and noise
Kyong C. Chun	Ph.D. Environmental Health Engineering, M.S. Chemical Engineering; 30 years of experience in air pollution dispersion modeling, air quality monitoring and noise propagation modeling, and environmental impact assessments	Technical lead for climate and meteorology; air quality; and noise
John D. DePue	M.S. Biology; 27 years of experience in technical and environmental assessment editing	Lead technical editor
Stephen M. Folga	Ph.D. Gas Engineering; 8 years of experience in technology assessment and waste management	Spill scenarios
Larry J. Gorenflo	Ph.D. Geography, M.A. Anthropology; 24 years of experience in anthropological and geographical research, 15 years in environmental assessment	Technical lead for subsistence; sociocultural systems; cultural resources; paleontology; and environmental justice
Matthew Greby	B.A. Anthropology; 20 years of experience in archeological research	Paleontology
Rebecca A. Haffenden	J.D., B.A. Psychology; 12 years of experience in environmental regulation and environmental impact analysis	Hazardous materials and waste management
Heidi M. Hartmann	M.S. Environmental Toxicology and Epidemiology; 15 years of experience in exposure and risk analysis and public health assessment	Human health and safety analysis
John Hayse	Ph.D. Zoology; 16 years of experience in ecological research and environmental assessment	Biological resources analysis (fish)
Patricia E. Hollopeter	M.A. Philosophy; 20 years of experience in technical editing	Technical editor
Elizabeth K. Hocking	J.D.; 12 years of experience in regulatory and policy analysis.	Glossary of environmental laws

Name	Education/Experience	Contribution
Philip H. Kier	ScD Nuclear Engineering, J.D.; 40 years experience in engineering, 12 years in environmental assessment	Spill scenarios
Ronald L. Kolpa	M.S. Inorganic Chemistry, B.S. Chemistry; 30 years of experience in environmental regulation, auditing, and planning	Technical lead for hazardous materials and waste management; lead author for sections on existing mitigative measures and impacting factors
John R. Krummel	Ph.D. Ecology; 20 years of experience in ecological research and environmental assessment	Argonne program manager
James A. Kuiper	M.S. Biometrics, Certificate in Remote Sensing; 15 years of experience in geographic information systems (GIS), programming, and remote sensing	Technical lead for GIS data acquisition, integration, management and analysis; preparation of maps and figures
Kirk E. LaGory	Ph.D. Zoology, M.En. Environmental Science; 27 years of experience in ecological research, 16 years in environmental assessment	Technical lead for biological resources; threatened and endangered species
Michael A. Lazaro	M.S. Environmental Science (Atmospheric Physics), M.S. Nuclear Engineering; 30 years of experience in atmospheric modeling, environmental engineering, policy analysis, and environmental assessment	Technical lead for development of spill scenarios; fire analysis of spill events
John C. Molburg	Ph.D. Engineering and Public Policy, B.S. Mechanical Engineering; 20 years of experience in process and mechanical design of power and chemical plants and engineering analysis of environmental issues and technologies	Spill scenarios
Marita Moniger	B.A. English; 24 years of experience in editing and writing	Technical editor
Robert H. Moore	B.S. Forest Management and Engineering; 40 years of experience in natural resource management (with the U.S. Bureau of Land Management), 7 years in natural resource program management and coordination	Summary
Leslie A. Nieves	M.S. Agricultural Economics, B.A. Economics; 21 years of experience in environmental sciences and economics	Human health and safety
Daniel J. O'Rourke	M.S. Industrial Archaeology; 10 years of experience in cultural resources management, 6 years in historical property issues	Cultural resources

Name	Education/Experience	Contribution
Edgar C. Portante	MSEE Power Systems, M.M. (Masters in Management) Business, MSEE Energy Markets (candidate); 18 years of experience in power systems research and analysis, 6 years in gas and oil infrastructure analysis	TAPS infrastructure
David A. Poyer	Ph.D. Economics, M.A. Economics, B.S. Chemistry; 20 years of experience in applied economic theory and public policy analysis	Economics
Elizabeth A. Stull	Ph.D. Zoology; 35 years of experience in ecological research, 26 years in environmental impact assessment	Technical lead for cumulative impacts analysis
Bobby Templin	M.S. Environmental Engineering, Professional Engineer, American Academy of Environmental Engineers; 24 years of experience in environmental management, hazardous waste disposal, and weapons disposal	Argonne deputy program manager
David Tomasko	Ph.D. Civil Engineering; 24 years of experience in hydrogeology and fluid mechanics	Technical lead for geology and water resources, including hydrological analysis of spill events
Robert A. Van Lonkhuizen	B.A. Biology; 10 years of experience in ecological research and environmental assessment	Biological resources (vegetation and wetlands)
William S. Vinikour	M.S. Biology with environmental emphasis; 26 years of experience in ecological research and environmental assessment	Biological resources (birds and mammals); assistant technical lead for cumulative impacts analysis
Konstance L. Wescott	M.A. Anthropology, B.A. Mathematics and Sociology/Anthropology; 15 years of experience in archaeology, 13 years in environmental assessment	Document manager
Gustavious P. Williams	Ph.D. Civil Engineering, B.A. Asian Studies, B.S. Civil Engineering; 16 years of experience in environmental sciences, 11 years in environmental impact assessment	Physical marine environment; marine chemistry
C. Ron Yuen	Ph.D. Geology; 21 years of experience in engineering geology, environmental geology, and hydrogeology	Physiography and geology; soils and permafrost; seismicity; sand, gravel, and quarry resources

## 8. Glossary

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**100-year flood:** A flood which on the average will be equaled or exceeded once in every 100 years.

**aboriginal:** In general, the term aboriginal applies to persons who can trace their origins to the native people who inhabited a region when the first Europeans arrived.

**abutment (bridge):** The outermost end supports on a bridge. Abutments support the bridge at each shore of a stream.

**acceleration (g):** The rate at which velocity changes, either by increasing or decreasing. Velocity is the distance traveled per unit of time.

**acute effect:** An adverse effect that develops rapidly and often subsides after the exposure stops.

**acid:** A *corrosive* liquid with a *pH* of less than 7.

**acre-foot:** The amount of water required to cover one acre of land to a depth of one foot (approximately 325,900 gallons).

**active fault:** A *fault* that is likely to have another earthquake sometime in the future. A fault is commonly considered to be active if it has moved one or more times in the last 10,000 years.

**active layer:** A seasonally thawed surface layer of *soil* that lies above permanently frozen ground (*permafrost*). It can be between a few centimeters and about 3 meters thick.

**active zone:** The zone in which the *permafrost* thaws.

**acute hazardous waste:** *Hazardous waste* that is very toxic and can be fatal to humans in small amounts.

**advection:** The process by which substances are transported along with the bulk motion of flowing gas or liquid; moving along with the current.

**aerobic:** A biological process that occurs in the presence of oxygen.

**aesthetics:** Things that can be appreciated through the five senses (e.g., visual resources).

**affected environment:** For an *environmental impact statement*, a description of the existing environment covering information necessary to assess or understand the impacts. It must contain enough detail to support the impact analyses and must highlight environmentally sensitive resources.

**aggradation:** Propagation; filling in or leveling by deposition.

**airblast overpressure:** Increased air pressure (above normal atmospheric pressure) resulting from the explosion of unconfined charges.

**air pollutant:** Any substance in air that could, if present in a high enough concentration, harm humans, other animals, vegetation, or material. *Pollutants* may include almost any natural or artificial composition of matter capable of being airborne.

**air quality:** A measure of the quantity of pollutants, measured individually, in the air. These levels are often compared to regulatory standards.

**Air Quality Control Region (AQCR):** An interstate or intrastate area designated by the U.S. *Environmental Protection Agency* for the attainment and maintenance of *National Ambient Air Quality Standards*.

**air quality standards:** The level of selected *pollutants* set by law that may not be exceeded in outside air. They are used to determine the amount of pollutants that may be emitted by industry.

**airshed:** A term used to describe those areas where significant portions of *emissions* result in deposition of various *air pollutants* to a region.

**air toxics:** Substances that have adverse impacts on human health when present in the *ambient air*.

**Alaska Coastal Management Program (AS 46.40):** See Chapter 9.

**Alaska Historic Preservation Act (AS 41.35):** See Chapter 9.

**Alaska Natives:** The *indigenous* people of Alaska.

**Alaska National Interest Lands Conservation Act:** See Chapter 9.

**Alaska Native Allotment Act of 1906:** See Chapter 9.

**Alaska Native Claims Settlement Act:** See Chapter 9.

**Alaska Permanent Fund Dividend:** An annual per capita (per person) payment from a savings account established in 1976 using a portion of royalties paid to the State from oil production on State land.

**Alaska Statehood Act of 1958:** See Chapter 9.

**alacids:** A family of marine birds with a stout bill, short wings and tail, webbed feet, a large head and heavy body, and thick, compact plumage. They are found in the northern parts of the Northern Hemisphere and include auks, guillemots, murrelets, and puffins.

**alevin:** A young fish, particularly a young salmon, that is still attached to the yolk sac.

**alkane chains:** A series of organic compounds with general formula  $C_nH_{2n+2}$ . Examples are propane (with  $n=3$ ) and octane (with  $n=8$ ).

**alkaline:** Having the properties of a *base* with a *pH* of more than 7.

**alkalinity:** The total measurable *bases* in a volume of water; a measure of the material's capacity to neutralize *acids*.

**alluvial:** Formed by the action of running water; of or relating to river and stream deposits.

**alluvial deposits:** Relating to mud and/or sand deposited by flowing water.

**alluvial fan:** A gently sloping mass of *alluvium* deposited where a stream leaves a narrow canyon and enters a plain or valley floor. The material is deposited because the change from a steep gradient to a flatter gradient causes the stream to suddenly lose transporting power. Viewed from above, it has the shape of an open fan. An alluvial fan can be thought of as the land counterpart of a *delta*.

**alluvium:** A general term for *clay*, *silt*, sand, gravel, or similar unconsolidated material deposited by a stream or other body of running water.

**ALOHA model:** A computer model (Areal Locations of Hazardous Atmospheres) used to assess the impacts of potential chemical releases.

**ambient:** Undisturbed, natural conditions such as temperature; surrounding conditions.

**ambient air:** The surrounding atmosphere, usually the outside air, as it exists around people, plants, and structures. It is not the air in immediate proximity to emissions sources.

**Ambient Air Quality Standards:** Regulations prescribing the levels of airborne pollutants that may not be exceeded during a specified time in a defined area.

**ambient noise:** The background noise in an area or environment. It is a composite of sounds from many sources near and far.

**American Indian Religious Freedom Act:** See Chapter 9.

**ammonia (NH<sub>3</sub>):** A colorless gas with a strong, pungent odor, formed from the natural breakdown of manure, plants, and animals. It is present in water, soil, and air and acts as a source of nitrogen for plants and animals. It can be very toxic to fish and other aquatic life.

**ammonites:** Spiral-shaped *mollusks*, related to the modern-day octopus and squid.

**amphipods:** Small *crustaceans* living in or next to the water, including sand fleas and whale lice. They are often abundant on the bottom of coastal bays and *estuaries*.

**amplitude:** The amplitude of a seismic wave is the amount the ground moves as the wave passes by. The amplitude of an ocean wave is one-half the distance between the peak and trough of the wave.

**anadromous fish:** Fish (e.g., salmon and steelhead) that spend their adult lives in the sea but swim upriver into fresh water to breed. They usually return to the area where they were born.

**anaerobic:** Referring to an environment in which oxygen is absent; a biological process that occurs in the absence of oxygen; an organism that lives in the absence of oxygen.

**anode:** The positive electrode in a battery, diode, or other electrical device.

**anoxic:** Greatly deficient in oxygen; without oxygen.

**anthropogenic:** Human made; produced as a result of human activities.

**Antiquities Act:** See Chapter 9.

**aquifer:** A *permeable* underground formation that will yield usable amounts of water to a well or spring. The formation could be sand, gravel, limestone, and/or *sandstone*.

**Archeological District:** A significant concentration, linkage, or continuity of sites important in history or prehistory.

**archeological resources:** Any material remains or physical evidence of past human life or activities that are of archeological interest, including the record of the effects of human activities on the environment.

**Archeological Resources Protection Act:** See Chapter 9.

**archaeological site:** Any location where humans have altered the terrain or discarded *artifacts* during prehistoric or historic times.

**area of critical environmental concern:** Places within *Bureau of Land Management* public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes or to protect life and safety from natural hazards.

**armoring:** Placing *riprap* to control erosion.

**aromatic hydrocarbons:** A group of *hydrocarbon* compounds containing one or more six-carbon rings characteristic of the benzene series. They are called aromatic because of the strong odor that many of them have (e.g., turpentine and wintergreen oil).

**arsenic:** A highly toxic, naturally occurring metal. In the past, it was used in pesticides.

**artifacts:** An object produced or shaped by human beings and of archaeological or historical interest.

**asbestos:** A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. The EPA has banned or severely restricted the use of asbestos in manufacturing and construction.

**aspect:** The direction toward which a slope faces with respect to the compass or the rays of the sun.

**assemblage (aquatic):** An association of interacting populations of organisms in a given body of water; for example, a fish assemblage.

**atomize:** To break up a liquid into extremely fine particles.

**attainment area:** An area considered to have air quality as good as or better than the *National Ambient Air Quality Standards* for a given pollutant. An area may be in attainment for one pollutant and in *nonattainment* for others.

**aufeis:** New ice that continues to form on top of older ice. These ice-forming situations occur wherever there are continuous sources of water and freezing temperatures.

**autoclaving:** Sterilization via a pressurized, high-temperature steam process.

**Bald and Golden Eagle Protection Act:** See Chapter 9.

**ballast water:** Water taken on board a ship to improve the ship's stability.

**barrel:** A liquid-volume measure for petroleum products equal to 42 U.S. gallons at 60°F.

**barrens:** A level area with poor soil that is sparsely forested or unable to support normal vegetative cover and that generally has a low level of productivity. Plants growing in barrens are usually smaller and stunted in comparison to those grown on more fertile soils.

**barrier islands:** Elongated, narrow *landforms* composed of sand and other loose *sediments* transported by waves, currents, and winds.

**base:** A liquid with a *pH* of greater than 7.

**bathymetry:** The measurement ocean depths in order to determine the locations and depths of underwater hills, plains, valleys, etc. The equivalent land term is *topography*.

**bedload:** *Sediment* moving on or near the streambed and frequently in contact with it.

**bedrock:** A general term for the solid rock that is underneath the *soil* and other unconsolidated material or that is exposed at the surface.

**belemnites:** A group of extinct *cephalopods* with an internal, bullet-shaped shell, related to squids, octopuses and cuttlefish.

**benches (mitigation):** Surface configurations added to storm-water basins that create flat edges, usually installed for safety and to minimize erosion.

**benthic:** Occurring at the bottom of a body of water, such as a seabed, river bottom, or lake bottom. The presence or absence of certain

benthic organisms can be used as an indicator of water quality.

**berm:** An elongated earthen structure that acts to control the flow of a liquid (for example, surface water or an oil spill).

**berth:** The water area, terminal, or wharf and mooring facilities used by a ship.

**biennial:** Occurring every two years.

**bilge water:** Water generated in the bilge of the ship's machinery spaces and thereby contaminated with oil and other substances, some of which may be harmful.

**bioaccumulation:** The process by which chemicals are retained in fatty tissue and increase in concentration over time.

**biochemical oxygen demand (BOD):** A measure of the amount of oxygen needed by *aerobic* bacteria to break down organic materials in water at a certain temperature over a specified time. Higher organic loads in the water require larger amounts of oxygen and may reduce the amount of oxygen available for fish and other aquatic life to below acceptable levels.

**biochemical oxygen demand over 5 days (BOD<sub>5</sub>):** The biochemical oxygen demand measured over five days. This value is used by regulatory agencies for monitoring wastewater treatment facilities and monitoring surface water quality.

**biodegradation:** Breaking down of substances by bacteria.

**biodiversity:** The number and variety of different organisms in an *ecosystem*. It is used to describe species richness, ecosystem complexity, and genetic variation.

**biohazard:** Material of biological origin that presents a risk or potential risk to the well-being of humans, other animals, or plants, either directly through infection or indirectly through disruption of the environment.

**biomagnification:** The process by which some chemical contaminants become more concentrated in the tissues of organisms (through diet) at higher levels in the food chain. The contaminants are stored in the fatty tissues of animals and are passed along to their predators. The concentration of these contaminants eventually reaches harmful levels at the top of the food chain.

**biota:** The living organisms in a given region.

**bivalve:** A *mollusk* whose body is enclosed by two hinged shells (e.g., mussels, clams, and oysters).

**block valve:** A valve that can block the flow of oil in a pipeline in both directions. Block valves include manual gate valves and *remote gate valves*.

**bluff (landform):** A high bank with a broad, precipitous, and sometimes rounded cliff face overlooking a plain or body of water.

**body burden:** The amount of a chemical stored in the body at a given time, especially a potential toxin present in the body as the result of exposure.

**bog:** Waterlogged, spongy ground consisting primarily of mosses and containing acidic, decaying vegetation that may develop into *peat*.

**boom:** A temporary floating barrier used to contain oil on a body of water.

**boreal:** Related to or growing in northern regions.

**boreal forest:** A subarctic forest that is dominated by *conifers*, stretching across North America, Europe, and northern Asia. It is found south of the *tundra* in the Northern Hemisphere and often contains peaty or swampy areas.

**borrow pit:** A pit or excavation area used for gathering earth materials (borrow) such as sand or gravel.

**borrow sites:** An area that is used for excavating earthen material.

**bounding:** A condition, consequence, or risk that provides an upper limit that is not exceeded by other conditions, consequences, or risks. The term is also used to identify conservative assumptions that will likely overestimate actual risks or consequences.

**brachiopods:** A group of marine invertebrates with an asymmetrical two-valved shell. During adult life, many brachiopods are attached to the seabed by a stalk or by one shell. They were very abundant in the oceans of the *Paleozoic Era*.

**brackish:** Water that is salty, but not as salty as seawater.

**braided river or stream:** A river or stream consisting of a network of interwoven small channels and resembling the strands of a complicated braid.

**browse (noun):** Shrubs, trees, and herbs that provide food for wildlife.

**bryozoa:** Microscopic aquatic animals that live in large colonies of interconnected individuals. Because these colonies are usually made of secreted calcite, they commonly form *fossils*. Bryozoa are abundant in modern marine environments and are also an important part of the *fossil* record. They are commonly referred to as sea mats, moss animals, or lace corals.

**Bureau of Land Management (BLM):** An agency of the U.S. Department of the Interior that is responsible for managing public lands.

**cache:** A deliberate store of equipment, food, furs, or other resources placed in or on the ground or raised above the ground on a platform.

**catchment area:** An area that “catches” rainfall or snow to supply a river, aquifer, or lake.

**caldera:** A large, basin-shaped volcanic depression, formed by explosion and/or collapse, that surrounds a volcanic vent; a crater.

**calving:** The breaking away of ice from the front of a *glacier* when it ends in a lake or an ocean. Calving produces icebergs.

**Cambrian Period:** The period of geologic time from 500 to 570 million years ago.

**candidate species:** Species for which the U.S. Fish and Wildlife Service has substantial information on hand to support the biological appropriateness of proposing to list the species as *endangered* or *threatened*.

**canopy:** The upper forest layer of leaves consisting of tops of individual trees whose branches sometimes cross each other. (See *closed canopy* and *open canopy*.)

**carbon dioxide (CO<sub>2</sub>):** A colorless, odorless, nonpoisonous gas that is a normal part of earth's atmosphere. Carbon dioxide is a product of fossil-fuel combustion as well as other processes. It is considered a *greenhouse gas* because it traps heat radiated into the atmosphere and thereby contributes to the potential for *global warming*.

**carbon monoxide (CO):** A colorless, odorless gas that is toxic if breathed in high concentrations over an extended period. Carbon monoxide is one of the six *criteria air pollutants* specified under Title I of the *Clean Air Act*.

**carcinogenic:** Capable of causing cancer.

**carrying capacity (animals):** The maximum average number of animals that can be sustained on a long-term basis in a given area. It can vary throughout the year and from year to year depending on conditions within the *habitat*.

**cathode:** The negative electrode in a battery, diode, or other electrical device.

**cathodic protection:** A technique to prevent corrosion of a metal surface by making it the cathode of an electrochemical cell.

**Cenozoic Era:** A geologic era dating from approximately 65 million years ago to the present. It is known as the age of mammals.

**census blocks:** Census blocks are defined by the U.S. Bureau of the Census and are the smallest geographic unit for which that agency tabulates data.

**census block groups:** Geographic entities consisting of groups of individual census blocks. Census blocks are grouped together so that they contain between 250 and 550 housing units.

**centistoke (cSt):** A unit of measure representing 1/100th of a stoke (S), which is the fundamental unit of *kinematic viscosity*.

**cephalopods:** A class of marine *mollusks* with an internal or external shell and tentacles that includes nautiloids, squids, octopuses, cuttlefish, and other extinct *belemnites*.

**channel morphology:** The general shape of a stream channel.

**check valves:** Check valves operate one way and prevent the reverse flow of oil in a pipeline. They are designed to be held open by flowing oil and to drop closed automatically when the flow of oil stops or is reversed.

**chert:** A very fine-grained *sedimentary rock* made of quartz with excellent fracturing properties, producing good cutting edges on stone tools.

**chlordane:** A pesticide made up of about 10 major components.

**chlorofluorocarbons (CFCs):** A family of chemicals commonly used in air conditioners and refrigerators as coolants. They are also used as solvents and aerosol propellants. CFCs drift into the upper atmosphere, where their chlorine components destroy *ozone*. The CFC Halon 1301™ (bromotrifluoromethane) is used in fire-suppression systems at pump stations and at the Valdez Marine Terminal.

**chronic effect:** A (health) effect resulting from long-term exposure to a substance or persistent (months, years, or permanent) adverse effects resulting from a short-term (acute) exposure.

**circumpolar:** Surrounding or found in the vicinity of the North or South Pole.

**cirque:** A semicircular recess with steep walls located at the head of a mountain valley. The upper edges have the steepest slopes, approaching vertical, and the base may be flat or hollowed out and occupied by a small lake or pond.

**Class I landfill:** A landfill that accepts for disposal 20 tons or more of municipal solid waste daily (based on an annual average); or one that does not qualify as a Class II or Class III municipal solid waste landfill.

**Class II landfill:** A landfill that (1) accepts less than 20 tons daily of municipal solid waste (based on an annual average); (2) is located on a site where there is no evidence of groundwater pollution caused or contributed by the landfill; (3) is not connected by road to a Class I municipal solid waste landfill, or, if connected by road, is located more than 50 miles from a Class I municipal solid waste landfill; and (4) serves a community that experiences (for at least 3 months each year) an interruption in access to surface transportation, preventing access to a Class I landfill, or a community with no practicable waste management alternative.

**Class III landfill:** A landfill that is not connected by road to a Class I landfill or a landfill that is located at least 50 miles from a Class I landfill. Class III landfills can accept no more than an average of 1 ton daily of ash from incinerated municipal solid waste or less than 5 tons daily of municipal solid waste.

**clastic:** Pertaining to rocks or *sediment* made up primarily of fragments of preexisting rocks or *minerals*.

**clay:** A rock or mineral fragment of any composition that is smaller than very fine *silt* grains, having a diameter of less than 0.00016 inch (1/256 millimeter).

**Clean Air Act:** See Chapter 9.

**Clean Water Act:** See Chapter 9.

**climax:** The final stage of succession in an *ecosystem*. Also, a community that reached a steady state under a particular set of environmental conditions.

**closed canopy:** A forest *canopy* that is dense enough that the tree crowns fill or nearly fill the canopy layer so that light cannot reach the forest floor directly.

**closed forest:** A forest with a tree canopy coverage of 60 to 100%. (See *closed canopy*.)

**Coastal Zone Management Act:** See Chapter 9.

**Code of Federal Regulations (CFR):** A compilation of the general and permanent rules published in the *Federal Register* by the executive departments and agencies of the federal government of the United States of America. It is sometimes referred to as the "United States Code" or "USC."

**colluvial:** Pertaining to or composed of *colluvium*.

**colluvium:** Loose deposits of rock, usually located at the foot of a slope or cliff, having been brought there under the influence of gravity (a process known as *mass wasting*).

**commercial waste:** Waste that originates from wholesale, retail, or service establishments.

**conditionally exempt small quantity generator:** A waste generator who, in a calendar month, generates no more than 100 kilograms (200 pounds) of hazardous waste in that month.

**confluence (of a stream or river):** The meeting of junction of two or more streams or rivers; the place where these streams meet.

**congener:** Any of two chemical substances composed of the same elements in the same proportions but which have difference properties because of different molecular structures.

**conglomerate:** A coarse-grained, *clastic sedimentary* rock composed of rounded rock fragments mixed with sand and finer material.

**conifer:** Cone-bearing trees, mostly evergreens, that have needle-shaped or scale-like leaves.

**convergence line:** A line on the water surface where floating objects and oil collect. A convergence can be the interface between two different types of bodies of water, or it can be caused by a significant depth change, tidal changes, or other common phenomena.

**corrosive:** A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away.

**corrosivity:** One of the characteristics of *hazardous waste*. A liquid waste exhibits the characteristic of corrosivity if it is strongly acidic or strongly basic (pH  $\leq 2.0$  or  $\geq 12.5$ ).

### **Council on Environmental Quality**

**(CEQ):** The President's Council on Environmental Quality was established by the National Environmental Policy Act and is the agency responsible for the oversight and development of national environmental policy.

**Cretaceous Period:** A period of geologic time lasting from 65 to 145 million years ago.

**crinoids:** Also known as feather-stars and sea-lilies, they are a class of *echinoderms* with many movable arms and often attached to the sea floor by a long stalk. They have a long *fossil* history extending back to the *Cambrian Period*.

**criteria air pollutants:** Six common air pollutants for which *National Ambient Air Quality Standards* have been established by the EPA under Title I of the *Clean Air Act*. They are *sulfur dioxide*, *nitrogen oxides*, *carbon monoxide*, *ozone*, *PM<sub>10</sub>*, *PM<sub>2.5</sub>*, and *lead*. Standards for these *pollutants* were developed on the basis of scientific knowledge about their health effects.

**critical habitat:** Specific areas within the geographical range of a *threatened or endangered species* that are formally designated by the U.S. Fish and Wildlife Service under the *Endangered Species Act* as essential for conservation of the species.

**crustacean:** A diverse group of arthropods (jointed-legged animals, such as centipedes, millipedes, insects, crustaceans, and spiders), mostly aquatic, that includes crabs, lobsters, shrimps, and wood lice. They have an exoskeleton, a pair of often modified

appendages on each segment, and two pairs of antennae.

**cryogenic:** Related to the production and effects of extremely low temperatures. Cryogenic conditions are conditions under which temperatures are low enough for gases to condense to become liquids or solids.

**cultural resources:** *Archaeological sites*, architectural structures or features, traditional-use areas, and Native American sacred sites or special-use areas that provide evidence of the prehistory and history of a community.

**cumulative impacts:** The impacts assessed in an *environmental impact statement* that could potentially result from incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or nonfederal), private industry, or individual undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

**cushion plants:** A low-growing mat formed by tightly massed individuals of the same species of plant. Generally associated with *tundra* or high alpine communities.

**dabbling:** A means of foraging for food (often used by ducks) whereby the body is tipped into the water, bill first, tail in the air.

**deadweight:** The carrying capacity of a ship in terms of the weight in tons of the cargo, fuel, provisions, and passengers that the vessel can carry.

**decennial:** Occurring every 10 years.

**decibel (dB):** A standard unit for measuring sound-pressure levels based on a reference sound pressure of 0.0002 dyne per square centimeter. This is the softest sound a human can hear. In general, a sound doubles in loudness with every increase of 10 decibels.

**decibel, A-weighted (dBA):** A measurement of sound approximating the sensitivity of the human ear and used to characterize the intensity or loudness of sound.

**deciduous:** Plants having structures that are shed at regular intervals or at a given stage of development, such as trees that shed their leaves in the autumn.

**deciduous forest:** A forest of trees that shed their leaves at some season of the year.

**delta:** An *alluvial deposit* at the mouth of a river where it discharges into the sea or a lake. Deltas occur when a sediment-laden current enters an open body of water. At this point, the reduction in velocity of the current results in the rapid deposition of sediment.

**demographics:** Specific population characteristics such as age, gender, education, and income level.

**denuded:** Stripped of all vegetative cover.

**depleted stock:** A species or population that is below its optimum sustainable population.

**dermal exposure:** Exposure to a substance through the skin.

**design contingency earthquake:** A rare, intense earthquake with an estimated occurrence frequency (return period) of 500 years.

**design operating earthquake:** A lower intensity earthquake that has ground motion *amplitudes* one-half of those associated with the *design contingency earthquake*.

**Devonian Period:** A period of geological time from 365 to 408 million years ago.

**dewater:** To remove or drain water from an area.

**diatom:** A one-celled plant with a silica framework that grows in oceans and lakes.

**dike (containment):** An embankment to confine or control water or other liquid, such as spilled oil.

**direct impact:** An effect that results solely from the construction or operation of a proposed action without intermediate steps or processes. Examples include habitat destruction, soil disturbance, air emissions, and water use.

**dispersion (of spilled oil):** The break-up of an oil slick into small droplets that are mixed into the water column by breaking waves and other turbulence at the water surface.

**dispersion model (air):** A mathematical prediction of how pollutants from a discharge or emission source will be distributed in the surrounding environment under given conditions of wind, temperature, humidity, and other environmental factors.

**domestic wastewater:** See sanitary wastewater.

**double-hulled tanker:** A hull construction technique in which a ship has an inner and outer bottom or hull separated by a void space, usually several feet in width.

**draft:** The depth of a loaded vessel in the water, taken from the level of the waterline to the lowest point of the hull of the vessel; the depth of water, or distance between the bottom of the ship and waterline.

**drag-reducing agent:** A substance that, when dissolved in crude oil, reduces the friction of the flowing oil along the wall of a pipe, making the oil easier to pump.

**drainage lakes:** Lakes fed primarily by streams and with outlets into streams or rivers.

**dust shadow:** A darkened, often linear, patch where the ground was exposed to settling dust. The dust may accumulate, leaving a permanent stain.

**dynamic volume (related to spills):** The quantity of oil that would be pumped through the section of the pipe where the break occurred from the time of the break until the pumps upstream are shut down and the mainline valves are closed.

**echinoderms:** A group of marine invertebrates with skeletal plates in the skin and often five axes of symmetry (e.g., sea urchins, sea cucumbers, sea stars, and sea lilies).

**ecological succession:** The chronological sequence of vegetation and associated animals in an area; or, continuous colonization, extinction, and replacement of species populations at a particular site, due either to environmental changes or to the properties of the plants and animals themselves.

**ecology:** The study of the interrelationships between organisms and their natural environment.

**ecosystem:** A group of organisms and their physical environment.

**effects range–low:** Concentration of a chemical in sediment below which toxic effects are rarely observed among sensitive species.

**effluent:** A gas or fluid discharged into the environment, treated or untreated. Most frequently, the term applies to wastewater discharged from a *point source* (such as a pipe) to *surface waters*.

**egalitarian:** Referring to societies in which all people are equal in terms of economic and political rights.

**elevation:** The distance above or below mean sea level.

**Emergency Planning and Community Right-To-Know Act:** See Chapter 9.

**emergent (vegetation):** Erect plants rooted underwater that grow above (emerge from) the surface of the water (e.g., cattails).

**emergent wetlands:** Wetlands, commonly called marshes and wet meadows, that are dominated by grasses, sedges, and other nonwoody plants.

**emissions:** Substances that are discharged into the air from industrial processes and vehicles as well as living organisms.

**emulsification:** The formation of a water-in-oil mixture. An emulsified mixture of water in oil is commonly called *mousse*. The presence of mousse indicates that a spill has been on the water for some time.

**endangered species:** Any species (plant or animal) that is in danger of extinction throughout all or a significant part of its range. Requirements for declaring a species endangered are found in the *Endangered Species Act*.

**Endangered Species Act:** See Chapter 9.

**entrainment (oil spill):** The loss of oil from containment when it is pulled under a *boom* by a strong current.

**environment:** All external conditions that affect an organism during its lifetime.

**environmental impact statement (EIS):** A document required of federal agencies by the *National Environmental Policy Act* for major proposals or legislation that will or could significantly affect the environment.

**environmental justice:** The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

**Environmental Protection Agency (EPA):** The EPA is responsible for working with state and local governments to set standards that help control and prevent pollution and minimize the potential health effects in areas of solid and hazardous waste, pesticides, water, air, drinking water, and toxic and radioactive substances. It was created in 1970.

**Eocene:** A geologic *epoch* early in the *Cenozoic Era*, dating from approximately 56 to 34 million years ago.

**eolian:** Pertaining to the wind or deposits that have been laid down by the wind.

**eolian deposits:** Sand, silt, or clay-sized *clastic* material transported and deposited primarily by wind.

**eon:** The longest unit of geologic time.

**EPA Region 10:** The Pacific Northwest region of the EPA, serving Alaska, Idaho, Oregon, Washington, and Native Tribes.

**epicenter:** The point on the Earth's surface directly above the focus of an earthquake.

**epilithic:** Living on rocks or other stony matter.

**epoch:** A division of geologic time next shorter than a *period*.

**era:** A division of geologic time shorter than an *eon* and larger than a period.

**ericaceous:** Of, or relating to, the heath family of plants, which are mostly shrubby and often evergreen plants that thrive on open, barren soil that is usually acidic and poorly drained.

**erosion:** The wearing away of the land surface by running water, wind, ice, or other geological processes.

**essential fish habitat (EFH):** Those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity.

**estuarine:** Pertaining to or found in an *estuary*.

**estuary:** A region between rivers and near-shore ocean waters, where tidal action and river flow mix fresh and salt water. Estuaries include bays, mouths of rivers, salt marshes, and *lagoons*.

**ethnography:** A method of studying and learning about a person or group of people. Typically, ethnography involves the study of a small group of subjects in their own environment.

**ethnohistory:** The ethnographic study of cultures through historical records.

**euphotic zone:** The upper layer of water that receives enough light for photosynthesis and the growth of green plants.

**evapotranspiration:** The combined loss of water from the soil both by evaporation and by transpiration from plants growing in the soil.

**extant:** Currently existing.

**extirpate:** To destroy or eliminate completely. Extirpate is not necessarily synonymous with extinction, since the term may be applied to

certain populations within the range of a given species.

**factor of 10:** To increase something by a factor of 10 is to increase it 10 times.

**facultative biological decomposition:** Decomposition that occurs either with oxygen (aerobic) or without oxygen (anaerobic). Facultative bacteria can be found in aerobic or anaerobic environments.

**family:** In the hierarchy of taxonomy, the rank or category below order and above genus. Families consist of a number of similar genera. (See *genus*.)

**fast-ice:** Sea ice that is attached or fastened to the shoreline or seafloor.

**fatigue life:** Number of cycles of stress and strain of a specified nature that a material will sustain before failure occurs.

**fauna:** Animals, especially those of a specific region, considered as a group.

**faunal remains:** Animal remains.

**fault (geologic):** A fracture in rock along which movement of one side relative to the other has occurred.

**Federal Cave Resources Protection Act:** See Chapter 9.

**Federal Land Policy and Management Act:** See Chapter 9.

**fen:** A marshy, low-lying *wetland* covered by shallow, usually stagnant, and often alkaline water that originates from *groundwater* sources; waterlogged, spongy ground containing alkaline decaying vegetation that develops into peat.

**Fiber-optic cable:** Cables consisting of thin filaments of glass (or other transparent materials), which can carry beams of light.

**fjord:** A former glacial valley with steep sides now occupied by the sea.

**fledge:** To leave the nest, usually with the ability to fly or run.

**flocculent:** A chemical that causes a dispersed colloidal system (such as clay) to coagulate and form flocs (coagulated masses of particles in a liquid).

**flocculation:** The process by which clays, polymers, or other small charged particles become attached and form a fragile structure, called a floc.

**floodplain:** Mostly level land along rivers and streams that may be submerged by floodwater.

**floral analysis:** Analysis of the remnants of past vegetation found in archaeological sites.

**fluvial:** Pertaining to rivers or to deposits laid down by rivers.

**footslope:** The hillslope position that forms the inner, gently inclined surface at the base of a slope.

**forbs:** Nonwoody plants that are not grasses or grasslike.

**fossil:** An impression or trace of an animal or plant of a past geologic age that has been preserved in the earth's crust.

**fossil fuel:** Natural gas, petroleum, coal, and any form of solid, liquid, or gaseous fuel derived from such materials for the purpose of creating useful heat.

**frost creep:** Slow *mass movement* of soil downslope caused by *frost heaving* and subsequent settling after thawing (freeze-thaw action).

**frost heave or jacking:** Expansion in soil volume due to the formation of ice; generally expressed as an upward movement of the ground surface.

**frost mound:** A localized uplift of land surface caused by *frost heaving* or by groundwater pressure. (See *hummock* and *pingo*.)

**fugitive dust:** The dust released from activities associated with construction, manufacturing, or transportation.

**fugitive emissions:** Emissions (air pollutants) released to the air other than those

from stacks or vents. They are often due to equipment leaks, evaporative processes, and windblown disturbances.

**full-time equivalent worker (FTE):** The equivalent of a full-time worker. For example, two people who each work half time correspond to one FTE.

**fungi:** Plural of *fungus*.

**fungus:** Colorless (lacking chlorophyll) plant with practically no differentiation of cell structure (e.g., yeasts and molds).

**fur-bearers:** Species that are of primary economic importance for their fur rather than as a food source.

**gabion:** Wire mesh baskets (filled with cobblestones that range in size from 4 to 8 inches) used to control erosion.

**gastropods:** A large class of aquatic and terrestrial *mollusks*, usually with a univalve shell or no shell, including slugs and snails.

**genera:** Plural of *genus*.

**General Accounting Office:** The arm of Congress that investigates the performance of the federal government, including the use of public funds.

**genus:** A grouping of one or several species that possess common characteristics; a classification above *species* and below family.

**geographic information system (GIS):** A computer hardware and software system designed to collect, manipulate, analyze, and display spatially referenced data for solving complex resource, environmental, and social problems.

**geology:** The science that deals with the study of the materials, processes, environments, and history of the earth, including the rocks and their formation and structure.

**geomorphic processes:** Processes (physical, chemical, or biological) at the earth's surface that shape the landscape and result in specific deposits.

**gigawatt (GW):** A measurement of power equal to a thousand million *watts*.

**glacial:** Involving *glaciers* and moving ice.

**glacial surge:** A period of unusually rapid movement (tens of meters a day) of a *glacier*.

**glacial till:** Material (e.g., sand, pebbles, and boulders) deposited by a *glacier*.

**glacier:** A large mass of ice, formed by the compaction of snow, that persists all year and flows slowly over the surface of the ground or down a valley. Glaciers originate in snow fields and end at lower elevations in a warmer environment, where they melt. They vary in size from small valley glaciers to huge ice sheets that cover large parts of continents.

**glaciofluvial:** Pertaining to meltwater streams flowing from *glaciers* or to the deposits made by such streams.

**glaciolacustrine:** Pertaining to, or characterized by, *glacial* and *lacustrine* processes or conditions. The term is applied especially to deposits made in lakes.

**global warming:** The progressive, gradual rise of the earth's surface temperature thought to be caused by the greenhouse effect and responsible for changes in global climate patterns.

**gradient:** The slope, expressed as a percentage of change in elevation per unit of distance traveled.

**gram-atoms:** The mass of one *mole* of an element equal in grams to the atomic weight of the element. (A gram-atom of oxygen is 16 grams.)

**graminoid plants:** Grasses and grasslike plants, such as sedges.

**greenhouse gases:** Heat-trapping gases that cause global warming. Natural and human-made greenhouse gases include water vapor, *carbon dioxide*, methane, *nitrogen oxides*, *ozone*, and *chlorofluorocarbons*.

**gross state product (GSP):** The sum of value added in the production of all goods and services in the state in a year. It is a measure of the level of economic activity in the state.

**ground ice:** A general term used to describe all bodies of ice in the ground surface of the permafrost layer.

**groundwater:** The supply of water found beneath the earth's surface, usually in porous rock formations (*aquifers*), which may supply wells and springs; generally, all water contained in the ground.

**guillotine (pipeline) break:** A break in the pipeline that involves the entire circumference of the pipe.

**habitat:** The place, including physical and biotic conditions, where a plant or animal lives.

**halons:** Bromine-containing compounds that are used in firefighting. They have long atmospheric lifetimes, and their breakdown in the stratosphere causes depletion of *ozone*.

**halophytic:** Referring to a plant that can tolerate or thrive in alkaline soil rich in sodium or calcium salts; tolerant of saline (salty) conditions.

**hanging glacier:** A glacier that terminates at or near the top of a cliff.

**hanging valley:** A glacial valley whose mouth is at a relatively high level on the steep side of a larger glacial valley.

**haulout areas:** Areas where seals and other marine mammals climb up out of the water.

**hazard index:** The sum of the *hazard quotients* for all chemicals to which an individual is exposed. A hazard index of less than one indicates that adverse health effects (noncancer) are unlikely.

**hazard quotient:** A comparison of the estimated intake level or dose of a chemical in air, water, or soil with its reference dose or concentration, expressed as a ratio. A hazard quotient of less than one indicates that the exposure is unlikely to cause adverse noncancer health effects.

**hazardous material:** Any material that poses a threat to human health and/or the environment. Hazardous materials are typically toxic, corrosive, ignitable, explosive, or chemically reactive.

**hazardous substance:** See hazardous material.

**hazardous waste:** According to the *Resource Conservation and Recovery Act*, this term refers to a waste that because of its characteristics may (1) cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness or (2) pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes possess at least one of the following characteristics: *ignitability*, *corrosivity*, *reactivity*, or *toxicity*. Hazardous waste is nonradioactive.

**heavy metals:** A metallic element with a high specific gravity, such as antimony, bismuth, cadmium, copper, gold, lead, mercury, nickel, silver, tin, and zinc. These metal are toxic even in low concentrations. They persist in the environment and can accumulate to levels that stunt plant growth and interfere with animal life.

**Henry's Law/Henry's Law Constants:** The mass of a gas that dissolves in a definite volume of liquid is directly proportional to the pressure of the gas provided the gas does not react with the solvent. Henry's Law Constants characterize the equilibrium distribution of dilute concentrations of volatile, soluble chemicals between gas and liquid.

**herbaceous plants (herbs):** Nonwoody plants.

**herbicides:** Chemicals used to kill undesirable vegetation.

**high-centered polygons (landform):** A polygon with a center that is higher than its margins.

**historic context:** Information about historic trends and properties grouped by an important theme in the prehistory or history of a community, state, or the nation during a

particular period of time. Historic contexts are organized by theme, place, and time and link properties to important historic trends.

**historic district:** A geographically definable area with a significant concentration of buildings, structures, sites, or objects unified by past events.

**historic site:** The site of a significant event, prehistoric or historic occupation or activity, or structure or landscape (existing or vanished), where the site itself possesses historical, cultural, or archeological value apart from the value of any existing structure or landscape.

**historic structure:** A standing structure that has historic significance.

**hummock:** A small hill of broken ice which has been forced upward by pressure.

**hydraulic:** Related to water or other liquid in motion.

**hydraulic head:** The force per unit area exerted by a column of liquid at a height above a depth (and pressure) of interest. Fluids flow down a hydraulic gradient, from points of higher to lower hydraulic head.

**hydrocarbon:** A naturally occurring *organic compound* made up of carbon and hydrogen atoms arranged in chains or rings. *Fossil fuels* are made up of hydrocarbons; some hydrocarbons are major *air pollutants*.

**hydrology:** The study of water relating to the occurrence, properties, distribution, circulation, and transport of water, including groundwater, surface water, and rainfall.

**hydrophytic vegetation:** Plants that have adapted to living in aquatic (water) environments.

**hydrostatic testing:** A method of leak-testing components by pressurizing them inside with water.

**hypoxic:** Deficient in oxygen.

**ice field:** An extensive area of interconnected *glaciers* in a mountain region, or of pack ice at sea.

**ice surge:** The fast advance of a *glacier* in response to melting.

**ice wedge:** A buildup of ice in frozen soil that is wedge-shaped in cross-section.

**igneous rock:** Rock formed by solidification of molten magma from deep in the earth. Volcanics (e.g., basalt) are formed by the cooling of lava from a volcano; intrusives (e.g., granite) are formed when molten material is forced into cracks or between layers of preexisting rocks.

**ignitability:** A liquid exhibits the characteristic of ignitability if it has a flash point less than 140°F.

**impoundment:** A natural or artificial body of water confined by a dam, dike, floodgate, or other barrier.

**increased lifetime cancer risk:** An upper-bound estimate of the likelihood that an individual will develop cancer as a result of exposure to a cancer-causing chemical.

**Indian Reorganization Act of 1934:** See Chapter 9.

**indigenous:** A species that occurs naturally in an area; native.

**indirect impact:** An effect that is related to but removed from a proposed action by an intermediate step or process. An example would be changes in surface-water quality resulting from soil erosion at construction sites.

**industrial waste:** Liquid, gaseous, solid, or other waste substance or a combination of them resulting from processes of industry, manufacturing, trade, or business or from the development of natural resources.

**influent:** Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

**infrastructure:** The basic facilities, services, and utilities needed for the functions of an industrial facility or site. Transportation, water supply, and electrical systems are part of the infrastructure.

**ingestion:** The taking in of a substance through the mouth.

**in-situ:** In its natural position or place.

**intermontane basin:** A generic term for a wide structural depression between mountain ranges that is partly filled with *alluvium*. Commonly called a valley.

**intertidal zone:** Shoreline area occurring between the highest normal tide and the lowest normal tide.

**intrusive (rock):** *Igneous rock* formed when molten material is forced into cracks or between layers of preexisting rocks and does not reach the earth's surface.

**inundation:** The covering by water of lands normally not covered.

**Jurassic Period:** A period of geologic time lasting from 145 to 210 million years ago.

**kilowatt (kW):** A measurement of power equal to 1,000 *watts*.

**kinematic viscosity:** The time required for a fixed amount of an oil to flow through a capillary tube under the force of gravity. The unit of kinematic viscosity is the stoke or centistoke (1/100<sup>th</sup> of a stroke). Kinematic viscosity may be defined as the quotient of the absolute viscosity divided by the specific gravity of a fluid, both at the same temperature.

**kinematics:** The study of objects in motion.

**krill:** Small *crustaceans* similar to small shrimp but with bristled tails. They are generally 1 to 6 centimeters long and are found at depths of up to 2,000 meters in the ocean.

**L<sub>dn</sub>:** A 24-hour average sound level that gives additional weight to noise that occurs during the night (10:00 p.m. to 7:00 a.m.).

**L<sub>eq</sub>:** For sounds that vary with time, L<sub>eq</sub> is the steady sound level that would contain the same total sound energy as the time-varying sound over a given time.

**lacustrine:** Pertaining to, produced by, or living in lakes.

**laden tanker:** A tanker that is carrying cargo.

**lagoon:** A shallow body of water that is near or connected to a larger body of water.

**lagoon (for wastewater treatment):** A shallow, artificial pond where sunlight, bacterial action, and oxygen work to purify wastewater.

**laminar flow:** A flow in which fluid moves smoothly in parallel layers or sheets. It is characteristic of the movement of groundwater.

**land use:** The way land is developed and used by humans.

**landfill:** An area of land, or an excavation, in which solid wastes are placed for permanent disposal; a method for final disposal of solid waste on land.

**landform:** Any physical, recognizable form on the earth's surface, having a characteristic shape and produced by natural causes.

**leachfield:** The area of land into which a septic tank drains or wastewater is discharged.

**lead (Pb):** A gray-white metal that is listed as a *criteria air pollutant*. Health effects from exposure to lead include brain and kidney damage and learning disabilities.

**lichen:** An organism consisting of a *fungus* and an alga living together in symbiotic association.

**limnetic:** Pertaining to lakes or to other bodies of standing fresh water.

**line volume balance:** A leak detection system that compares the volume of oil entering the line with the volume leaving the line.

**lipids:** A general term for fats, waxes, and related products in living tissues.

**liquefaction:** A process by which water-saturated sediment temporarily loses strength and acts as a fluid. This effect can be caused by earthquake shaking.

**littoral:** The region along the shore of a nonflowing body of water. It corresponds to *riparian* for a flowing body of water.

**littoral zone:** The shallow area near the shore of a nonflowing body of water where light penetration is sufficient for the growth of plants.

**loam:** A soil consisting of an easily crumbled mixture of *clay*, *silt*, sand, and organic matter. It is rich soil, typically good for plant growth.

**loess:** Material transported and deposited by wind. Loess is usually composed of unstratified fine sand or silt.

**low-centered polygon:** A polygon whose center is depressed (low) relative to its boundary.

**Magnuson-Stevens Fishery Conservation and Management Act:** See Chapter 9.

**Marine Mammal Protection Act:** See Chapter 9.

**marsh:** A wetland where the dominant vegetation is nonwoody plants, such as salt grasses and *sedges*, as opposed to a swamp, where the dominant vegetation is woody plants such as trees and shrubs.

**mass movement:** General term that describes the downslope movement of sediment, soil, and rock material.

**mass wasting:** A general term used to describe geologic processes that are primarily driven by the action of gravity.

**material safety data sheets (MSDS):** Material safety data sheets provide details on chemical and physical dangers, safety procedures, and emergency responses for chemicals.

**mean (statistical):** The sum of a set of observations divided by the number of observations.

**meander:** The winding of a stream channel.

**median value:** The point that divides the distribution of values in half. Numerically, half of the values are equal to or larger than the median and half of the values are equal to or smaller than the median.

**medical waste:** Medical waste is generally defined as any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals.

**megawatt (MW):** A measurement of power equal to one million *watts*.

**mélange:** Rock that includes fragmented blocks of all sizes embedded in a fragmented and fine-grained matrix.

**memorandum of agreement (MOA):** A formal memorandum defining and explaining agreements and decisions reached on specific issues by two or more parties.

**memorandum of understanding (MOU):** An agreement between organizations defining the roles and responsibilities of each organization in relation to the other.

**mercury (Hg):** A naturally occurring shiny, silver-white, liquid metal. It enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants and is known to *bioaccumulate* in the food chain. The nervous system is very sensitive to all forms of mercury, and effects include irritability, shyness, tremors, changes in vision or hearing, and memory problems. Exposure to high levels of mercury can permanently damage the brain, kidneys, and lungs.

**mesic:** Intermediate in moisture, without extremes; neither wet (hydric) nor dry (xeric).

**Mesozoic Era:** An era of geologic time lasting from 65 to 248 million years ago.

**metal fatigue:** Cracking and/or breaking of metal parts because of repeated stresses, such as flexing or bending.

**metamorphic rock:** Preexisting rock that is restructured by high temperature and pressure. Examples are slate (formerly shale) and marble (formerly limestone).

**meteorology:** The science dealing with the atmosphere and its phenomena, especially as relating to weather.

**Migratory Bird Treaty Act:** See Chapter 9.

**millimole:** One-thousandth of a *mole*.

**Mineral Leasing Act:** See Chapter 9.

**mineral:** A component of rocks; a naturally occurring inorganic solid with a crystalline structure and a specific chemical composition. More than 2,000 types of minerals have been classified.

**mineral lick:** A naturally occurring mineral source, which supplies animals with critical nutrients.

**mitigation:** Actions taken to avoid, minimize, rectify, or compensate for any adverse environmental impact.

**mixing height:** The depth through which pollutants released to the atmosphere are typically mixed by dispersion.

**mixing layer:** See mixing height.

**mole (unit of measure):** A unit of mass equal to the molecular weight of the substance. The amount of pure substance that contains the same number of elementary entities as there are atoms in exactly 12 grams of the isotope carbon-12.

**mollusk:** An organism whose soft, unsegmented body parts are frequently enclosed in a shell (e.g., snails, clams, or squids).

**moment magnitude:** A measure of earthquake size (magnitude) in which the stiffness of the rock, the average slip on the rupture plane, and the area of the rupture plane are taken into account.

**moraine:** A mound or ridge of rock consisting of boulders, stones, or other debris carried and deposited by a glacier.

**mousse:** An emulsified mixture of water in oil. It ranges in color from dark brown to nearly red or tan and typically has the consistency of pudding. (See *emulsification*.)

**mulching:** Covering an area loosely with some material (e.g., straw or bark) to hold soil in place and facilitate revegetation.

**muskeg:** A type of *bog* that has developed over thousands of years in depressions, on flat areas, and on gentle to steep slopes. They have poorly drained, acidic, or organic soils.

**mutagenic:** Causing mutation, or the abrupt change in the genotype of an organism.

**National Ambient Air Quality**

**Standards (NAAQS):** Air quality standards established by the *Clean Air Act*, as amended. The primary NAAQS are intended to protect the public health with an adequate margin of safety, and the secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.

**National Environmental Policy Act:** See Chapter 9.

**National Historic Preservation Act:** See Chapter 9.

**National Landmark Status:** The highest recognition that the U.S. Department of Interior gives an historic property. (Note: National historic landmarks are buildings, sites, districts, structures, and objects that have been determined by the Secretary of the Interior to be nationally significant in American history and culture.)

**National Park Service (NPS):** An agency in the U.S. Department of the Interior responsible for protection and preservation of natural and cultural units throughout the United States.

**National Petroleum Reserve-Alaska:** The area currently known as the National Petroleum Reserve-Alaska was originally designated in 1923 as Naval Petroleum Reserve No. 4. It was one of four U.S. regions thought to contain significant amounts of oil that were to be reserved for national crises.

**National Pollutant Discharge**

**Elimination System (NPDES):** A federal permitting system controlling the discharge of effluents to surface waters of the United States and regulated through the *Clean Water Act*, as amended.

**National Register of Historic Places:** A comprehensive list of districts, sites, buildings,

structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.

**Native American Graves Protection and Repatriation Act:** See Chapter 9.

**naturally occurring radioactive material (NORM):** Material containing no significant amounts of radionuclides other than naturally occurring radionuclides.

**nautical mile:** A nautical mile is equal to 1,852 meters (about 6,076 feet).

**nitrate (NO<sub>3</sub>):** A nitrogen-containing compound that is water soluble and mobile in the environment. Nitrates are toxic at elevated concentrations.

**nitrite (NO<sub>2</sub>):** The product in the first step of the two-step process of conversion of ammonium (NH<sub>4</sub>) to nitrate (NO<sub>3</sub>).

**nitrogen oxides (NO<sub>x</sub>):** The oxides of nitrogen, primarily nitrogen oxide (NO) and nitrogen dioxide (NO<sub>2</sub>), that are produced in the combustion of fossil fuels. Nitrogen dioxide emissions constitute an air pollution problem, as they contribute to acid deposition and the formation of ozone. Nitrogen oxides are one of six *criteria air pollutants* specified under Title I of the *Clean Air Act*.

**Noise Control Act as Amended by the Quiet Communities Act:** See Chapter 9.

**nonattainment area:** The U.S. *Environmental Protection Agency's* designation for an air quality control region (or portion thereof) in which ambient air concentrations of one or more criteria pollutants exceed *National Ambient Air Quality Standards*.

**Occupational Safety and Health**

**Administration (OSHA):** Congress created OSHA under the Occupational Safety and Health Act on December 29, 1970. Its mission is to prevent work-related injuries, illnesses, and deaths.

**Oil Pollution Act:** See Chapter 9.

**oil seep:** A natural flow of oil to the earth's surface.

**old-growth:** Referring to an ecosystem or community (particularly a forest) that has not experienced intense or widespread disturbance for a long time relative to the life span of the dominant species and that has entered a late successional stage. It is usually associated with high diversity of species, specialization, and structural complexity.

**oleophilic:** Having a strong affinity for oil.

**omnivorous:** Eating both plants and animals.

**open canopy:** A canopy with frequent openings between the tree crowns (leaves). An open forest has a tree canopy coverage of 25 to 60%.

**open forest:** See open canopy.

**operational material sites (OMSs):** See borrow pit.

**organic compounds:** Natural or synthetic compounds based on carbon. They also usually contain hydrogen, nitrogen, and oxygen. All living organisms are made up of organic compounds.

**oriented thaw lake:** A lake or pond in a permafrost area formed by the thawing of ground ice and enlarged by wind currents.

**ostracods:** A group of small marine or freshwater *crustacean* with a bivalved shell. There are more than 2,000 species of living ostracods and many that are known as fossils. They are also called "seed shrimp."

**outfall:** The discharge point of a drain, sewer, or pipe into a body of water.

**outwash:** A *glaciofluvial sediment* that is deposited by meltwater streams from a *glacier*.

**outwash fan:** A fan-shaped body of *sediments* deposited by streams of a melting *glacier*.

**oxbow lake:** A lake formed in the channel of an abandoned *meander* or river bend. The river

forms a new channel, isolating the bend or meander and forming a lake.

**ozone (O<sub>3</sub>):** A strong-smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms chemically attached to each other. It is the product of the photochemical process involving the sun's energy and ozone precursors, such as hydrocarbons and oxides of nitrogen. Ozone is one of six criteria air pollutants specified under Title I of the *Clean Air Act* and is a major constituent of smog.

**pack ice:** Floating ice that has been driven together into a single mass.

**packline conditions:** A pipeline flow condition in which the oil stream completely fills the pipe cross-section. (See *slackline*.)

**paleontology:** The study of plant and animal life that existed in former geologic times, particularly through the analysis of *fossils*.

**Paleozoic Era:** An era of geologic time lasting from 248 to 570 million years ago.

**palustrine:** Pertaining to wet or marshy habitats.

**parameters:** Data, or values, that are input to computer codes or equations.

**particulate matter (PM):** Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions. The size of the particulates is measured in micrometers ( $\mu\text{m}$ ); a micrometer is 1 millionth of a meter (0.000039 inch). Particle size is important because the *Environmental Protection Agency* has set standards for *PM<sub>10</sub>* and *PM<sub>2.5</sub>* designed to protect human health and welfare.

**particulates:** Solid or solid particles such as dust, smoke, mist, or smog small enough to become airborne.

**parts per million (ppm):** One ppm equals one unit of measurement per million units of the same measurement. The equivalent to microgram per gram or milliliter per liter.

**passerine:** Perching birds or songbirds.

**patterned ground:** A mosaic of polygons (up to 20 feet in diameter) at the surface of unconsolidated, weathered rock, that are formed by freeze/thaw cycles. Patterned ground is found in the *tundra*.

**peak acceleration:** The largest acceleration recorded by a particular station during an earthquake.

**peat:** Unconsolidated soil material consisting largely of undecomposed, or slightly decomposed, organic matter accumulated under conditions of excessive moisture.

**pelagic:** Referring to or occurring in the open sea.

**pelecypods:** Bivalved *mollusks* such as oysters, clams, and mussels.

**per capita:** Per person.

**perched lake:** A lake that is isolated above the *groundwater* table by a layer of rock or organic material.

**perched saturated zone:** A saturated zone held above a lower body of *groundwater* by an unsaturated zone.

**percolation:** The downward movement of water through porous material such as soil or rock.

**period:** In the geologic time scale, a unit of time less than an *era* and greater than an *epoch*.

**permafrost:** Ground that has remained continuously frozen for two or more years.

**Permian Period:** A period of geologic time from 248 to 290 million years ago.

**permeable:** Able to transmit water or other fluids.

**permissible exposure limit (PEL):** The maximum amount or concentration of a chemical that a worker may be exposed to under OSHA regulations.

**petrified:** Turned to stone through a process that replaces organic molecules with inorganic minerals.

**petroleum hydrocarbons:** Liquids that are generated through the action of time and temperature on organic matter buried below the earth's surface.

**pH:** A measure ranging from 0 to 14 that describes the acidity or alkalinity of a solution based on the concentration of hydrogen ions in the solution. A pH of 7 is neutral; values below 7 are acid, and above 7 are alkaline (bases).

**phenols:** A group of organic compounds that are by-products of petroleum refining, tanning, and other manufacturing processes. In very low concentrations they produce a taste and odor problem in water; in higher concentrations they are toxic to aquatic life.

**physiographic province:** A region in which the *landforms* are similar in geologic structure and differ significantly from the landform patterns in adjacent regions.

**physiography:** The physical geography of an area, or the description of its physical features.

**phytoplankton:** Minute plant life (e.g., algae), usually containing chlorophyll, that passively drifts or weakly swims in a body of water.

**pigs:** Instrumented probes in a pipeline used to determine the condition and operation of the pipeline.

**pingo:** A rounded or conical mound containing ice at its core. It is formed when the hydrostatic pressure of freezing *groundwater* causes the upheaval of a layer of frozen ground. Pingos are commonly 30 to 50 meters high and up to 400 meters in diameter.

**pinnacle:** A tall, slender, tapering pillar of rock.

**pioneer species:** The first species or community to colonize or recolonize a barren or disturbed area.

**placer:** *Glacial* or *alluvial* deposits of sand or gravel that contain gold particles or other valuable minerals.

**placer mining:** The removal of ore from *placers*.

**plankton:** Animals and plants (especially minute organisms) floating in the water of seas, rivers, ponds, and lakes.

**Pleistocene:** The *epoch* of the *Quaternary Period* of geologic time from 1.6 million to 10,000 years ago; the “Ice Age.”

**Pliocene:** The last epoch of the *Tertiary Period*, from 1.6 to 5.2 million years ago.

**PM<sub>10</sub>:** *Particulate matter* with a diameter less than 10 micrometers (0.0004 inch). Particles less than this diameter are small enough to be breathable and could be deposited in the lungs. PM<sub>10</sub> is one of the six *criteria air pollutants* specified under Title I of the *Clean Air Act*.

**PM<sub>2.5</sub>:** *Particulate matter* with a diameter less than 2.5 micrometers (0.0001 inch). A standard for this material as a *criteria air pollutant* has been defined but has not yet been implemented.

**point source:** A source of *effluents* that is small enough in dimensions that it can be treated as if it were a point. A point source can be either a continuous source or a source that emits effluents only in puffs for a short time.

**pollutant:** Any material entering the environment that has undesired effects.

**pollution:** The addition of an undesirable agent to the environment in excess of the rate at which natural processes can degrade, assimilate, or disperse it.

**polychlorinated biphenyls (PCBs):** A group of manufactured *organic compounds* made up of carbon, hydrogen, and chlorine. They were used in the manufacture of plastics and as insulating fluids for electrical equipment. Because they are very stable compounds and are also fat-soluble, they accumulate in ever-higher concentrations as they move up the food chain. The use of PCBs was banned in the United States in 1979.

**polycyclic aromatic hydrocarbons (PAHs):** *Organic compounds* that include only carbon and hydrogen with a fused ring structure containing at least two benzene (six-sided) rings.

PAHs are commonly found in petroleum oils (e.g., gasoline and fuel oils) and are emitted from various combustion processes (e.g., automobile exhausts). Some PAHs are potent human carcinogens.

**polygonal ground:** A type of *patterned ground* outlined by cracks that are filled with *ice wedges* and produced by frost action.

**polynuclear aromatic hydrocarbons:** See polycyclic aromatic hydrocarbons.

**ponding:** Runoff that collects in depressions and cannot drain out, creating a temporary pond.

**potable water:** Water that can be used for human consumption.

**potlatches:** A ceremonial feast where one's property is given away in order to repay debts or achieve a position of status in the community.

**ppm:** See parts per million.

**prehistoric:** That part of the past beginning with the emergence of human beings and continuing until the introduction of written records.

**primary waste treatment:** Mechanical separation of solids, grease, and scum from wastewater.

**proglacial lake:** A lake formed by the damming action of *moraines* in front of a *glacier* as the glacier melts.

**protected species:** Species that are protected by law, including the *Endangered Species Act*. This includes all *threatened*, *endangered*, and *candidate* species.

**Proterozoic Era:** An *era* of geologic time lasting from 570 to 2,500 million years ago.

**Public Money, Property or Records:** See Chapter 9.

**putrescible waste:** Solid waste that contains organic matter capable of being decomposed by microorganisms and of such a character and proportion as to cause obnoxious odors and to be capable of attracting or providing food for birds or animals.

**Quaternary Period:** The period of the *Cenozoic Era* of geologic time extending from about 1.8 million years ago to the present. It is noted for numerous major ice sheet advances in the Northern Hemisphere.

**radioactive waste:** Materials that are radioactive or are contaminated with radioactive materials, and for which use, reuse, or recovery are impractical.

**radionuclide:** An atom that exhibits radioactive properties. Radionuclides can be man-made or naturally occurring, can have a long life, and have potentially *mutagenic* or *carcinogenic* effects on the human body.

**rampdown:** Operation at reduced levels.

**raptor:** Bird of prey.

**reach (of a river):** Any specified length of a river; a relatively homogeneous section of a river having a repetitious sequence of physical characteristics and habitat types.

**reactivity:** A substance exhibits the characteristic of reactivity if it reacts violently, forms explosive mixtures, or emits significant quantities of toxic vapors when mixed with water.

**recreation opportunity spectrum (ROS):** A system for planning and managing recreation resources that categorizes recreation opportunities into three classes: semi-primitive, roaded natural, and rural.

**recycling:** The process by which a material that would otherwise be destined for disposal is collected, reprocessed, and then reused.

**reef:** A ridge of rock or coral lying at, near, or beneath the surface of the water.

**reference concentration:** The concentration of a chemical in air that is very unlikely to have adverse effects if inhaled continuously over a lifetime.

**reference dose:** The oral intake level of a chemical that is very unlikely to have adverse effects. It is measured in units of milligrams per kilogram of body weight per day.

**relict permafrost:** Permafrost that persists in places where it could not presently form. Relict permafrost reflects past climatic conditions, usually colder temperatures, that differ from current conditions.

**remediation:** The cleanup, removal, containment, isolation, treatment, or monitoring of hazardous substances released into the environment.

**remote gate valves:** A remotely controlled *block valve* used primarily to protect segments of a pipeline in the event of a catastrophic pipeline break.

**Resource Conservation and Recovery Act (RCRA):** See Chapter 9.

**return period:** Recurrence interval; a statistical parameter used in frequency analysis as a measure of the average time interval between the occurrence of a given quantity and that of an equal or greater quantity.

**revetment:** A facing of stone, concrete, or other material placed on a riverbank to protect it from erosion. Revetments are used to prevent further movement of rivers towards a pipeline.

**Richter Scale:** A logarithmic scale used to express the total amount of energy released by an earthquake. The scale has 10 divisions, from 1 (not felt by humans) to 10 (nearly total destruction).

**riparian:** Relating to, living in, or located on the bank of a river, lake, or tidewater.

**riprap:** Material, usually large, blocky stones, placed to stabilize and prevent erosion along a riverbank or shoreline.

**riverine:** Relating to or formed by a river.

**rookery:** A breeding or nesting place for some gregarious mammals and birds.

**runoff:** Water on land (usually from precipitation) that runs off to a body of water.

**Safe Drinking Water Act:** See Chapter 9.

**salinity:** A measurement of the amount of dissolved salts in water.

**sandstone:** *Sedimentary* rock containing mostly sand-sized *clastic* materials.

**sanitary (domestic) wastewater:** Wastewater, including toilet, sink, shower and kitchen flows, originating from human domestic activities. It is collected from residences, commercial buildings, institutions, or similar structures.

**schist:** A crystalline metamorphic rock that can be readily split into thin flakes or slabs.

**scientific notation:** For example, 4,900 =  $4.9 \times 10^3 = 4.9E+03$ , or  $0.049 = 4.9 \times 10^{-2} = 4.9E-02$ .

**scour:** Erosion that occurs underwater, as in the case of a streambed.

**scrub-shrub:** Woody vegetation less than about 20 feet tall. Species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

**secondary wastewater treatment:** Biological removal of organics and solids from wastewater.

**sedges:** Perennial nonwoody plants (genus *Carex*) common to most fresh water *wetlands*; they resemble grasses.

**sediment:** Materials that sink to the bottom of a body of water or materials that are deposited by wind, water, or *glaciers*.

**sedimentary rock:** Rock formed at or near the earth's surface from the consolidation of loose sediment that has accumulated in layers through deposition by water, wind, or ice, or deposited by organisms. Examples are *sandstone* and limestone.

**sedimentation:** The removal, transport, and deposition of *sediment* particles by wind or water.

**seismic:** Pertaining to any earth vibration, especially that of an earthquake.

**semidiurnal tides:** Tides having cycles of approximately 12 hours. The predominant type of tide throughout the world is semidiurnal, with

two high waters and two low waters each tidal day.

**sensitive species:** A plant or animal species listed by the state or federal government as *threatened*, *endangered*, or as a *species of special concern*.

**sewage:** The water-carried human or animal wastes from residences, buildings, industrial establishments, or other places, together with groundwater infiltration and surface water that may be present.

**shallow sills:** A bedrock ridge at a shallow depth near the mouth of a *fjord*. It separates the deep water of the fjord from the deep ocean water.

**sheen:** A very thin layer of oil (less than 0.0001 inch thick) floating on the water surface. Depending on thickness, sheen ranges in color from dull brown for the thickest sheens to rainbows, grays, silvers, and near-transparency for the thinnest sheens.

**shrub wetlands:** Wetlands, including shrub swamps and bogs, that are represented by medium-height (less than 20 feet tall) woody plants.

**silt:** A *sedimentary* material consisting of fine mineral particles intermediate in size between sand and *clay*.

**siltation:** The deposition or accumulation of *silt*.

**skimmers:** Devices used to remove oil from the water's surface.

**slackline conditions:** A pipeline flow condition in which the oil stream does not completely fill the pipe cross-section. (See *packline*.)

**slick:** Oil spilled on the water, which absorbs energy and dampens out surface waves, making the oil appear smoother – or slicker – than the surrounding water.

**slope factor:** An upper-bound estimate of a chemical's probability of causing cancer over a 70-year lifetime.

**slopewash:** The action of water from rain or melted snow carrying (washing) soil down a slope.

**slough:** A swamp, *marsh*, or muddy backwater.

**sludge:** The residue (solids and some water) produced as a result of raw or wastewater treatment. Also, oil residues normally found at the bottom of oil tanks.

**slumps:** A generic term for various types of landslides.

**small quantity generator:** A waste generator who generates less than 1,000 kilograms (2,200 pounds) of hazardous material in a calendar month.

**smolt:** The stage in life of salmon and similar fishes in which the subadult individuals migrate down the river to begin their adult lives in the open sea.

**soil:** The unconsolidated material on the surface of the earth that serves as a natural medium for the growth of land plants.

**solid waste:** All unwanted, abandoned, or discarded solid or semisolid material whether or not subject to decomposition, originating from any source.

**solifluction:** The slow creeping of fragmented material such as soil down a slope caused by a combination of *frost creep* and downslope movement of wet, unfrozen soil.

**sorbents:** Substances that take up and hold water or oil.

**spawning:** In aquatic organisms, the act of producing eggs.

**special waste:** Waste (not hazardous) that requires special handling considerations during disposal.

**species:** A group of organisms formally recognized as distinct from other groups. Members of a species are genetically similar and normally mate only with other members of the same species.

**species of special concern:** Any species or subspecies of fish or wildlife or population of mammal or bird native to an area that has entered a long-term decline in abundance or is vulnerable to significant decline due to low numbers, restricted distribution, dependence on limited habitat resources, or sensitivity to environmental disturbance.

**spit:** A sandy bar built out from the land into a body of water.

**spur dikes:** Elongated structures having one end on the bank of a stream and the other end projecting perpendicularly into the current, used to protect eroding stream banks.

**squalene:** An oil (hydrocarbon) that was traditionally obtained from shark liver.

**squall:** A sudden, intense wind storm of short duration, often accompanied by rain.

**staging area:** A traditional area, usually a lake, where birds that migrate in flocks rest and feed either immediately before or during migration. Many flocks may use the same staging area.

**strangmoor ridges:** Alternating ridges and hollows oriented perpendicular to water flow.

**State Historic Preservation Officer (SHPO):** The State officer charged with the identification and protection of prehistoric and historic resources in accordance with the *National Historic Preservation Act*.

**static volume (related to spills):** The amount of oil spilled from a break in a pipeline because of hydraulic heads established at elevations higher than the break location.

**streamers:** A narrow line of oil, *mousse*, or *sheen* on the water surface, surrounded on both sides by clean water. Streamers result from the combined effects of wind, currents, and/or natural convergence zones. Streamers are also called “fingers” or “ribbons.”

**subalpine:** The zone just below the treeline on temperate mountains, usually dominated by a *coniferous* forest ecologically similar to *boreal* forest. The elevation of this zone increases as latitude decreases.

**subsidence:** The process of sinking or settling of a land surface because of natural or artificial causes.

**subsistence:** The noncommercial acquisition of naturally occurring renewable resources harvested for traditional and customary uses. Subsistence activities can involve hunting, fishing, trapping, and collecting.

**subtidal:** The *benthic* ocean environment below low tide that is always covered by water.

**succession:** See ecological succession.

**sulfur dioxide (SO<sub>2</sub>):** A compound of sulfur produced by the burning of sulfur-containing compounds and considered to be a major air pollutant. Sulfur dioxide is one of six *criteria air pollutants* specified under Title I of the *Clean Air Act*.

**suprapermafrost water:** Free water in the ground above the *permafrost*.

**surface water:** Water on the earth's surface that is directly exposed to the atmosphere, as distinguished from water in the ground (groundwater).

**surfactant:** A substance, such as a detergent, wetting agent, or emulsifier, that breaks oil into small droplets by reducing surface tension among liquids and solids.

**taiga:** A subarctic, evergreen *coniferous* forest located just south of the *tundra* and dominated by firs and spruces. It is sometimes referred to as a *boreal forest*.

**taliks:** Unfrozen zones that occur beneath lakes and rivers that are either underlain by *permafrost* at depth or completely open to subpermafrost groundwater.

**talus:** Accumulation of rock debris at the base of cliffs.

**tanker:** A ship designed to carry liquid cargo in bulk. The cargo space consists of many tanks.

**tarballs:** Weathered oil that has formed pliable balls or patches that float on the water. Tarballs range in diameter from a few millimeters to a foot.

**teratogen:** Any substance that causes growth abnormalities in embryos, genetic modifications in cells, etc.

**terrestrial:** Living or growing on land rather than in water or air.

**Tertiary Period:** The first period of the *Cenozoic Era*, from 1.8 to 65 million years ago. It was marked by formation of high mountains and the dominance of mammals on land.

**thaw bulb:** In permafrost, an area of thawed ground below a building, pipeline, river, or other heat source.

**thermokarst:** A landscape characterized by shallow pits and depressions caused by selective thawing of *ground ice* or *permafrost*.

**thermokarst lake:** A lake formed in a depression by the thawing of *ground ice* in soil above *permafrost*.

**threatened species:** Any species that is likely to become an *endangered* species within the foreseeable future throughout all or a significant portion of its range. Requirements for declaring a species threatened are contained in the *Endangered Species Act*.

**throughput:** The amount of material that can be handled or processed by a facility in specified period of time.

**tide rips:** A heavy boil on the sea surface often accompanied by breaking waves. Rips are produced by strong tidal currents over irregular sea bottoms.

**till:** Unstratified *glacial* material deposited directly by the ice and consisting of *clay*, sand, gravel, and boulders.

**topography:** The shape of the earth's surface. The relative position and elevations of natural and human-made features of an area.

**topping unit:** A mini-refinery that draws crude oil from a pipeline and produces turbine fuel to power a pump station.

**total suspended solids (TSS):** A measure of the suspended solids in *wastewater*, *effluent*, or water bodies, determined by tests for total suspended nonfilterable solids. Suspended solids are particles of soil, *sediment*, living material, or dead organisms suspended in water.

**toxic equivalency factor:** A numerical index that is used to compare the toxicity of different *congeners* and substances.

**toxicity:** The ability of a substance to cause damage to cells or tissues of living organisms when the substance is inhaled, *ingested*, or absorbed by the skin.

**Trans-Alaska Pipeline Authorization Act:** See Chapter 9.

**transient volume balance:** A leak-detection system that compares reported flow with calculated flow and can identify the probable location of a leak by pipeline section.

**treeline:** The upper limits of tree growth in mountains or at high latitudes.

**Triassic Period:** The first period of the *Mesozoic Era*, dating from approximately 210 to 246 million years ago.

**trilobites:** Ancient marine arthropods, abundant in the Early and Middle *Paleozoic Era*, but extinct since the *Permian Period*. They had three lobes running the length of the body and ranged in size from a few millimeters to about 90 centimeters.

**trophic level:** Describes the residence of nutrients in various organisms along a food chain ranging from the plants to the predatory carnivorous animals.

**tsunami:** A large, destructive wave caused by seafloor movements in an earthquake.

**tundra:** A level or rolling treeless plain in the arctic or subarctic regions. The soil is black and mucky, the subsoil is permanently frozen, and the vegetation is dominated by mosses, *lichen*, herbs, and dwarf shrubs.

**turbidity:** A measure of the cloudiness or opaqueness of water. Typically, the higher the

concentration of suspended material, the greater the turbidity.

**tussock:** A compact tuft of grass or *sedges*, or an area of raised solid ground that is held together by roots of low vegetation. Tussocks are found in *wetlands* or *tundra*.

**ungulate:** Any four-footed, hoofed, grazing mammal (e.g., cattle, pigs, camels, horses, and elephants).

**vagrants (species):** Individuals of a species that move, by natural means, from one geographical region to another outside their usual range, or away from usual migratory routes, without establishing a new population in the region.

**viscosity:** A measure of the resistance to flow, or internal friction, of a fluid. Material with higher viscosity is more resistant to flow.

**visual resource management (VRM) classification system:** A process devised by the *Bureau of Land Management* to assess the aesthetic quality of a landscape and to design proposed activities in a way that would minimize their visual impact on that landscape. The process consists of a rating of site's visual quality followed by a measurement of the degree of contrast between the proposed development activities and the existing landscape.

**visual resources:** The composite of basic terrain, geologic features, hydrologic features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal that the unit may have.

**volatile:** Evaporating readily at normal temperature and pressures.

**volatile organic compounds (VOCs):** A broad range of *organic compounds* that readily evaporate at normal temperatures and pressures. Examples include certain solvents, paint thinners, degreasers (benzene), chloroform, and methyl alcohol. Such compounds can react with other substances, principally nitrogen oxides, to form *ozone*. They contribute significantly to photochemical smog production and certain health problems.

**waste stream:** A waste or group of wastes from a process or a facility with similar physical, chemical, or radiological properties.

**watershed:** An area from which water drains to a particular body of water. Watersheds range in size from a few acres to large areas of the country.

**watt:** A measurement of power, commonly used to define the rate of electricity consumption of an appliance.

**weathering (of oil):** A combination of physical and environmental processes, such as evaporation, dissolution, *dispersion*, and *emulsification*, that act on spilled oil to change its physical properties and composition.

**wetlands:** Areas that are soaked or flooded by surface or groundwater frequently enough or long enough to support plants, birds, animals, and aquatic life. Wetlands generally include swamps, *marshes*, *bogs*, *estuaries*, and other inland and coastal areas, and are federally protected.

**Wild and Scenic Rivers Act:** See Chapter 9.

**Wilderness Act of 1964:** See Chapter 9.

**wind rose:** A circular diagram showing, for a specific location, the percentage of time the wind is from each compass direction. A wind rose for use in assessing consequences of airborne releases also shows the frequency of different wind speeds for each compass direction.

**year-class:** Fish of a given species spawned or hatched in a given year.

**zooplankton:** Small, often microscopic, animals that drift in currents.



## 9. Glossary of Laws, Executive Orders, and Regulations Cited in This EIS

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The laws, executive orders, and regulations listed and described below are only those referenced in the text of this document. The descriptions are very brief explanations of what are often very complicated laws and regulations; readers wishing more information are directed to the source included in the description.

### 9.1 Federal Laws

**Alaska National Interest Lands Conservation Act** (16 USC §3101 et seq.) established more than 100 million acres of federal land in Alaska as conservation system units to preserve the land and associated resources for the national interest. The law also established a subsistence preference for rural Alaskans.

**Alaska Native Allotment Act of 1906** (formerly 43 USC §270-1 to §270-3) provided for an allotment of up to 160-acre homesteads on nonmineral land to Eskimos or Alaska Indians of full or mixed blood, 21 years old, and heads of families. The Act was repealed by Section 18 of the Alaska Native Claims Settlement Act.

**Alaska Native Claims Settlement Act** (43 USC §1601 et seq.) was passed in 1971 to settle multiple Alaska Native land use claims by extinguishing all prior aboriginal land claims. The Act established 12 regional corporations, provided \$962,500,000 in cash, and conveyed 44 million acres to the corporations.

**Alaska Statehood Act of 1958** (48 USC note preceding Chapter 21) admitted Alaska to the United States as the 49th state.

**American Indian Religious Freedom Act** (42 USC §1996 et seq.) requires federal agencies to consult with Tribal officials to ensure protection of religious cultural rights and practices.

**Antiquities Act** (16 USC §431 et seq.) prohibits excavating, injuring, or destroying any historic or prehistoric ruin or monument or object

of antiquity on federal lands without the prior approval of the agency with jurisdiction over the land.

**Archeological Resources Protection Act** (16 USC §470(aa) et seq.) requires a permit for excavation or removal of archeological resources from public or Native American lands.

**Bald and Golden Eagle Protection Act** (16 USC §668 et seq.) makes it unlawful to take, pursue, molest, or disturb bald and golden eagles, their nests, or their eggs. Permits must be obtained from the U.S. Department of the Interior in order to relocate nests that interfere with resource development or recovery.

**Clean Air Act** (42 USC §7401 et seq.) establishes national ambient air quality standards (NAAQS) and requires facility compliance with emission limits or reduction limits stipulated in state implementation plans (SIPs). The law requires construction and operating permits, as well as reviews of new stationary sources and major modifications to existing sources. It also prohibits the federal government from approving actions that do not conform to SIPs.

**Clean Water Act** (33 USC §1251 et seq.) requires National Pollutant Discharge Elimination System (NPDES) permits for discharges of effluents to surface waters, permits for storm-water discharges related to industrial activity, and notification of oil discharges to navigable waters of the United States. The State of Alaska certifies NPDES permits issued by the federal government.

**Coastal Zone Management Act** (16 USC §1451 et seq.) encourages states to develop management plans for the water and land of their coastal zones. Plans must identify the boundaries of the area covered by the plan and permissible land and water uses.

**Emergency Planning and Community Right-To-Know Act** (42 USC §11001 et seq.) requires emergency planning,

emergency release notification, hazardous chemical inventory reporting, and toxic chemical release inventory reporting by facilities, depending on the chemicals stored or used and their amounts.

**Endangered Species Act** (16 USC §1531 et seq.) requires consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to determine if endangered or threatened species or their habitats will be impacted by a proposed activity and what, if any, mitigation measures are needed to address the impacts.

**Federal Advisory Committee Act** (5 USC App1) outlines the appointment, recordkeeping, and meeting procedures applicable to committees established to provide advice to the federal government.

**Federal Cave Resources Protection Act** (16 USC §4301 et seq.) allows the collection and removal of resources from federal caves only with a permit authorized by the Secretary of Agriculture or the Secretary of the Interior.

**Federal Land Policy and Management Act** (43 USC §1701 et seq.) requires the Secretary of the Interior to issue regulations to manage public lands and the property located thereon for the long term.

**Indian Reorganization Act of 1934** (25 USC §461 et seq.) authorized Indian tribes to organize, adopt constitutions and bylaws, and request charters of incorporation if desired, and it banned dividing reservation lands into private allotments.

**Jones Act of 1920 (Merchant Marine Act of 1920)** (46 USC §861 et seq.) requires that vessels used to transport cargo and passengers between U.S. ports be owned by U.S. citizens, built in U.S. shipyards, and manned by U.S. citizen crews.

**Magnuson-Stevens Fishery Conservation and Management Act** (16 USC §1801 et seq.) establishes regional fishery management councils to develop fishery management plans describing the conservation and management measures necessary to

protect, restore, and promote the long-term health and stability of fisheries.

**Marine Mammal Protection Act** (16 USC §1361 et seq.) protects marine mammals through regulating takings of them.

**Migratory Bird Treaty Act** (16 USC §703) requires consultation with the U.S. Fish and Wildlife Service to determine the effects of a proposed activity on migratory birds and consider opportunities to minimize their effects. The list of migratory birds protected by the Act is found at 50 CFR 10.13.

**Mineral Leasing Act** (30 USC §185(h)(2)) allows the Secretary of the Interior to grant a right-of-way on federal land, such as that issued for the TAPS. A right-of-way is an authorization to use specific parcels of public land for specific facilities or operations for periods up to 30 years.

**National Environmental Policy Act** (42 USC §4321 et seq.) requires federal agencies to prepare a detailed statement on the environmental impacts of their proposed major actions significantly affecting the quality of the human environment.

**National Historic Preservation Act** (16 USC §470(a) et seq.) requires federal agencies to take into account the effects of their actions on historical and archaeological resources and consider opportunities to minimize their impacts.

**Native American Graves Protection and Repatriation Act** (25 USC §3001) establishes the priority for ownership or control of Native American cultural items excavated or discovered on federal or Tribal land after 1990 and the procedures for repatriation of items in federal possession. The act allows the intentional removal from or excavation of Native American cultural items from federal or Tribal lands only with a permit or upon consultation with the appropriate tribe.

**Noise Control Act as Amended by the Quiet Communities Act** (42 USC §4901 et seq.) requires that the noise levels of facilities or operations do not jeopardize public health and safety. States are authorized to establish their own noise levels.

**Oil Pollution Act** (33 USC §2701 et seq.) requires double-hulled vessels by 2014 and development of Area Contingency Plans to be implemented in conjunction with the National Contingency Plan described at 40 CFR 300.

**Pollution Prevention Act of 1990** (42 USC §13101 et seq.) establishes a hierarchy of responses to waste to reduce pollution in the following descending order: source reduction, recycling, treatment, and disposal.

**Resource Conservation and Recovery Act** (42 USC §6901 et seq.) regulates the storage, treatment, and disposal of hazardous and nonhazardous wastes.

**Safe Drinking Water Act** (42 USC §300 et seq.) authorizes development of maximum contaminant levels for drinking water applicable to public water systems (i.e., systems that serve at least 25 people or have at least 15 connections).

**Trans-Alaska Pipeline Authorization Act** (43 USC §1651 et seq.) authorized the Secretary of the Interior to expedite the issuance of a Mineral Leasing Act grant of right-of-way on federal land for the TAPS. It provided broad oversight authority over the TAPS to the U.S. Department of the Interior.

**Wild and Scenic Rivers Act** (16 USC §1271 et seq.) allows rivers and their adjacent land areas to be designated as Wild, Scenic, or Recreational Areas. Water resource projects above or below a designated river can be approved if they will not invade the area or unreasonably diminish the values present in the area.

**Wilderness Act of 1964** (16 USC §1131 et seq.) authorizes the U.S. Congress to designate federally owned areas as Wilderness Areas and defines the criteria for determining if an area qualifies as a Wilderness Area.

## 9.2 Executive Orders

**Executive Order 11988, Floodplain Management**, requires federal agencies to take into account the impact of their actions on

floodplains in order to reduce or minimize any such impacts.

**Executive Order 11990, Protection of Wetlands**, requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands as they carry out their responsibilities.

**Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations**, requires federal agencies to identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

**Executive Order 13007, Native American Religious Practices**, requires federal agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of the sites to the extent practicable, allowed by law, and consistent with agency functions.

**Executive Order 13175, Consultation and Coordination with Indian Tribal Governments**, requires federal agencies to consult with Tribal officials in the development of policies with Tribal implications.

**Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use**, requires federal agencies to prepare a Statement of Energy Effects for any significant energy action to present information on any adverse effects on the energy supply of the action.

**Executive Order 13212, Actions to Expedite Energy-Related Projects**, requires federal agencies to expedite their review of permits associated with energy-related projects in order to accelerate completion of such projects while maintaining safety, public health, and environmental protections.

### 9.3 Federal Regulations

**40 CFR 50, National Primary and Secondary Ambient Air Quality Standards**, establishes the primary standards that define the level of air quality judged necessary, with an adequate margin of safety, to protect the public health and the secondary standards that define levels of air quality judged necessary to protect the public welfare from known or anticipated adverse effects of a pollutant.

**40 CFR 52.21, Prevention of Significant Deterioration of Air Quality**, defines terms and establishes conditions for state implementation plans (SIPs) for the prevention of significant deterioration (PSD) of air quality in portions of states where the existing air quality is better than the national ambient air quality standards.

**40 CFR 60, Subpart E, Standards of Performance for Incinerators**, establishes, for incinerators of more than 45 metric tons per day charging rate, standards for particulate matter, and the test method and procedures to determine compliance.

**40 CFR 81.402, Alaska**, lists the areas in Alaska identified as mandatory Class I federal areas where visibility is an important value (Bering Sea Wilderness, Simeonof Wilderness, Tuxedni Wilderness, and Mt. McKinley National Park).

**40 CFR 82 Subpart A, Protection of Stratospheric Ozone**, implements the Montreal Protocol on Substances That Deplete the Ozone Layer and Clean Air Act provisions limiting the production and consumption of certain ozone-depleting substances according to listed schedules.

**40 CFR 82 Subpart G, Significant New Alternatives Policy Program**, establishes the acceptable and unacceptable substitutes for banned ozone-depleting substances.

**40 CFR 122.26(b)(14)(ii), Stormwater Discharges Associated with Industrial Activity**, defines conditions under which National Pollutant Discharge Elimination System (NPDES) permits are required.

**40 CFR 144.6, Classification of Wells**, lists and describes the five classes of injection wells authorized by the Safe Drinking Water Act.

**40 CFR 145, State UIC Program Requirements**, specifies the procedures that the U.S. Environmental Protection Agency will use in approving, revising, and withdrawing approval from states requesting or already having authority to operate their own underground injection control program.

**40 CFR 261.3, Definition of Hazardous Waste**, describes the bases for declaring a solid waste a hazardous waste.

**40 CFR 261.4(b)(5), Solids Which Are Not Hazardous Wastes**, excludes drilling fluids, produced waters, and other wastes associated with exploration, development, or production of crude oil, natural gas, or geothermal energy from being managed as hazardous waste.

**40 CFR 261.5, Special Requirements for Hazardous Waste Generated by Conditionally Exempt Small Quantity Generators**, describes requirements applicable when no more than 100 kg of hazardous waste is generated in a calendar month.

**40 CFR 261.24(a), Toxicity Characteristic**, defines the required test method to determine if a solid waste exhibits the toxicity characteristic and is therefore subject to the Resource Conservation and Recovery Act.

**40 CFR 262.34, Accumulation Time, Subsections (a) and (b)**, describe the conditions and timing under which hazardous wastes can be accumulated without subjecting the waste generator to the permit requirements of the Resource Conservation and Recovery Act.

**40 CFR 300, National Oil and Hazardous Substances Pollution Contingency Plan**, describes the notification requirements for oil discharge or hazardous substance releases and the response procedures that must be followed.

**40 CFR 370.2 (no title)** describes the terms used in regulation 40 CFR 370, Hazardous Chemical Reporting: Community Right-to-Know.

**40 CFR 761.3(1), Small Capacitor**, defines a capacitor as small if it contains less than 1.36 kg (3 lb) of dielectric fluid.

**40 CFR 1508.7, Cumulative Impact**, describes cumulative impact as the environmental impact resulting from incremental impacts of the action when added to other actions.

**40 CFR 1508.25, Scope**, requires that agencies preparing environmental impact statements under the National Environmental Policy Act take into account connected actions, cumulative actions, and similar actions; alternatives; and mitigation measures.

**43 CFR 2881.1-1(f) (no heading)** describes the conditions under which a right-of-way will be renewed and establishes the authority for modifying its terms and conditions.

**49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Standards**, describes the following required features related to gas pipelines: material, pipe design, pipeline design components, welding, construction, corrosion control, testing, operations, maintenance, uprating, and pipeline personnel qualifications.

**49 CFR 195.2, Definitions**, defines breakout tanks by describing their use to either relieve surges in hazardous liquid pipeline systems or receive and store hazardous liquid transported by pipeline for subsequent reinjection and continued transportation.

## 9.4 State Laws

**AS 16, Fish and Game**, establishes state authority for fish and game management.

**AS 16.05.789, Prohibition on Hunting Adjacent to Highway between Yukon River and Arctic Ocean**, prohibits hunting with firearms north of the Yukon River in the area

within 5 miles on either side of the highway between the Yukon River and the Arctic Ocean.

**AS 16.05.840, Fishways Required**, requires fishways, if necessary, for dams or obstructions of streams frequented by salmon or other fish.

**AS 16.05.870, Protection of Fish and Game**, authorizes the identification of the rivers, lakes, and streams important for spawning, rearing, or migration of anadromous fish and an approval process for activities that could affect them.

**AS 16.05.940, Definitions, Subsection (32)**, defines subsistence uses as “the noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption; in this paragraph, ‘family’ means persons related by blood, marriage, or adoption, and a person living in the household on a permanent basis.”

**AS 19.40.210, Prohibition of Off-Road Vehicles**, prohibits off-road vehicles on land within 5 miles of the right-of-way of the Dalton Highway, with several exceptions.

**AS 38.35, Right-of-Way Leasing Act**, reserves to the State of Alaska right-of-way leasing of state land for pipeline construction, transmission, or operation within its boundaries. Subsection 38.35.100 describes the criteria for the State to make a decision on a right-of-way application.

**AS 41.35, Alaska Historic Preservation Act**, reserves to the State title to all historic, prehistoric, and archeological resources on land owned or controlled by the State. The Act requires permits for investigation, excavation, or removal of historic, prehistoric, or archeological resources of the State.

**AS 46.40, Alaska Coastal Management Act**, requires coastal resource districts to develop coastal management programs.

## 9.5 State Regulations

**5 AAC 93.020, Endangered Species**, lists the following as endangered species in Alaska: Eskimo curlew, short-tailed albatross, humpback whale, right whale, and blue whale.

**5 AAC 95.010, Waters Important to Anadromous Fish**, adopts, by reference, the *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes* and the *Atlas to the Catalog* to identify the rivers, lakes, and streams, or parts of them, that are important for the spawning, rearing, or migration of anadromous fish.

**18 AAC 50.010, Ambient Air Quality Standards**, establishes the State's standards for concentrations of contaminants in ambient air for PM<sub>10</sub> (particulate matter), sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, and ammonia.

**18 AAC 50.020, Baseline Dates, Maximum Allowable Increases, and Maximum Allowable Ambient Concentrations**, establishes standards for the prevention of significant deterioration (PSD) of air quality.

**18 AAC 50.725 to 50.735, General Conformity: Incorporation by Reference of Federal Regulations**, incorporates the federal conformity regulations at 40 CFR 51.850 to 51.859 into State of Alaska regulations and requires reporting of any mitigation measures intended to offset air quality impacts of federal actions.

**18 AAC 60.300, Purpose, Scope, and Applicability; Classes of MSWLF**, establishes the minimum standards for owners and operators of municipal solid waste landfills (MSWLFs); the MSWLF classes are described in 18 AAC 60.300(c).

**18 AAC 70, State of Alaska Water Quality Standards**, specifies the degree of degradation that may not be exceeded in a water body as a result of human actions by establishing an antidegradation policy, water quality criteria, protected water use classes and subclasses, and protocols for granting variances and establishing site-specific criteria.

**18 AAC Chapter 75, Oil and Other Hazardous Substance Pollution Control**, describes requirements related to oil pollution prevention, financial responsibility for discharges, discharge reporting and cleanup, oil discharge prevention and contingency plans, and civil penalties for petroleum dischargers. 18 AAC 75.341 describes soil cleanup levels for different soil types, geographic zones, and contaminants; 18 AAC 75.445(k) stipulates the criteria for determining if the oil discharge and contingency plan relies on the best available technology.

**18 AAC 78, Underground Storage Tanks**, establishes requirements for underground storage tanks, corrective actions for leaking tanks, and cleanup standards.

**18 AAC 80, State of Alaska Drinking Water Standards**, establishes minimum separation distances between drinking water sources and potential sources of contamination, classifications for public water systems, maximum contaminant levels (MCLs), sampling requirements, and public notice requirements for violations of MCLs, treatment techniques, variances, and exemptions.