FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E
TransCanada Alaska Company, LLC
Alaska Pipeline Project
Docket No. PF09-11-000

March 30, 2012

Ms. Irene T. Garcia
EIS Project Manager
Alaska Pipeline Project
16945 Northchase Drive; Room 422
Houston, TX 77060

Re: Comments on Draft Resource Reports 1-11

Dear Ms. Garcia:

The enclosure contains the comments of the FERC staff and the cooperating agencies on TransCanada Alaska Company, LLC's (TC Alaska) draft environmental resource reports 1-11 for the planned Alaska Pipeline Project. The comments ask for clarifications of discrepancies and identify missing information that the agencies believe necessary to begin substantive preparation of a draft environmental impact statement (EIS) for the project.

Due to the large number of agency comments and the complexity of some of the outstanding information identified in our review of TC Alaska's draft resource reports, we are requesting that TC Alaska file revised draft reports that address the comments in this request. To facilitate agency review of the revised reports, TC Alaska should provide a matrix that identifies the specific locations where the requested information may be found.

When filing documents and maps, be sure to prepare separate volumes, as outlined on the Commission's web site at http://www.ferc.gov/help/filing-guide/file-material.asp. Any plot plans showing equipment or piping details or other Critical Energy Infrastructure Information (CEII) should be filed as non-public and labeled "Contains Critical Energy Infrastructure Information – Do Not Release" (18 CFR 388.112). Cultural resources material containing location, character, or ownership information should be marked "Contains Privileged Information – Do Not Release" and should be filed separately from the remaining information which should be marked "Public."

I remind you that, in accordance with the Alaska Natural Gas Pipeline Act of 2004, the Commission will not begin the formal process of developing a draft EIS until it determines that the application, including all required environmental information, is complete. Thank you for your cooperation.

Sincerely,

Michael J. Boyle
Deputy Director
Division of Gas – Engineering
and Environment

Enclosure

cc: Public File, Docket No. PF09-11-000

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ENCLOSURE

Consolidated List of Comments on TransCanada Alaska Company's Draft Environmental Resource Reports

March 30, 2012

Comment Number	RR Location Reference	General Comments	Source
G-1.		Missing Data: Provide all missing data highlighted in the text of each draft environmental resource report (RR), including incomplete or missing appendices. Without this information, the report lacks completeness and would not meet minimum requirements.	FERC
G-2.		Plan and Procedures (Appendices 1J and 1K): We acknowledge TransCanada Alaska Company, LLC's (TC Alaska) effort to develop a project-specific *Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) (draft RR appendices 1J and 1K, respectively) in order to address the construction and reclamation challenges specific to Alaska. We believe that some of the measures proposed in TC Alaska's draft Plan and Procedures need additional justification as to how they would provide equal or greater environmental protection than the baseline measures in the Federal Energy Regulatory Commission (FERC) staff's Plan and Procedures. Many of the cooperating agencies provided detailed comments and suggestions on appendices 1J and 1K. We will provide these comments to TC Alaska under separate cover along with details of our review of the draft Plan and Procedures. We will also coordinate a discussion between FERC, resource agencies, and TC	FERC

		Alaska to evaluate possible revisions. It will also be necessary for TC Alaska to ensure all revisions to the Plan and Procedures are reflected throughout the corresponding sections of the RR text.	
G-3.		<u>Cumulative Effects</u>: TC Alaska must provide sufficient information for the FERC and the cooperating agencies to complete a cumulative effects analysis for all affected resource areas. Discuss the impacts of other past, present, and reasonably foreseeable future projects or actions and then consider those cumulative impacts in their entirety. More specifically, address the impacts of the current development of Point Thomson (refer to draft environmental impact statement [EIS] recently issued by the U.S. Army Corps of Engineers [COE] for that project), including expansion of pads, additional wells, and infield gas lines. The U.S. Environmental Protection Agency (EPA) also submits the following projects for cumulative consideration: • Department of Interior, U.S. Fish and Wildlife Service (FWS) o *Comprehensive Conservation Plan and EIS for the Arctic National Wildlife Refuge (ANWR)* • Department of Interior, Bureau of Land Management (BLM) o *National Petroleum Reserve-Alaska Integrated Activity Plan and EIS* o *Trans-Alaska Pipeline System (TAPS) Renewal EIS (2002)* o *Trans-Alaska Gas System EIS (1988)* • National Oceanic and Atmospheric Administration (NMFS) o *EIS on the Effects of Oil and Gas Activities in the Arctic Ocean* Clearly identify the resources that may result in cumulative impacts, the timeframe which impacts are going to occur, and the geographic area that would be impacted by the proposed project. The focus should be on resources of concern--those resources that are at risk and/or likely to be impacted by the proposed project before mitigation.	FERC, EPA, BLM, COE

		Identify opportunities to avoid and minimize cumulative impacts. Where adverse cumulative impacts may exist, provide information, as appropriate, concerning opportunities for TC Alaska and other parties to provide for mitigation measures.	
G-4.		Transboundary Effects: Discuss the transboundary impacts extending across the border to Canada. Include a discussion of reasonably foreseeable transboundary effects from the Alaska Pipeline Project (APP). The analysis should include potential impacts on waterbodies and aquatic resources (from spills, sedimentation, erosion, scour), wildlife migrations, impacts from air emissions, and others. The U.S. Coast Guard (USCG) also notes that if the pipeline should cross a waterway (regardless of navigability) at the international border, a USCG International Bridge Permit would be required.	EPA, USCG
G-5.		Abandonment: Describe how project facilities would be abandoned when the APP reaches the end of its life-cycle. Identify any abandonment/ decommissioning regulations that would be required by the U.S. Department of Transportation (DOT) and/or its Pipeline and Hazardous Materials Safety Administration (PHMSA) division.	PHMSA
G-6.		Project coordination: Describe how TC Alaska would coordinate new borrow material sites with other projects in order to minimize the need for multiple new sites.	FWS
G-7.		Injection Wells: Specify the number and approximate location and depths of injection wells, as well as well type (e.g., Class I, Class II, etc.) TC Alaska would use for the planned project. In addition, describe the composition and volumes of the waste stream and plans for the waste injection. Because different well types and different uses require varying permits, the EPA and the Office of the Federal Coordinator (OFC) suggest that TC Alaska describe its injection well permitting plan in RR 1 in addition to updating table 1.11-1.	FERC, EPA, OFC

		Characterize the sub-surface geology and hydrology of well site locations and evaluate impacts of the use of injection wells on groundwater, including any underground sources of drinking water.	
G-8.		Pipe thickness: Identify what pipe specifications would be used for areas requiring thicker, heavy wall pipe (e.g., for road and stream crossings). This information should be presented in RR 1 (text) and on appropriate graphics in appendix 1E (e.g., Road-01, WB -01, and WB-02). Indicate whether pipe specifications would vary based on length or depth of road crossing or on the installation process. Also references are made to changes in pipe wall thickness throughout the RRs – please summarize this information in RR 1 and cross-reference other RR discussions as necessary.	OFC
G-9.		Dredge Disposal and Ocean Dumping**:** Include the results from the 2011 and 2012 ocean surveys in a separate "Dredging and Disposal Appendix." This appendix should contain detailed information, while RRs 1, 2, and 3 (e.g., page 2-12, section 2.3.1, section 3.2.2.1, and elsewhere as applicable) should summarize the information and discuss resource impacts. Address the specific requirements of the ocean dumping regulations at 40 Code of Federal Regulations (CFR) Parts 227 and 228. Be aware that the ocean dumping regulations require an evaluation of need. This should be included in the appendix and summarized in either RR 1 or 2. Be sure the discussion in the RRs includes data on currents in the marine disposal area. Update volume and acreage calculations based on current bathymetric data for channel dredging and disposal. Verify all acreage calculations (there appear to be inconsistencies between appendix 1B and table 1.4.3-1). Further, draft RR 2, section 2.3.5.3 does not contain sufficient habitat description and discussion of impacts from dredging and disposal activities on the marine	FERC, EPA, OFC, COE

		environment, including from construction and operation of the planned West Dock expansion. RR 3 should clarify whether the initial dredging and disposal would occur in the summer, in the winter, or both. This is an important distinction as the environmental effects of summer dredging and winter dredging are likely to differ substantially. (For example, summer dredging may affect whales and whaling, and winter dredging may affect seals and seal hunting.) See also comments 1-88j and 1-107 through 1-112.	
G-10.		<u>Visual Resource Analysis:</u> A visual resource analysis is essential for inclusion in the EIS. Provide in RR 8 the following information for the visual resource analysis for the various eco-regions affected by the planned pipeline, aboveground facilities, and associated infrastructure: a. representative photographs/textual descriptions of the existing landscape in summer and winter. These should cover all relevant eco-regions sufficient to show any substantial variation in visual qualities; b. textual descriptions of existing landscape in nighttime views; c. an eco-region map for all lands within 25 miles of the planned right-of-way (ROW) and other project infrastructure; and d. a description of the potential effects of the projects facilities on the existing visual resources within the entire project area. TC Alaska's visual resource analysis should also include: a. additional land use information (i.e., use, acreage, and distance to the APP) for areas within 25 miles of the planned pipeline and associated infrastructure; b. a viewshed analysis (this may be segmented in order to account for the entire length of the pipeline but must include compressor stations and other major non-pipeline project components); c. information regarding peak use periods and seasonal restrictions for all lands identified as having sensitive visual resources;	FERC

		d. a description of existing visual resources within federal, state, and local lands (e.g., presence of scenic overlooks, specific trails, or visitor centers, etc.); and e. a draft list of critical key observation points (KOPs) along the pipeline route and within sight of aboveground facilities, ensuring they are representative locations within federal and state standards. Further, draft RR 8 provides the existing land use and associated acreage in those areas where the planned pipeline, aboveground facilities, and associated infrastructure would cross. Provide additional data to address potential visual impacts on resources within the APP viewshed. These should address three distance zones – the foreground (0 to 3-5 miles), the background (5-15 miles), and the seldom-seen (15 miles and beyond), consistent with the BLM visual resource management (VRM) system. TC Alaska must also document the project's compliance with federal and tribal land management visual resource objectives. See also comments 8-14, 8-24, 8-28, 8-29, and 8-47.	

Comment Number	RR Location Reference	Comments on Draft RR 1 – General Project Description	Source
1-1.	General	**NOTE**: We recognize that some project aspects included in the RR 1 comments below will be more fully discussed elsewhere in the filed version of the RRs. For any such issues and resources, add a cross-reference to the location (RR text, tables, figures, appendices, etc.) for that discussion or evaluation.	FERC
1-2.	General	Clarify whether the Point Thomson and Alaska Mainline pipelines would have a permanent access road along the right-of-way as much of the TAPS line does.	FERC
1-3.	General	Assuming the Alaska Mainline pipeline ran at full capacity, identify how much fuel a typical compressor station on the system would use over the course of 1 year.	FERC
1-4.	General	The RRs should be written for the applicable requirements for alternative maximum allowable operating pressure in 49 CFR Part 192 for those portions of the pipeline where such would be used.	PHMSA
1-5.	1-8	Compressor stations located south of the Brooks Range are planned to discharge gas within a temperature range of about 25 degrees Fahrenheit (ºF) (winter) to about 45 ºF (summer). a. Given the abundance of discontinuous permafrost south of the Brooks Range, provide more detail on how the planned project would avoid significant frost-heave and/or permafrost melt issues along the pipeline. b. Would ground temperatures be monitored along the pipeline before allowing discharge temperatures to rise?	FERC
1-6.	1-8	Discuss here and in RR 11 how TC Alaska will address hazardous liquid safety and environmental issues due to the impact radius of a failure of the pipeline system, taking into account the proposed composition of the products being transported along with their toxicity, physical properties, etc.	PHMSA
1-7.	1-10	Please clarify what is meant by “sales quality gas.”	FERC,

		a. Would the natural gas stream leaving the gas treatment plant (GTP) and entering the Alaska Mainline carry more than a trace amount of natural gas liquids (e.g., propane, butane, pentane, etc.)? If not, where in the GTP would these higher hydrocarbons be separated from the gas stream and how would they be handled (ultimate disposition)? b. If the gas stream leaving the GTP would carry natural gas liquids, where would the liquids be stripped from the gas stream? c. Clarify whether the Point Thomson Unit (PTU) gas would receive any treatment or conditioning before being delivered to the planned Point Thomson Pipeline. If treatment is planned, describe it. d. How would liquids be handled at each of the planned take-off points in Alaska?	EPA
1-8.	1-10	Clarify and discuss the amount of collocation with existing highway ROWs. The statement "Although most of the Alaska Mainline is generally collocated either with TAPS or highway rights-of-way" may be out-of-date at time of filing, given alignment shifts. Also, just because the planned pipeline may be parallel to the highway ROW does not necessarily mean it is collocated with said ROW.	DOT
1-9.	1-10	Identify the capacity of the power generation equipment planned for the GTP. What fuel would the equipment use? Provide specifics of the design of the GTP as well as the jurisdiction and government agencies that would regulate the construction, operation, and maintenance of the plant. (Also revise RR 11, section 11.4.2 accordingly).	PHMSA
1-10.	1-11	Identify where the 12-inch-diameter carbon dioxide (CO_2) pipeline would go from the GTP. Would it terminate at the Central Gas Facility (CGF)? If not, describe to where it would extend, including the distance, and add it to the location maps in appendix 1B. Would the single and/or double feedline(s) be aboveground or buried? Would all of the CO_2 removed from the raw gas be routed through this pipeline? If not, please explain its ultimate disposition. Provide a table that identifies all the necessary feed/transfer lines between the	FERC, EPA, OFC

		CGF and GTP and their specifications (length, diameter, wall thickness, pressure, etc.). These pipelines should be included in the overall project description and analyzed in the environmental consequences.	
1-11.	1-12	Provide additional detail in figure 1.3.2-1. a. Expand the box labeled "CO_2 Removal Unit" to include each process step in the CO_2 removal operation, all working fluids, and all waste streams. Identify all working fluids and waste streams. Is a commercial CO_2 removal process planned? If so, identify the process by name and briefly explain why this process was chosen versus another. Highlight environmental issues associated with selection of the chosen process vs. other potential CO_2 removal processes options. Respond to the same questions if a non-commercial CO_2 removal process is planned. b. Clarify how the trace hydrogen sulfide (H_2S) moves through the GTP and its ultimate disposition (e.g., re-injected into the Prudhoe Bay Unit [PBU], flared, etc.). c. Expand the boxes labeled "Sales Gas Dehydration Unit" and "CO_2 Dehydration Unit" to identify the process steps planned for use and the final disposition of the moisture removed.	FERC, EPA, PHMSA
1-12.	1-15	Table 1.3.2-1 and the text identify only three meter stations on the planned APP system. Explain why TC Alaska believes that a custody-transfer meter station is not required at the Alaska-Yukon border.	FERC
1-13.	1-16	Identify the capacity of the power generation equipment planned for each compressor station.	FERC
1-14.	1-17	Identify the locations(s) of any communication towers planned to be taller than 150 feet, and the height(s) planned. Address these towers and any planned mitigation in the **Aesthetics** discussion in RR 8.	FERC
1-15.	1-17	What volume of liquid is anticipated to be collected by the compressor station inlet scrubbers, and how would these liquids be stored? How would the liquids be handled after collection at the compressor stations? Identify (and include in table 1.11-1) any permits that would be necessary for this activity. Same questions for the custody transfer meter stations.	FERC

1-16.	1-18	Clarify whether the mainline block valves would be automatically activated or operated by SCADA alone. If automatically activated valves would be used at any location, describe the procedure for restarting the system.	FERC
1-17.	1-18	Would blow-offs be located away from roads, highways, and power lines? Explain how the blow-off distances from these structures will be calculated to ensure that entrained liquids do not escape during venting operations and that venting operations do not cause a public hazard. Also, revise table 8.2.3-1 accordingly.	PHMSA
1-18.	1-18	In the discussion of cathodic protection facilities: a. identify any controls or procedures planned to limit the effects of stray currents on other facilities in the environment, including other pipeline facilities that would be crossed by the Point Thomson and Alaska Mainline pipelines; and b. briefly outline any procedures TC Alaska plans to monitor sun spot activity or other phenomenon and to evaluate resulting damage to cathodic protection system components.	FERC
1-19.	1-19	Add a description on how ice roads would be built.	OFC
1-20.	1-22; 5-83	Expand the discussion of road improvements to address the DOT disagreement with the statements on pages 1-22 and 5-83 that "Roadway improvements are not expected to be required for public roads that will be used during construction of the project." The DOT reports that it is advancing many improvements to the existing infrastructure to support the construction of a natural gas pipeline and that additional projects will be needed long term to repair damage to the public road system associated with construction of the APP.	DOT
1-21.	1-25	Identify all existing airstrips associated with the Alaska Mainline where upgrades would be required, and the upgrades planned at each location.	FERC
1-22.	1-26	Tanacross Airport is not controlled or operated by the state; it is owned by BLM. Please resolve this apparent discrepancy.	OFC
1-23.	1-29	Explain why the gravel pads are not going to be removed.	BLM
1-24.	1-31;	Land requirements for helipads are shown as 0.0 acre during both construction	FERC

	Appendix 1E	and operation (see table 1.4-1). Appendix 1E (CONST–20) shows the dimensions of the helipads as 100 feet by 100 feet, consistent with a 100-foot-wide permanent ROW. However, page 1-22 says the ROW may be widened at some locations to keep it clear of trees/brush for safe approach and landing. If clearing would be conducted outside the permanent ROW following construction, then Lands Affected During Operation (in table 1.4-1) would not be 0 for helipads. Please resolve/clarify this apparent discrepancy.	
1-25.	1-42	The acres of Land Affected During Operation of the pipeline are presented in table 1.4.3-5 as "TBD" for Construction Camps, Pipe Storage Areas, and Contractor Yards. However, table 1.4-1 (page 1-31) shows Land Affected During Operation of the pipeline as 0.0 acres. Please resolve this apparent discrepancy.	FERC
1-26.	1-31	Justify the need for a 100-foot-wide permanent ROW for the planned 32-inch-diameter Point Thomson pipeline.	FERC
1-27.	1-32	Clarify that all of the 170-acre and adjacent 65-acre construction workspaces would be needed for both construction and operation of the GTP. This paragraph seems to indicate there would really be no temporary workspace and that the entire acreage (235 acres) would be permanently altered and encumbered.	FERC
1-28.	1-33	Clarify whether there would be any areas disturbed temporarily for construction of compressor stations and then restored and returned to previous use during operation. Identify any land requirements not covered by the construction and operation totals.	FERC
1-29.	1-33	Identify all locations where horizontal ground-bed cathodic protection facilities are planned and the acreage needed (if outside the permanent pipeline ROW) for both construction and operation in each instance.	FERC
1-30.	1-34	Table 1.4.3-1 shows 0 acres of Land Impact During Operation of the project for Channel Dredging and Dredge Disposal. If there would be maintenance dredging for the modified West Dock, wouldn't there be an operational land impact? Please resolve this apparent discrepancy.	FERC
1-31.	1-34	Verify that there is sufficient materials left in the Put 23 mine site to handle the	OFC

		excavation associated with the planned APP.	
1-32.	1-34	Table 1.4.3-1 shows 2,500,000 cubic yards of dredged material. The Dredging and Disposal Appendix (see comment G-9) should explain how this volume was estimated, including the following information: • the design vessel dimensions including length, beam, and draft; • the lateral and vertical clearances for the design vessel; • the design dredging depth (i.e., design vessel draft + vertical clearance); • overdredging; • the proposed alignment and dimensions of the barge channel and turning basin; • the total volume of the dredge prism, based on 3, 4, and 5 above; • expansion of the dredged material due to the excavation of compacted sediments; • any contingency due to uncertainty about sedimentation rates in the navigation channel and subsequent maintenance dredging needs; and • based on all of the above factors, the estimated volume per year for each year of dredging (i.e., construction dredging in 2016 and maintenance dredging in 2017, 2018, and 2019).	FERC
1-33.	1-35	Include in the **West Dock Modifications** discussion the frequency of maintenance dredging and the volume of material collected for disposal per maintenance cycle.	FERC
1-34.	1-37, -39	Justify the need for additional temporary workspace for pipeline bends (see table 1.4.3-2). Why are the temporary workspace sizes different for right and left bends of an identical degree?	FERC
1-35.	1-38 – 1-39	Regarding table 1.4.3-2: a. For crossing the TAPS pipeline, provide justification for needing more additional temporary workspace when crossing on state land (320 feet by 15 feet) than crossing on federal land (160 feet by 15 feet)? b. Additional temporary workspace is planned at “steep side slopes.” Define “steep” by slope range. c. Explain why “Timber Decks” would require additional temporary workspace.	FERC

1-36.	1-41	In table 1.4.3-4: a. Are all roads shown in this table considered to be "existing, non-commercial" roads? b. Identify which of the roads would require upgrades. c. If the acres of "Land Affected During Operation" are zero for all entries, would all of the roads in this table be reclaimed following construction? Note that all roads which require "preparation" would require cultural surveys.	FERC
1-37.	1-43	The Fort Wainwright Pipe and Double Jointing Yard (shown in appendix 1B) appears to be missing from the Land Requirements (table 1.4.3-5). Please resolve this apparent discrepancy.	FERC
1-38.	1-43 – 1-44	Regarding table 1.4.3-5: a. When "Alternate" facilities are identified (e.g., Tok Camp 17 and Tok Alternate Camp 17), why are both acreages included in the land requirements total? Does TC Alaska plan on using both facilities when an alternate is identified? b. How many Beaver Creek facilities (Camp, Alternative Camp, Storage Yard, Storage Alternative) are proposed? Appendix 1B shows only one Beaver Creek facility (at milepost [MP] 701.5). Please resolve this apparent discrepancy.	FERC
1-39.	1-46	Please enlarge the "3 Year Alaska Construction Summary Schedule" to facilitate viewing. Consider printing as 11 inches by 17 inches.	FERC
1-40.	1-46; 7-34	Regarding figure 1.5-1: a. Why is pipeline clearing scheduled to be conducted during both winter and summer? Wouldn't impact be reduced if clearing were conducted during the winter only? Section 1.6.2.2 states that "Clearing activities will occur in the winter season prior to the scheduled pipeline construction season." Please resolve this apparent discrepancy. b. Why is the first summer pipeline construction season labeled "Summer 2"? Also, update RR 7 to reflect the percentages of the Alaska Mainline and Point	FERC

		Thomson Pipeline that would be constructed during the summer.	
1-41.	1-47	Discuss the impact and consequences of a pipeline rupture on existing adjacent infrastructure that is within the potential impact radius in section 1.6. What effect would the construction and operations, including a rupture, have on TAPS, military bases, and other infrastructure? Provide proposed mitigation measures. Revise section 11.4.1 accordingly.	PHMSA
1-42.	1-48	Hydro-test fluids are identified as a "restricted material." Please identify the hydro-test fluid components which would cause the fluids to be "restricted" and briefly discuss their toxicity characteristics.	FERC
1-43.	1-49	"Infrastructure" is discussed in several parts of this draft RR. However, nowhere does TC Alaska identify the marine ports (other than West Dock at Prudhoe Bay) where pipeline construction supplies would be delivered, or the infrastructure improvements (port, rail, highway, bridge) needed to move supplies to the project area. Please include this information in RR 1 (including temporary and permanent acres of disturbance) and update the information as plans evolve. Ensure that the information is carries through the other applicable RRs.	FERC
1-44.	1-49	Have the "marshalling yard[s] near the start of each pipeline segment or Aboveground Facility site" been included in tables 1.3.3-3, 1.4-1, and 1.4.3-5, and shown in appendix 1B? If not, please revise the tables and include facility plot plans and maps for these disturbances in appendix 1B.	FERC
1-45.	1-49	Include the "storage yard and marshalling complex" in the Fairbanks area in the tables identified in the previous comment, and in appendix 1B.	FERC
1-46.	1-51	Provide a description of self-propelled modular transporters. Are these propelled on wheels or tracks? Are these used in winter? What impacts do they have on the tundra?	EPA
1-47.	1-51; Appendix 1G	Include in the section 1.6.1.9 discussion (as well as the discussion in section 1.6.5.5) a reference to appendix 1G-1.	FERC
1-48.	1-51	Section 1.6.1.12 states that any hazardous waste generated by construction or	BLM

		operation would likely be shipped to an approved facility outside Alaska. Identify all hazardous wastes which would be generated during construction or operation of the planned facilities. Does TC Alaska anticipate collecting any natural-occurring radioactive materials in its waste streams?	
1-49.	1-51	Identify by name and location all "approved and permitted waste management facilities located in the (Alaska North Slope)" that would be used by the project. For each, include its current capacity, percentage of capacity used, and any plans for expansion.	FERC
1-50.	1-52	Would all existing roads used as primary routes to support pipeline construction be returned to their pre-construction condition?	FERC
1-51.	1-52	Page 1-52 states that "… root structures will not be removed from over the trench line until the season of pipeline construction." Clarify whether root structures would be removed from <u>non-trench-line areas</u> during right-of-way clearing or construction.	FERC
1-52.	1-55	Does TC Alaska plan to sell merchantable timber? Why and for how long would the timber be stored?	OFC
1-53.	1-56	In wetlands and areas with unstable soils, would TC Alaska build ice layers in addition to driving frost depth down by rolling equipment over the area? Explain whether frost packing wetlands would damage wetlands until the wetlands are sufficiently frozen. Frost-packing should be avoided if it results in compacted wetland soils or increases the rate or depth of summer thaw.	OFC
1-54.	1-57	Identify all sources of water planned for use during construction of the project. For each, include the distance and direction from the project work area as in table 1.4.3-5.	FERC
1-55.	1-58	Identify the maximum bend that would be conducted in the field, above which factory bends would be necessary.	FERC
1-56.	1-58	Consider deploying reusable temporary sediment barriers to reduce literally hundreds of miles of waste (from the use of silt fences) that must be disposed of properly.	FWS
1-57.	1-59	Identify when "site-specific environmental crossing plans" for waterbody	FERC

		crossings will be filed for review.	
1-58.	1-60	Identify the biocide and freeze-depressant additives that would be used in the hydrostatic test water and briefly describe their toxicity characteristics. Same question for the "additives" potentially added to Putuligayuk River water as noted in section 1.6.4.1 on page 1-78.	FERC
1-59.	1-61	Identify when the "Project-specific revegetation and reclamation plans" will be filed for review.	FERC
1-60.	1-61	TC Alaska states that construction debris would be disposed of at an approved off-ROW disposal site. Clarify what constitutes "debris" in this context. Are the disposal sites existing? The BLM has indicated that any new disposal sites would have to be identified, analyzed under the National Environmental Policy Act (NEPA), and permitted.	BLM
1-61.	1-61	How does TC Alaska propose to "crown" the ROW if, upon backfilling the trench there is more subsidence than the crown, or if the crown does not compact to the original surface level?	FWS
1-62.	1-63	"If an open-cut timing window is not available or is too short to complete the in-stream work, [TC Alaska] will consider the feasibility of using isolated (dry) crossing methods." What alternatives dry-crossing methods would be considered, and what parameters would be used to evaluate the alternatives?	FERC
1-63.	1-63	Describe where the temporary bridges would be constructed, especially if and when located over navigable waters.	OFC
1-64.	1-63	"Ramp and culvert bridging structures require filling the waterbody channel with earth or snow to provide a level surface …" Using earth fill would be unacceptable, and is inconsistent with TC Alaska's draft appendix 1K, pages 9 and 17. Please resolve this apparent discrepancy.	FERC
1-65.	1-66	Evaluate the feasibility of using aboveground tanks for horizontal directional drill (HDD) fluids instead of excavated pits.	FWS
1-66.	1-66	Update the **Horizontal Directional Drill Crossing Method** discussion with a table that identifies by MP the locations of waterbodies or other features where HDD crossings are being considered. Include anticipated drill depths below	FERC, OFC, DOT

		target waterbodies or other features and update this information at the project evolves. If more information on the HDD crossings is provided elsewhere, reference the other RR(s).	
1-67.	1-67	Identify whether TC Alaska's drill fluid would be non-toxic to aquatic life.	FERC
1-68.	1-67	Identify when the "observation protocol" and the spill response plan prepared for HDD activities will be filed for review.	FERC
1-69.	1-68	Identify when the HDD Contingency and Inadvertent Release Plan will be filed for review.	FERC
1-70.	1-68	Update the **Aerial-Span Crossing Method** discussion with a table that identifies by MP the locations where aerial-span crossings are being considered. Include a reference to another RR(s) if more information about aerial-span crossings is provided elsewhere. Update this information as the project evolves. Provide proposed locations for aerial span bridge crossings and associated geotechnical investigations. Include foundation recommendations that take permafrost conditions into consideration.	FERC, OFC, DOT
1-71.	1-76	Identify all residences within 50 feet of any construction work areas by MP, the distance from the work area, and the distance/direction from the planned pipeline centerline. In each instance, provide justification for not altering the pipeline route to accommodate additional separation between residences and the planned facilities.	FERC
1-72.	1-76	The RRs should outline the maximum operating pressures; design safety factors; potential impact radius; and pipe diameter, wall thickness, seam type, and pipe coating for each Class location and for high consequence areas (HCA). Revise section 11.4.1 accordingly.	PHMSA
1-73.	1-78	Section 1.6.4.1 discusses construction of one of the world's largest GTPs. Provide a detailed list of the activities that would be needed to construct this facility. Identify other options considered (with reference to their attendant environmental impacts) for bringing modules and other construction materials to the North Slope.	FERC

		Justify the need for a reservoir near the GTP. Reference why existing waterbodies would be unsuitable for the planned use. Explain the risks of creating a waterbody on the North Slope and propose mitigation measures regarding permafrost and thaw bulb issues associated with it.	
1-74.	1-78	Identify the following for North Slope Borough (NSB) facilities where waste water and other select liquid wastes would initially be disposed of: • location of facility; • available capacity to accept additional liquid wastes; and • rate at which the APP would generate wastes to be handled in this manner.	FERC
1-75.	1-79	Identify the conditions or situations which would require an air-space separation, as referenced in the statement "Where required an air-space separation between the pad and the base of the facilities structure will be maintained."	FERC
1-76.	1-81	Would permanent roads to access the pipelines have barriers to control access (as the TAPS pipeline does)?	FERC
1-77.	1-81	Provide the culvert diameters that would be used to maintain cross drainage at access roads.	EPA
1-78.	1-82	List existing borrow/mineral material sources or possible new borrow sites needed, their acreages, and the estimated quantities and types of materials needed/extracted. Include these sites on project maps. Discuss any anticipated post-mining reclamation of the sites.	BLM
1-79.	1-82	Describe how TC Alaska plans to meet DOT requirements regarding construction work force training.	PHMSA
1-80.	1-83	Would "other appropriate actions" include terminating a contractor or crew member who displayed a blatant disregard for complying with environmental requirements?	FERC
1-81.	1-83	The EPA recommends that the environmental training also include cultural sensitivity and awareness training for employees.	EPA
1-82.	1-84	Identify when TC Alaska would develop and implement its integrated public	FERC

		awareness program to inform the public about pipeline safety associated with the pipelines and the GTP? a. Would this be completed prior to construction? If not, then when? b. Elaborate on how this program would be presented to emergency service personnel, public officials, and other relevant members of the public.	
1-83.	1-85	Specify how often "periodically" is. Indicate whether aerial observations would be low flying. Describe how else leaks would be detected. Reference RR 11 as appropriate.	OFC
1-84.	1-86	Would additional gathering/production pipelines be constructed to support the planned APP, either at the PBU or the PTU? If so, a description and maps should be provided in the Non-Jurisdictional Facilities discussion. **PLEASE NOTE**: It is not TC Alaska's responsibility to apply the FERC's four-factor procedure to determine whether specific "non-jurisdictional facilities" would be included in the EIS.	FERC
1-85.	1-86	In the **Non-Jurisdictional Facility** discussion (section 1.9), we suggest TC Alaska include a brief description of the pipeline facilities planned in Canada to carry the North Slope gas to the contiguous United States. Include a map showing the facilities between the Alaska Mainline's termination point at the Alaska-Yukon border and the U.S.-Canadian border. On the map, identify the pipeline route (planned and existing) and any major facilities (i.e., compressors, etc.) required by the APP.	FERC
1-86.	1-87	Include in the discussion of sales gas off-takes: • the minimum number of off-takes required; • the likely locations for off-takes (as presented in table 1.3.2-1); and • what facilities would be constructed at the off-takes.	FERC
1-87.	1-87	**Auxiliary Facilities** (section 1.9.2) are <u>not non-jurisdictional</u>. They may be constructed under a section of the regulations other than 7(c), but "auxiliary facilities" are FERC jurisdictional and shouldn't be included in section 1.9.	FERC
1-88.	1-88	The following questions and comments refer to table 1.11-1. a. To what does footnote 1 refer? (See header of right column.)	FERC, FWS, EPA,

		b. For the first entry under FERC, right column: Revise the date that TC Alaska filed its draft RRs as "Jan 2012." c. Delete the third row (FERC – Section 106) under FERC. Insert a row at the bottom of the table for State Historic Preservation Office-Consultation under Section 106 of the National Historic Preservation Act (NHPA). d. For the first entry under the FWS, right column, Oct 2012: TC Alaska may file an "applicant-prepared BA" (Biological Assessment) as part of its FERC application, but the document will not be issued. Same comment for the Essential Fish Habitat (EFH) Assessment Report referenced in the first row ("Magnuson-Stevens") under NMFS, right column, and the second row under NMFS ("Endangered Species Act") regarding the applicant-prepared BA being "issued" in Oct 2012. e. For the second entry under the FWS, right column, Nov 2013: FERC may submit a BA to the FWS concurrent with issuance of the draft EIS, but it will not be issuing a BA. Same comment for the second row under NMFS ("Endangered Species Act"), right column, second entry (Oct 2012; note difference in date from FWS entry). This date for issuance of the draft EIS is speculative. f. For the third entry under the FWS, right column, Mar 2014: Please revise; only the FWS (not FERC) can issue a Biological Opinion (BO) and Incidental Take Statement. g. NMFS (not FERC) would issue the BO, Incidental Harassment Authorization (IHA), and/or Letter of Authorization (LOA). NMFS would issue the Marine Mammal Protection Act (MMPA) IHA or LOA to TC Alaska, and the BO to FERC. Moreover, NMFS would not issue an IHA and LOA simultaneously. Rather, TC Alaska would apply for one type of authorization (likely an LOA), and that would be issued to cover all activities that have the potential to take marine mammals. It should also be noted that an Incidental Take Statement would not appear in a completed BO until the MMPA authorization is issued. h. Revise table 1.11-1 to reflect that the FWS will process standard permits for	OFC, COE USCG, NMFS, SPCO

		eagle take. The FWS has already advised TC Alaska that standard eagle take permits will likely be required for project-related disturbance (construction and operation). Permit applications will need to be filed <u>every year</u> prior for construction or operations that have potential to disturb eagles. i. Add Clean Air Act, Clean Water Act (CWA), COE 401, and U.S. Department of Energy export license, as appropriate. j. Add correct citations for the Marine Protection, Research, and Sanctuaries Act (MPRSA 102(c)(1)) for ocean disposal of dredged material. According to the EPA, the table does not accurately depict the permitting processes for site designation, ocean disposal of dredged material, or site selection by the COE (with EPA concurrence). Refer to MPRSA 103(b) and MPRSA 103(c)(2) and compare to the requirements of MPRSA 102. Consult with the EPA and COE to ensure that the Dredging and Disposal Appendix as well as related RR discussions reflect the proper permitting approach. k. Improvements to the West Dock would not likely require a USCG Bridge Permit. The West Dock falls under the sole jurisdiction of the COE. l. Change "Underground Inspection Control" to "Underground Injection Control." m. The State of Alaska (SPCO) indicates that Alaska Department of Environmental Conservation (ADEC) air permits would be required prior to construction. These permits typically have longer lead times than other permits and should therefore be considered "major authorizations" and be included in the table. n. The COE is providing a list of relevant questions and factors (**Attachment 1**) to assist TC Alaska in its Section 404 (b)(1) analysis.	
1-89.	1-91	The first paragraph in section 1.12 references a "comprehensive public outreach program" involving "tribal officials; Alaska Native Claims Settlement Act (ANCSA) regional and village corporations; Alaska Native Organizations and Groups; community and tribal leaders; …". Provide any documentation of meetings with tribal officials. If available, provide meeting minutes.	FERC

1-90.	Appendix 1A	Include the temporary workspace locations; annotate feature and size data from appendix 1D, tables 1D-1 and 1D-2.	FERC
1-91.	Appendix 1A	Include all access road segments from appendix 1F, tables F1-1 and F1-2, and annotate with road/segment name.	FERC
1-92.	Appendix 1A	Include the TAPS pipeline, with line symbology indicating buried vs. above-ground sections, and add this information to the legend.	FERC
1-93.	Appendix 1A	Include the major TAPS infrastructure features, such as pump stations, and annotate with names, when they occur within the bounds of the existing maps.	FERC
1-94.	Appendix 1A	Depict oil and gas leases within 1,500 feet of the planned pipeline ROW (listed in RR 6, table 6.3.2-1).	FERC
1-95.	Appendix 1A	Depict locations/regions with potentially active fault crossings (listed in RR 6, table 6.4.1-4).	FERC
1-96.	Appendix 1A	Depict locations/areas with existing landslides (listed in RR 6, table 6.4.3-1), and mudflow occurrences (listed in RR 6, table 6.4.3-2).	FERC
1-97.	Appendix 1A	When available, depict areas with potential slope instability (from RR 6, table 6.4.3-3).	FERC
1-98.	Appendix 1A	Depict areas of avalanche occurrences (from RR 6, table 6.4.3-4) and locations of rock glaciers (from RR 6, table 6.4.3-5).	FERC
1-99.	Appendix 1A	Depict industrial mineral claims and leases within 1,500 feet of the planned pipeline ROW (from appendix 6A, table 6A-1) and all active mineral holdings (listed in appendix 6A, table 6A-2).	FERC
1-100.	Appendix 1A	Depict probable and potential blasting locations (from appendix 6C, table 6C-1).	FERC
1-101.	Appendix 1B	Add a table of contents. Also add page and figure numbers throughout.	FERC
1-102.	Appendix 1B	Add the Point Thomson and Alaska Mainline pipelines to the GTP Site Overview Map.	FERC
1-103.	Appendix 1B	Clarify the meaning of the red arrow shown on sheet US-02-013-006.	FERC

1-104.	Appendix 1B	Clarify whether any of the access road to the Prudhoe Bay Storage Yard (shown on sheet US-05-020-001) is a new road. If new, explain why the existing roads (shown on the sheet) would not be sufficient.	FERC
1-105.	Appendix 1B	The GTP plot plan shows a communications tower, but the only communications towers mentioned in the text of RR 1 are for the compressor stations. Provide text describing the tower at the GTP, including its height and type of lighting it would have.	OFC
1-106.	Appendix 1B; Appendix 1E	Include at least one drawing in each appendix of the locations of the Vertical Support Members (VSM) needed for the line between the CGF and GTP.	OFC
1-107.	Appendix 1B	The conceptual location of the GTP Offshore Dredge Disposal Area needs to be fleshed out with coordinates; studies are required and criteria must be met for site designation (MPRSA 102(c)(1)) or site selection (MPRSA 103(b)).	EPA
1-108.	Appendix 1B	**Barge Channel Dredge Area.** The water depth soundings (in feet) are based on NMFS nautical chart 16061, which is outdated. The present bathymetry, based on the APP 2011 survey, is up to five feet shallower than shown on chart 16061. This would require a deeper dredging prism and a longer barge channel to achieve the proposed dredging depth (-14 feet), which in turn would require more dredging and more dredged material. Show the present bathymetry, based on 2011 and 2012 surveys, and revise the barge channel length, dredge area and dredged material volume accordingly.	EPA
1-109.	Appendix 1B	**Barge Channel Dredge Area.** If the proposed screeding area is different than the proposed dredge area, then show the screeding area and insert “and Screeding Area” after “Dredge Area.”	EPA
1-110.	Appendix 1B	**GTP Off-Shore Dredge Disposal Area.** This figure includes an area labeled “possible location of spoils disposal area.” The EPA guidance on ocean dumping site selection includes guidance on identifying the Zone of Siting Feasibility (ZSF), ecologically sensitive areas and areas of incompatible uses. The ZSF identifies a broad area within which it is feasible to transport and dispose of dredged material, and beyond which such transport and disposal is infeasible. The	EPA

		area labeled "possible location of spoils disposal area" does not meet the ZSF guidance because it does not identify the outer limit of all feasible dredging and disposal methods. The Dredging and Disposal Appendix should evaluate and identify the ZSF based on all feasible dredging methods. It should also identify and avoid sensitive areas and incompatible use areas, consistent with the EPA guidance.	
1-111.	Appendix 1B	**GTP Off-Shore Dredge Disposal Area.** This figure includes the size of the proposed disposal site (2500 feet by 2500 feet and 5 feet of depth). The theoretical maximum capacity of the proposed disposal site is about 1.16 million cubic yards of dredged material (assuming no dispersion and vertical side slopes, which are impractical). The practical capacity (assuming little or no dispersion and reasonable side slopes) is likely less than a million cubic yards. This is substantially less than the proposed dredged material volume of 2.5 million cubic yards, which itself may be underestimated because it is based on outdated bathymetry data. The Dredging and Disposal Appendix should: • redesign the barge channel alignment and dredge prism dimensions based on updated bathymetry; • recalculate the dredged material volume based on the new dredge prism dimensions; and • revise the proposed disposal site size, configuration and location based on the new volume, the proposed dredging method, the general and specific site selection criteria at 40 CFR 228.5 and 228.6, and the EPA site selection guidance.	EPA
1-112.	Appendix 1B	**GTP Off-Shore Dredge Disposal Area**. Draft RR 1 (Project Description) does not describe the proposed dredging method. Rather, draft RR 10 (Alternatives) describes a range of alternative dredging methods that may be used, all of which are deemed to be feasible, although some are more feasible than others. However, different dredging methods may have different environmental effects. For example, hydraulic dredging of silty soils using a cutterhead dredge or a hopper dredge may cause higher turbidity and suspended solids over a larger area than mechanical dredging methods such as a clamshell dredge or excavator. Hence,	EPA

		hydraulic dredging may require a larger disposal site and release zone than mechanical dredging to ensure compliance with the ocean dumping regulations. The EPA cannot determine whether the APP would comply with the ocean dumping regulations without knowing the proposed dredging method. Therefore, TC Alaska should specify the proposed dredging method and design the proposed disposal site and release zone to ensure compliance.	
1-113.	Appendix 1E; ROW-06	For winter construction of the Point Thomson Pipeline, justify the additional 9 feet of ROW width provided for a two-way travel lane. Why would a two-way lane be needed for the Point Thomson Pipeline but not the Alaska Mainline?	FERC
1-114.	Appendix 1E; Fault-01, -02, -03	In the active or potentially active fault crossing designs presented in appendix 1E, provide construction details for pipeline supports that consider the permafrost conditions. Provide site specific details for each crossing.	FERC
1-115.	Appendix 1E; Trench-01, 03	Include a layer of salvaged topsoil in the final grade cross section. Mention use of salvaged topsoil in the Notes.	FWS
1-116.	Appendix 1E; ROW-01 to -06	The One- and Two-Way Travel Lane on the right side of the figures in the Travel Area are only needed the few times when a side-boom vehicle needs to pass the side-boom vehicles in the Work Area at the same time other vehicles need to pass the Work Area. It seems like this travel lane many be unnecessary most of the time and in most locations. Can this lane be deleted and addressed by slight delays in passing, or restricted to areas when the additional passing width is most likely needed?	FWS
1-117.	Appendix 1E; ROW-01, -04, -06	Include space for salvaged topsoil in the spoil area, including winter operations.	FWS
1-118.	Appendix 1E;	Winter operations should include snow/ice pads where practicable. Show in the figure where excess snow would be stockpiled.	FWS

	ROW-02		
1-119.	Appendix 1E; ROW-04, -05A	Identify if the side slope fill in the Travel Area can be snow/ice when practicable, and other suitable materials when not practicable.	FWS
1-120.	Appendix 1E; ROW-22	Does this figure suggest that all the extensive wetlands crossed would have additional 50/100-foot-wide approaches, or would that perhaps be limited to the more difficult wetland crossings such as open-water or boggy wetlands?	FWS
1-121.	Appendix 1E; WB-01	The minimum burial depth beneath major and intermediate water body crossings is only 36 inches. Discuss whether this is sufficient where bottom scour and river meandering may be a problem. See also comments 2-60 and 6-60.	OFC
1-122.	Appendix 1E; WB-03A, top figure	Intermediate support(s) should not be placed in the thalweg.	FWS
1-123.	Appendix 1E; WB-03C	Towers should be set back from the bank to allow for lateral channel migration over the life to the project. Isolated support wires not associated with large objects like the pipeline should include bird diverters to minimize bird strikes.	FWS
1-124.	Appendix 1E; CC-01	In a typical cross-section for various corrosion control coatings, identify which coating would be the standard coating - FBE or 3LPE?	OFC
1-125.	Appendix 1E; ACC-01	A typical cross-section shows 4 feet to 5 feet, while the note indicates 5 feet as typical on permafrost. Correct the cross section or note.	OFC
1-126.	Appendix 1E; Const-04 to -09	Vegetated buffers on banks should be 50 feet for non-anadromous streams and 100 feet for anadromous streams.	FWS
1-127.	Appendix 1E;	Define “clean” as including free of any material or areas that can harbor invasive species in Note 5. Note 6 should only allow stockpiling spoil in the channel	FWS

	Const-04	where the channel bed is dry or has no surface water.	
1-128.	Appendix 1E; Const-11	Note 7: The granular blanket should be removed from non-rocky banks and riparian areas.	FWS
1-129.	Appendix 1E; Const-33	Straw bales should contain certified weed-free straw; Coir logs, or similar, would be better.	FWS
1-130.	Appendix 1F	In appendix 1F, tables F1-1 and F1-2, footnote "b," please clarify whether FI = Field Investigation or Fault Investigation.	FERC
1-131.	Appendix 1F	Provide the following information for the borrow sites listed in table 1G-1: a. identify any sites for which TC Alaska does not have owner/operator contact information; b. identify any sites for which the owner/operator does not have current permits or permissions to use the borrow area; c. identify any sites where a new rehabilitation plan would be needed; and d. indicate the amount of material currently available at each site.	FERC
1-132.	Appendix 1F	Identify any borrow sites planned for use that have accessibility issues, e.g., those which would require an ice road or pad construction for access. Identify any sites having on-site surface water and requiring fish, water quality, or other surveys.	FERC
1-133.	Appendix 1F	Include permanent and temporary gravel roads and ice/snow roads in the table.	EPA
1-134.	Appendix 1G; Table 1G-1	Identify the approximate volume of gravel that would be obtained from each borrow site. Identify whether these are existing permitted borrow sites and/or new unpermitted borrow sites. Provide a map showing borrow site locations.	EPA
1-135.	Appendix 1L	Demonstrate compliance with the governing regulations in regard to accommodation of utilities on highway facilities, or document the process on how compliance might be obtained. Appendix 1L includes only one set of meeting minutes with DOT dating Sep 24, 2009. Given the scope of impacts of such a large facility, broad statements such as "the project will work with authorities having jurisdiction over road, highway, and utilities to be crossed by the pipeline	DOT

		to determine acceptable crossing methods and to obtain permits and develop traffic management plans as necessary" may be insufficient to assure that the project can advance as planned without additional coordination with the DOT and the Federal Highway Administration.	
1-136.	Appendix 1L	In appendix 1L, we suggest that TC Alaska change the "Local Correspondence" subpart to "Alaska Natives" and "Multi-Agency Meeting Summaries."	FERC
1-137.	Appendix 1L	In appendix 1L, provide any correspondence, records, meeting minutes, etc., of TC Alaska's outreach program with non-Native **local** organizations.	FERC
1-138.	Appendix 1N	This appendix reports meetings with Alaska Native organizations, however no documentation (i.e., correspondence, records, meeting minutes, etc.) is apparent (beyond the 15 identical letters in appendix 1L dated September 15, 2011). Provide documentation of any communication with Alaska Native tribal governments and organizations.	FERC
1-139.	Appendix 1O	Indicate the type of access road (e.g., temporary, permanent, snow/ice) in the legend.	FWS
1-140.	Appendix 1O	Borrow sources should not cross between terrestrial (wetland/upland) boundaries and channels. In-channel borrow sources should remain in the channel, and vice versa. The FWS' preference is for in-channel borrow sources where they won't conflict with fish habitat.	FWS
1-141.	Appendix 1O	Indicate whether the proposed material sites from Point Thomson to Prudhoe Bay have been evaluated for potential material quality. The understanding of the FWS is that the availability of good gravel diminishes rapidly east of Prudhoe Bay.	FWS
1-142.	Appendix 1O	Given thermokarst potential and local channel bed adjustments to in-channel gravel mining, it may not be prudent to locate material sources so close to the planned pipeline (e.g., Sagavanirktok River 41,795 PT091).	FWS
1-143.	Appendix 1O	Update/address the following: a. Adobe Page 11, 17620 to 19770: Borrow sources include both wetlands and channel in the same mine site. b. Adobe Page 13, 22410 to 24910: What are the plans for these large borrow sources? The FWS recommends getting material from in channel sources	FWS

		where it would not conflict with fish habitat. This site should be an HDD. c. Adobe Page 17, 32440 to 34960 (Kadleroshilik River): Large material sources in wetlands might be better located in the floodplain of the Kadleroshilik River where the river can recharge the removed material. Potential site for an HDD. d. Adobe Page 20, 40030 to 42560: Potential site for HDD under Sagavanirktok River – Main. e. Adobe Page 23, 47640 to 50110: Potential site for HDD under Sagavanirktok River – West, and to keep in-channel mining away from the planned pipeline. f. US-03-101-064, APR-0570: This appears to be an abandoned material site that might be used instead of opening a new nearby site. g. US-03-101-081, near AMP 196.16: This appears to be an abandoned material site that might be used instead of opening a new nearby site. h. US-03-101-095, about AMP 231.5: This staging area could be moved slightly north to avoid wetlands. i. US-03-101-099, APR-0975: This is a potential active material site that could be used instead of opening a new nearby site. TC Alaska might have to coordinate with Alyeska. j. US-03-101-101, APR-0990: This is a potential active material site that could be used instead of opening a new nearby site. k. US-03-101-114, APR-A1130 and –B1130: It appears that APR-B1130 might be the preferred access route at this location, rather than APR-A1130. l. US-03-101-122, about AMP 298.960: Why is this (abandoned road?) not mapped as a wetland, while it is mapped as wetland on the other side of TAPS? m. US-03-101-138, Fort Hamlin Hills Compressor Station: Can the compressor station be moved slightly north to about APR-1405 where there are no wetlands? n. US-03-101-142. Staging Area at AMP 348.870: Can the staging area be moved to APR-1460, where the area appears to have been previously	

		disturbed? o. US-03-101-178, Staging Area near AMP 438. Can this staging area be moved slightly toward AMP 437 to avoid wetlands? p. US-03-101-192, Camp 12 – Little Chena: This area between the Little Chena and Chena Rivers has a lot of higher-value semipermanently flooded emergent wetlands. Any disturbance in this area should be minimized, especially temporary, easily located offsite work camps.	
1-144.	Appendix 1O	Index sheets are in the binder, but not in the PDF files. Provide index sheets in the electronic copy of Appendix 1O.	FERC
1-145.	Appendix 1O US-03-101-155	MP labels sometimes do not appear properly on the computer. Fix possible font issue. (They show as AM# ###, where the # is a box character.) Example: First map sheet in file 8 of 15.	FERC
1-146.	Appendix 1O	Additional, detailed FERC comments on the alignment sheets will be forthcoming under separate cover.	FERC

Comment Number	RR Location Reference	Comments on Draft RR 2 – Water Use and Quality	Source
2-1.	General	Discuss "compensatory mitigation" regarding impacts on jurisdictional waters of the United States, including wetlands that would require a Department of the Army permit prior to the discharge/placement of dredged or fill material in these areas. This discussion could be included in section 2.4, "Wetland Resources" or in an appendix. This project would likely also require some form of compensation. Compensatory mitigation may include payment to a mitigation bank or in-lieu fee or the permittee may propose to perform some kind of rehabilitation, restoration, preservation, or a combination of these methods. State if the complete mitigation package will be included with the Army permit application.	COE
2-2.	General	Add a navigation section to RR 2, including the existing and prospective navigation for each applicable waterway and the project's effects thereon (including any proposed development on the waterway that could impact navigation). See **Attachment 2** for a list of navigable waterways under the jurisdiction of the USCG.	USCG
2-3.	General	Provide correspondence/comments from state or federal agencies regarding mitigation of impacts, compensation plans, plans for restoration of forested wetlands, special permits required for construction within wetlands, and special permit conditions. Describe results of meetings to determine wetland permitting requirements with the EPA, COE, and appropriate tribal, state, and local authorities.	FERC
2-4.	General	Include a detailed description of the crossing and any potential environmental/ navigational/historical/socio-economic impacts for each navigable waterway to be crossed by a new/modified permanent or temporary bridge.	USCG
2-5.	General	Discuss the importance of high-value *Arctophila fulva* in North Slope wetlands.	OFC
2-6.	2-3	Provide a reference for the last sentence of the 1st paragraph.	EPA

2-7.	2-3 – 2-5	Provide citations for text references in section 2.2.1 for depth to groundwater values, stratigraphy, aquifer conditions, well yields, water quality (total dissolved solids numbers), etc. Provide data sources used throughout this section.	FERC
2-8.	2-3 – 2-5	In section 2.2.1, provide text, table, and/or figure that accurately depicts groundwater basins in the project area.	FERC
2-9.	2-3 – 2-5	Update citation on statewide groundwater use (1984) to a more recent reference.	FERC
2-10.	2-3	Describe how TC Alaska would trench and dewater wide areas of ice-rich (e.g., thermokarst prone) permafrost.	FWS
2-11.	2-4	State whether pingos would be crossed. If so, explain how frost heaving would be controlled during trenching and dewatering.	FWS
2-12.	2-4 – 2-5	"USGS [U.S. Geological Survey] 1955" is a 57 year old reference. The same reference occurs on page 2-5. Likewise, the 3rd paragraph on page 2-4 has a reference (Ferrians 1965) that speaks to depth of permafrost base in Fairbanks. Provide more recent citations.	EPA
2-13.	2-4	The text states, "In the Fairbanks area, where there is discontinuous permafrost, the depth to the base of the permafrost ranges from 155 to 265 feet (Ferrians 1965)." Define "the depth to the base of the permafrost." Is this to the top or the bottom of the permafrost table? Is it to the bottom of the active layer?	EPA
2-14.	2-4	The text states, "In 1996, the monthly mean water withdrawal rate was approximately 6 million gallons per day (USGS 2002)." Provide more recent data if available. The city of Fairbanks has grown in population size since 1996 and it is highly likely that more water is being withdrawn now.	EPA
2-15.	2-5	The text states that the Well Log Tracking System (WELTS) search identified 28 wells. There are likely more wells, though these additional wells are probably undocumented in WELTS.	EPA
2-16.	2-5	The text states, "Field surveys will confirm the presence of public and private drinking water wells proximate to the construction area prior to the start of pipeline construction in the vicinity of the well." Describe how this would be accomplished. It is possible that some undocumented drinking water wells exist. If so, how will the field survey crews know where to find them?	EPA

2-17.	2-5 – 2-7	In section 2.2.3, provide mitigation measures for project-related groundwater resource impacts.	FERC
2-18.	2-6	Provide the location of springs and seeps within 150 feet of all areas of construction disturbance by MP and direction/distance from the ROW.	FERC
2-19.	2-9	The text states that "The ADEC Project Manager for the BPXA GCF reports that off-site migration of the contamination is limited and does not have the potential to impact the GTP." Please cite this source as a personal communication.	EPA
2-20.	2-9	Groundwater contamination is referenced within Eielson Air Force Base (AFB), and TC Alaska is currently in consultation with the AFB regarding the planned routing through the base. Identify the nature/chemical composition of the contamination. Provide the results of this consultation and how routing would avoid or minimize the spread of the contamination.	FERC
2-21.	2-9	TC Alaska reports groundwater contamination at the Tanacross Airfield former fuel facilities site near MP 643 of the planned Alaska Mainline. Identify the contamination within this site and how TC Alaska would avoid or minimize the spread of this contamination.	FERC
2-22.	2-9	The last paragraph on the page identifies a number of contaminated sites for which sampling has not yet been carried out. Would TC Alaska conduct such sampling prior to construction? Is there an obligation for TC Alaska to determine the extent of contamination at sites along the pipeline route, and to either avoid or remediate these sites prior to construction? The EPA recommends that the APP ROW be routed to avoid known contaminated areas to minimize potential liability and to avoid negatively impacting the remedy that is in place for CERCLA (i.e., "Superfund") sites.	EPA
2-23.	2-11	TC Alaska states where contaminated groundwater is encountered, it would follow its Construction Unanticipated Discoveries Plan. Provide this plan. There are several areas where known groundwater contamination occurs. Ensure this plan (or accompanying plans) outline the processes for testing, documentation, cleanup, and monitoring of unanticipated contaminated groundwater, surface water, and soils. Provide mitigation measures TC Alaska would employ to avoid	FERC, EPA

		or minimize the spread of this contamination as a result of construction. How will field workers know if they cross contaminated soils or water during excavations? Will there be a protocol for sampling for contaminants during construction? Describe the process to be followed in the field to identify (and sample for) contaminants.	
2-24.	2-10	Dewatering the trench through permafrost areas may cause ponding in areas adjacent to the ROW due to limited percolation through the soil. Describe how TC Alaska would avoid or minimize adverse environmental impacts resulting from water ponding off ROW.	FERC
2-25.	2-11	Provide a summary of the blasting plan's elements related to potential impacts on springs, wells, and wetlands, as well as associated mitigation. Identify blasting locations on project maps.	EPA
2-26.	2-10 – 2-11	Provide details in section 2.2.5 regarding potential mitigation measures for returning water supplies to former capacity in the event of damage due to construction activities.	FERC
2-27.	2-11 – 2-14	The surface water resources discussion is qualitative and does not provide any citations. Provide citations for sources used in obtaining data regarding surface water resources, including the data on flows, precipitation, water quality, and basin characteristics.	FERC
2-28.	2-11	Provide information in section 2.3 on waterbody crossing surveys from 2011 and 2012. Currently, only 255 of the 504 streams have been surveyed. Clarify which streams TC Alaska has existing data for and does not propose to survey.	FERC
2-29.	2-11	Provide information in section 2.3 on waterbody crossings that would be impacted by aboveground facilities and associated infrastructure. Also update table 2B-1.	FERC
2-30.	2-11	Include the results of a comprehensive identification, delineation, and review of all potential source water protection areas, such as streams, rivers, and lakes, underground sources of drinking water, groundwater aquifers, public and private wells, natural springs and seeps, etc. along the proposed pipeline corridor. There are a large number of remote communities along the project corridor that may depend on groundwater sources which could be affected by the proposed project.	EPA

		These wells in the remote areas may not be well documented and subsequently, not included in the Alaska Department of Natural Resources' (ADNR) WELTS database. Describe the activities (e.g., trenching and excavation, water withdrawal, etc.) that could potentially affect source water areas, potential contaminants that may result from the project, and mitigation measures that would be taken to protect the source water areas.	
2-31.	2-11	Describe how a landowner would be compensated for loss of a drinking water source if a potable water well is permanently compromised/contaminated by the project.	EPA
2-32.	2-11	Include field studies of winter conditions; e.g., discharge, icing extent, ice depth (thickness), and Spring break-up characteristics for stream crossings. Winter conditions may include ice jams/scour on large streams and substantial flow over aufies for smaller streams.	BLM
2-33.	2-12	Show waterbody crossings on maps in appendix 1A to correspond with waterbodies listed in table 2B-1 of appendix 2B.	EPA
2-34.	2-12	The second paragraph in section 2.3.1 describes sea ice and refers the reader to appendix 1B of draft RR 1. However, appendix 1B does not discuss sea ice.	EPA
2-35.	2-13	Discuss more thoroughly the water quality data of the offshore area from the studies of Brown et al. 2005, Kuhle 2010, and Neff 2010.	FERC
2-36.	2-14	Provide water quality and substrate sampling results from 2011 in section 2.3.1.	FERC
2-37.	2-14	Provide a construction schedule by drainage basin (i.e., summer and winter construction) in section 2.3.2.	FERC
2-38.	2-17	Correct the statement "These tributaries discharge into the Sagavanirktok and the Kuparuk rivers…" to reflect that, on the Point Thomson side of the project, some tributaries discharge into the Staines and Canning Rivers.	FERC
2-39.	2-17 – 2-21	Provide missing citations for all the discharge, precipitation, suspended sediments, water temperature, and quality numbers presented for each basin. Also provide missing citations for the text descriptions of the general hydrology patterns for	FERC

		each basin. There are currently no citations for any of the data presented in these sections, including the hydrology-conceptual model depictions.	
2-40.	2-18	Explain what is meant by "Surface water quality is excellent…" Explain with respect to what --for human consumption? --lack of contaminants?	EPA
2-41.	2-18, -20	Explain why data on mean monthly runoff are provided only for the lowest runoff of the year. What is the importance of reporting the lowest month, and not reporting on other times of the year?	EPA
2-42.	2-21	Provide documentation of consultation with appropriate agencies regarding sensitive and designated waters. Provide mitigation measures TC Alaska would use on each stream to minimize impacts on these waters.	FERC
2-43.	2-21	State which waterbodies do not meet water quality standards, specifying which standards are not met. Identify which water bodies in the project area are listed as "Impaired Waterbodies," and the basis for their listing for exceeding specific pollutants. Identify the water bodies that are potentially affected by the project that are listed on the State of Alaska's most current EPA approved section 303(d) list. Describe enhancement efforts for those waters, how the project would coordinate with on-going protection efforts, and any mitigation measures TC Alaska would use on each waterbody to minimize the likelihood of construction activities further impacting these water quality standards, and to avoid further degradation of impaired waters.	FERC, EPA
2-44.	2-22	Identify and describe the public watershed areas that would be crossed by the project.	FERC
2-45.	2-22	Provide information regarding Alaska Wild and Scenic Rivers that would be crossed by the project. Additionally, provide a map of federally and state-listed Wild and Scenic River reaches with the project area.	FERC
2-46.	2-22	Provide information regarding public drinking water protection areas that would be crossed by the project. Describe TC Alaska's proposed mitigation measures to avoid or minimize impacts on the public drinking water protection areas that would be crossed.	FERC, OFC

2-47.	2-23	Verify that the BP Exploration Wells in table 2.3.4-1 are drinking water protection areas.	FERC
2-48.	2-23	Include domestic wastewater discharges from work camps in the evaluation of impacts.	EPA
2-49.	2-23	Add more discussion describing the differences by geographic region to make this section more specific.	OFC
2-50.	2-23	State whether any of the waterways in the project area are American Heritage Rivers.	USCG
2-51.	2-23	Include information regarding the project's impact (including potential bridges) on floodplains (100-year floodplain, etc.)	USCG
2-52.	2-23	Provide details regarding potential sedimentation impacts associated with construction and operations.	FERC
2-53.	2-23 – 2-34	Include discussion on the use of water for all operations, not just the GTP.	EPA
2-54.	2-23 – 2-25	Provide specifics on TC Alaska's impacts on waterbodies from construction for each waterbody width designation (i.e., minor, intermediate, and major), crossing method, and time of year for construction. Include acreage of disturbance, duration of construction, duration for reestablishment of vegetation, and proposed mitigation methods to minimize the disturbance of the project (i.e., a toolbox approach).	FERC
2-55.	2-24	Justify why TC Alaska does not propose to use HDD crossings on the Point Thomson line at wide and/or braided water crossings to avoid disturbing permafrost banks. Where HDD is not practical, discuss the option of using VSMs at narrow, single-thread channels to avoid disturbing permafrost banks.	FWS
2-56.	2-24	Provide an updated list of major waterbody crossings both in the text and in table 2.3.5-1. Provide a final construction schedule for major waterbody crossings. Further, clarify that an aerial crossing of the Yukon River would be TC Alaska's preferred crossing method. Clarify why TC Alaska would not HDD each of the 16 major waterbodies (i.e., those that are greater than 100 feet wide). For major waterbody crossings TC Alaska proposes to HDD, provide results of geotechnical feasibility studies in section 2.3.5.	FERC

2-57.	2-24	Discuss the rationale for deciding which construction/crossing method to use at waterbodies. TC Alaska proposes to use HDD with crossings as small as 150 feet (Chena River) to as large as 1700 feet (Yukon River), but at other times proposes to use open cut for crossings as small as 90 feet (Middle Fork Koyukuk River) to as large as 3500 feet (Sagavanirktok River). Why is HDD/aerial being used for Tanana River #1 (700 feet) and open cut for Robertson River (650 feet), when these two rivers are of similar width? Why is the Yukon River being crossed with an aerial bridge and the Sag River by open cut, when the Sag River is twice as wide as the Yukon? Explain and give a justification for how these decisions were made.	EPA
2-58.	2-25	Identify a list of crossings by MP where topographic or other site-specific factors may preclude the standard 50-foot setback between the extra workspaces and the edges of waterbodies prior to construction. (Specific data will also be needed before the review of a CWA Section 404 permit can be undertaken).	FERC, EPA
2-59.	2-27	The **Winter Construction** discussion states material excavated from the waterbody bed during construction would, in the vast majority of cases, be backfilled into the trench after pipeline installation. Clarify where and why this material would not <u>always</u> be backfilled into the trench and how this material would be disposed.	FERC
2-60.	2-27	The pipeline should be buried deeper than expected scour for at least the 100-year event *over the life* of the project, not simply the 100-year event based on current conditions. Also, some crossings are more susceptible to scour than others (e.g. high-gradient watercourses), and will need to have the pipe buried deeper than the 3 feet of cover for typical crossings. Indicate how the "zone of potential channel migration" will be determined. Pipe in this area should be buried at the same depth as the expected channel scour to avoid emergency bank stabilization needs in the future as the channel meanders across the meander plain (e.g., RR2C, Koyukuk River crossing, Note 11). The pipeline should be buried at this depth over the entire expected meander plane, so natural channel migration does not threaten the pipeline in the floodplain.	FERC, FWS

		Provide records of consultation with the FWS and COE to determine the need of a scour analysis for each waterbody crossing. If a scour analysis is determined to be necessary, then provide the analysis, the FWS'/COE's comments on the analysis, and TC Alaska's proposed mitigation measures to minimize the likelihood of the pipe becoming exposed. See also comment 6-60 regarding scour at bridge crossing sites.	
2-61.	2-28	Identify any time-of-year restrictions that occur within the project area for crossing waterbodies. Clarify each time-of-year restriction in appendix 2B.	FERC
2-62.	2-28	The text states that if there are discharges to waterbodies, EPA or ADEC permits will be necessary. Would discharges to wetlands need the same permits?	EPA
2-63.	2-28, -30; Appendix 1K	Neither appendix 1K, p. 1K-33 and p 1K-34, **Hydrostatic Testing**; nor text in draft RR 2 provide adequate details to evaluate potential water resource impacts associated with hydrostatic testing processes. Provide details regarding source water for hydrostatic testing and missing volume estimates both in the text and in table 2.3.5-2. Provide the following information: proposed timing of water withdrawals, withdrawal rates, water source, discharge locations of hydrostatic test water to land and/or surface waters, and method/procedure for documenting water chemistry of test water prior to discharge to ensure waste hydrostatic test water meets ADEC water quality standards. Of particular concern is hydrotesting in the winter season when other additives, such as antifreeze, may be mixed with the test water. Identify the types of chemical additives that may be required for winter hydrostatic testing and how these chemicals would be treated and properly disposed of. Describe the mitigation measures and control devices that would be implemented to minimize environmental impacts.	FERC, EPA, BLM
2-64.	2-29	Clarify why hydrostatic test water would not be cascaded between sections more often to reduce the overall volume of test water needed.	FERC
2-65.	2-30	Identify the measures TC Alaska would implement to eliminate the transport of	FERC

		noxious and invasive species via discharged hydrostatic test water.	
2-66.	2-30	Provide water use estimates and identify sources of water supply for the operational phase of the project.	FERC
2-67.	2-30	Identify the measures TC Alaska would implement to minimize the likelihood of the pipeline creating frost bulbs in waterbodies (e.g., insulating the pipeline within known talik areas and/or burying the pipeline deeper through these areas).	FERC
2-68.	2-30	Provide greater detail regarding the construction of the planned reservoir on the Putuligayuk River, such as its depth, size, what agencies would issue permits for its construction, any known current river uses (by fish or water withdrawal), and how this reservoir would impact the Putuligayuk River flow.	FERC
2-69.	2-30	Clarify how TC Alaska would avoid locating aboveground facilities in waterbodies "to the extent practicable" given that practically all of the North Slope is wetlands and waterbodies, and that the GTP (about 235 acres) would be situated entirely on wetlands and waterbodies.	EPA
2-70.	2-31	Provide information about waterbodies impacted by associated infrastructure, including access roads. This information will be also required for CWA Section 404 permitting.	FERC, EPA
2-71.	2-31	Clarify the construction procedures planned for the West Dock (including pile driving activities, number of piles, a design drawing, acres of shading that would be anticipated, etc…).	FERC
2-72.	2-31	Clarify whether all temporary and permanent access roads, including culverts, would be restored to original condition or better following construction.	FERC
2-73.	2-31	Clarify whether the proposed dredging depth for the turning basin and navigable channel is -14 feet, -15 feet or -16 feet, and whether it includes both the design depth (e.g., -14') and overdredging (e.g., 1'), or just the design depth. The proposed dredging depth is necessary for two reasons. First, it is needed to provide an accurate estimate of the proposed dredged material volume and the proposed disposal site capacity. Second, it is needed for the sampling and analysis plan to evaluate the physical and chemical characteristics of the sediment, including the proposed dredged material and the new seafloor surface after	EPA

		dredging. Also, this section uses mean low water as the elevation datum. The EPA recommends using mean lower low water as the elevation datum, unless there is a compelling reason to use mean low water.	
2-74.	2-31	The text states, "Vessels should be operated at sufficiently low speeds to reduce wake energy, and no-wake zones should be designated near sensitive habitats." a. Define "sensitive habitats." b. Are the locations of sensitive habitats in the West Dock area known at this time?	EPA
2-75.	2-31	In the section **Access Roads**: a. It is not clear, with respect to temporary access roads, whether these would be taken up (removed) and the wetlands restored. b. Would prefabricated construction mats used to reduce rutting and/or compaction be taken up after construction? c. With respect to the proposed abandonment of temporary access roads, if these are in wetlands, this would constitute a permanent fill, which requires a CWA Section 404 permit and is subject to compensatory mitigation requirements.	EPA
2-76.	2-31	In the section **Construction Water Use and Discharge**: a. Provide a discussion of operations water use and discharge. b. The reviewer is referred to appendix 1F for a preliminary list of all access roads; however, there is no indication of which of these access roads would cross wetlands, and the acreage of those wetland impacts. c. It is also noted that the last column, for "land affected during operations (acres)" is filled entirely with zeros; this is not consistent with the statement on page 2-31 that temporary access roads may be abandoned.	EPA
2-77.	2-31	Conduct a comprehensive water study to include the depth and area of the surface water (lakes), water withdrawal rates and volumes, and the availability of water from the water source. This information should also specify the presence and/or absence of any resident and/or anadromous fish species and discuss direct and cumulative impacts on fisheries resources.	EPA
2-78.	2-31	Regarding table 2.3.5-3, provide details regarding source water and water volumes	FERC,

		missing for the construction phase. Are there any data about temporary water use during operations? Discuss construction and operation water use impacts in the text. Explain why "n/a" is shown for most of the dust control column and why dust control water is sourced only at MPs 164, 180, 285, 560 and 625. Would water for dust control be hauled up to 137 miles in tank trucks? (This is ½ the distance between MPs 560 and 280). Dust control is an important consideration, especially on the North Slope, and should be explained in more detail. Further, the text states that "Potential sources of water for construction activities in the Project area have been identified in Resource Report 1." However, this information was not found in draft RR 1. Include a table and a map that identifies the location of all potential sources of water withdrawal used for this project.	EPA
2-79.	2-34	Provide information on major wetland complexes and sensitive wetlands which would be disturbed during construction and operation of the APP. Describe the effects of construction and operations on wetland complexes and sensitive wetlands, and TC Alaska's planned mitigation. Identify and describe wetlands where staging areas would likely be more extensive than "typical." Describe, in detail, the construction methods, the location of staging areas, and recommendations that were made by federal, state, and local agencies, and how their recommendations would be implemented. If any agency recommendations would not be carried out, provide specific reasons and identify if TC Alaska is planning other mitigation.	FERC
2-80.	2-34	Provide data to support TC Alaska's assertion that the mapping method used for this planned project accurately maps wetlands, including field delineations and corresponding light detection and ranging delineations, as well as assumptions. Does TC Alaska intend to provide wetland maps for all proposed infrastructure locations? Provide TC Alaska's version of a wetland delineation report for all wetlands that would be crossed.	FERC, FWS, EPA

		Further, indicate where wetlands have not been mapped (e.g., fragments with no aerial photography; appendix 2F, file 20, page 2; appendix 2F, file 24, page 2). Otherwise it is difficult to determine if the area is upland or simply not mapped.	
2-81.	2-37	Provide a wetland functional analysis. Without this analysis, the assumption will be that all wetlands are fully functional.	FWS
2-82.	2-35	Verify that "marine wetlands are not present in the Project area," especially in regards to text on page 2-40 that states construction of the GTP "could impact estuarine tidal habitat and wetlands in the area." Are marine wetlands present where barges would be unloaded or elsewhere in the vicinity of West Dock or the GTP?	EPA
2-83.	2-41	Provide source of statement that the "route encompassing the Brooks Foothills ecoregion is generally upland tundra; however, they are not predominantly wetlands." The following sentence, "…substantial wetland areas occur within the APP right-of-way…" seems to contradict this statement.	EPA
2-84.	2-44	Discuss if the thaw and oxbow lakes are associated only with river floodplains in this ecoregion.	EPA
2-85.	2-49	The FWS recommends that saturated wetland topsoil should be salvaged, and organics below standing water should be salvaged when practicable (e.g., when an excavator is used). Cross-reference to construction procedures in RR 1, as applicable.	FWS
2-86.	2-49	Expand the discussion of impacts on forested wetlands and drainage patterns. The North Slope vs. the Interior are very different, have different lengths of growing seasons, etc. Describe how impacts would be mitigated, especially in areas of slow revegetation.	OFC
2-87.	2-49	TC Alaska presents various tables and appendices for a list of wetlands potentially affected by the project. In addition to the specific tables, provide a single table that summaries the acreage of wetlands affected for the entire project, including both construction and operations phases, and including all project components. Describe TC Alaska's planned measures to avoid and/or minimize wetland losses,	FERC, EPA, OFC, BLM

		and to compensate for permanent wetland losses. Be sure to cross-reference the applicable portions of TC Alaska's Procedures. Estimate the length of time necessary to reestablish each wetland type, for both winter and summer construction. Provide total acreages of forested wetland that would be temporarily and permanently affected by activities associated with construction and operation of the pipeline and related infrastructure, including aboveground facilities. Describe measures TC Alaska would use to restore forested wetlands and how these wetlands would be monitored during restoration.	
2-88.	2-51	Verify that no farmed wetlands would be crossed or otherwise affected by the project area, especially in the vicinity of Delta Junction.	EPA
2-89.	2-51	Expand the discussion of geographic differences across the project area and different growing seasons. General "mitigation procedures" will not be sufficient given ecoregion differences. How high would the ROW crown be? (A matter of inches can result in a wetland or an upland on the North Slope). In some cases it is likely that no wetlands would be re-established and that the area would be converted to uplands.	OFC
2-90.	2-51	TC Alaska states it would install temporary erosion controls <u>following</u> clearing through wetlands. Temporary erosion controls must be installed <u>during initial ground disturbance</u> (which may include clearing). Clarify that TC Alaska commits to implementing this procedure. How long would temporary erosion controls be maintained in working order--through breakup?	FERC, OFC
2-91.	2-51	TC Alaska states, with approval by appropriate federal and state agencies, it would leave earthen pads in place after the pipeline is constructed through wetlands. Provide the location by MP and justification for each earthen pad that would be left in place in a wetland.	FERC
2-92.	2-51	TC Alaska states it may elect to remove riprap, timber mats, gravel, and fill from the wetland after post-construction reclamation, provided removal does not result	FERC

		in greater impacts on the wetland than if left in place. Clarify how removal could result in greater impacts on the wetland than the fill that TC Alaska would leave in place.	
2-93.	2-51	The text states, "…clearing crews will cut existing woody wetland vegetation off at ground level and remove it from the wetland most likely during the winter prior to pipe installation on that specific spread." Is it proposed that snow would be removed down to the ground level for the entire construction ROW for winter vegetation clearing? Where would the snow be taken? This winter exhibited a snow pack of at least 4 feet deep in Interior Alaska.	EPA
2-94.	2-51	TC Alaska states it would import thaw-stable fill in high ice content soils to reduce future backfill. Clarify what this fill would be composed of and what volume of native soil would cover this fill (in inches).	FERC
2-95.	2-52	Define when TC Alaska would implement the winter construction techniques and when it would implement the summer construction techniques through wetlands.	FERC
2-96.	2-53	TC Alaska states that summer construction would disturb about 1,300 acres of wetlands. Additionally, about 66 percent of wetland disturbance (or 6,700 acres) would result from winter construction. Identify when TC Alaska would construct through the remaining 1,900 acres of wetland.	FERC
2-97.	2-53	Identify and discuss the alternatives TC Alaska considered to minimize fill of wetlands (particularly forested wetlands) as a result of construction and operation of the aboveground facilities.	FERC
2-98.	2-53	Revise the text so as not to imply that leaving fill in place is a form of compensatory mitigation. Fill is not a form of compensatory mitigation, in the CWA Section 404 context. Fill is an action that requires compensatory mitigation, if unavoidable loss of aquatic resources results.	EPA
2-99.	2-49	Describe the potential for blasting to affect wetlands and what measures TC Alaska would take to detect and remedy such effects.	FERC
2-100.	Appendix 2B;	Provide final crossing details for all waterbody crossings. Clarify how "Summer Wetted Width" and "Wetted Width at Time of Construction" are calculated.	FERC, FWS

	Table 2B-1	Further, clarify if frozen conditions are included in the wetted width. If so, explain which streams are expected to be frozen solid at the time of construction.	
2-101.	Appendix 2B; Table 2B-1	Identify waterbody crossings that may have contaminated waters or sediments.	FERC
2-102.	Appendix 2C	Clarify that no clearing would occur between the HDD entry and exit locations at the Tanana River #2. Further, the extra workspace for the open-cut of the Middle Fork Kayukuk #3 appears excessive. Justify the need for such large space.	FERC
2-103.	Table 2E-2	Clarify if the access road impacts in table 2E-2 include the planned ice roads, e.g., for the West Dock/GTP; provide if not already included. Include all new or expanded access roads for the GTP, West Dock, and access road to Point Thomson MP 0.	FERC
2-104.	File 26816090/ page 18	Map wetlands along the pipeline route between Point Thomson MPs 51 and 54.	FERC
2-105.	Files 26816091 - 26816115	Complete wetland mapping along the planned Alaska Mainline route (e.g., between MPs 3 and 5, 30 and 32, 84 and 86, 93 and 97, 692 and 694, 703 and 704).	FERC
2-106.	Appendix 2-D; 2D-1 and 2D-1.3.1	Acknowledge that bentonite clay will not likely settle out except in the slowest moving water.	FWS
2-107.	Appendix 2D; 2D-5	Describe the pattern (density up and down stream, and vertically in the water column) for instrumentation. Describe the parameters that the instruments will monitor, and at what time interval they will be recorded and evaluated by an inspector.	FWS
2-108.	Appendix 2F	Include the footprint of all associated infrastructure, including infrastructure located outside the 1,000-foot survey width on either side of the pipeline alignment, such as roads and material sources, in the wetland table and the National Weland Inventory maps.	FWS

2-109.	Appendix 2F; File 20, page 2; and File 24, page 2	Address why there are numerous fragments not mapped where aerial photography is missing, including some very important waterbody crossings like the Tanana River near Delta Junction, as well as other waterbody crossings that were not mapped as wetlands but appear to be wetlands.	FWS
2-110.	Files 26816090 - 26816115	Include all associated infrastructure and aboveground facilities, e.g., access roads, compressor stations, meter stations, staging areas, laydown areas, West Dock (including new or expanded access roads), disposal areas, GTP water reservoir and transfer line, additional temporary work space, construction camps, storage yards, borrow pits, helipads, and airstrips. Include wetland mapping at each of these locations.	FERC

Comment Number	RR Location Reference	Comments on Draft RR 3 – Fish, Vegetation, and Wildlife Resources	Source
3-1.	General	A common statement throughout draft RR 3 is that TC Alaska concludes that impacts on a particular resource will be "negligible to minor." However, the information on which that conclusion is made is often not yet available (e.g., surveys have not been conducted, agency consultations have not been completed, and mitigation plans have not been finalized and indeed may not be completed until years in the future). We will not be able to conclude that impacts are "negligible" or otherwise without substantial additional information. Therefore, for each such resource area, provide the rationale as to how this conclusion was reached based on the extent of construction and the amount of time and possible difficulty with restoration; or, revise the conclusion to be commensurate with the scope of the project. Further, in many resource areas TC Alaska acknowledges the data are missing and states that they are forthcoming. However, be aware that we cannot confirm at this time whether the forthcoming information will be sufficient for us to start our NEPA review of that particular resource area.	FERC, OFC, FWS
3-2.	General	Add a table to RR 3 listing and describing outstanding environmental resource surveys (i.e., those that are still being conducted or are planned).	FERC
3-3.	General	Improve on citations throughout RR 3. For example: a. Under **Change in Spatial/Geographic Distribution** - Operations Impacts and Mitigation, give references for the biotic and habitat impacts from the formation of frost bulbs. b. Add any references demonstrating that engineering mitigation can reduce the formation and environmental impacts of frost bulbs. c. Under **Habitat Suitability** - Construction Impacts and Mitigation, add	FERC, FWS, BLM

		supporting references for the statements "Fish….could be temporarily displaced…during and immediately after construction" and "Invertebrates will colonize these areas over the following summer." Are there any studies stating how quickly invertebrates and fish return or after disturbance? Changes in community composition? d. Under **Sediment and Turbidity**, add supporting references for the statement "…re-colonization from natural stream drift will begin to occur soon after reclamation of the streambed." Provide any data on expected recovery time. e. Under **Water Depletions**, add any data on fish entrainment rates while building ice roads, if available. f. Cite the year when referencing the "current Catalog and Atlas," since it is constantly being updated. Using the Alaska Department of Fish and Game (ADFG) Anadromous Waters Catalog and Fish Distribution Database is a good preliminary step, but it is not considered definitive. Strive to include more rigorous citation throughout. *Environmental Monitoring and Assessment* (2007) 132:395–409 has a review that might be helpful in addressing some of the above.	
3-4.	General	In several locations of draft RR 3, TC Alaska states that it "is evaluating the potential for noise impacts to wildlife and will provide additional information prior to construction." However, our NEPA analysis must contain our assessment and conclusions regarding the project's potential noise impacts on wildlife, including marine mammals. Therefore, provide the potential noise impacts on wildlife, including noise impacts on marine mammals from vessels, dredging, pile driving, and so forth. See also our comments 3-23 and 3-79, below.	FERC
3-5.	3-3	Define "Eastern Arctic basin." Does this include Point Thomson, the Sagavanirktok River, and the Prudhoe Bay Basin?	FWS
3-6.	3-3	Include a discussion about the protection of all fishes under the state's fish passage act (AS 16.05.841) instead of focusing solely on the protection offered	FWS

		to anadromous species and streams under AS 16.05.871.	
3-7.	3-5	In the Arctic cisco discussion, add the text "from spawning areas in the Mackenzie River" in the second sentence after "After emergence…"	BLM
3-8.	3-5	Revise table 3.2.1-1 to represent species present in these drainages, then use text to describe the species expected to occur in the specific project area. Also, some inaccuracies noted in table 3.2.1-1 are: • pink and sockeye salmon don't occur in the Upper Yukon River; • anadromous broad whitefish do occur in the listed waters of the Yukon River; • anadromous Dolly Varden do not occur in the listed waters of the Yukon River; • least cisco and humpback whitefish should have the superscript a; and • arctic lamprey are present at least in the lower Koyukuk.	FWS, BLM
3-9.	3-11	Correct the following inaccuracies in table 3.2.1-2: • resident least cisco occur in the listed waters of the Yukon River; • least cisco is widespread in distribution (not just in the Tanana drainage); • Alaska whitefish is considered a form of humpback whitefish; and • least cisco and broad whitefish should have the superscript **[a].**	FWS, BLM
3-10.	3-5 – 3-24	The following fishery life history information is inaccurate or outdated. Ensure that the revised information/citations are reflected in the filed RR 3. a. Pink salmon is not an important commercial fish in the project area. b. The diet listed for adult Dolly Varden is for when they are in marine waters, otherwise, their freshwater diet is similar to juveniles. c. Correct the Genus/species for the Least Cisco - *Coregonus sardinella*. d. The text states: "Spawning migrations extend into the upper reaches of larger rivers that drain into the Beaufort Sea." Provide a citation regarding those migrations. e. Dolly Varden exhibit amphidromy in the Sagavanirktok drainage (North Slope). See ADFG studies (Viavant –author) for recent data. The BLM is not aware of studies citing anadromous Dolly Varden occurrence in the Yukon River drainage, nor in the upper Koyukuk drainage. Provide	FWS, BLM

		citations (more recent than ADFG 1978a) supporting the occurrence of Dolly Varden in both drainages. f. Pink and sockeye salmon are found in the Lower Yukon River. Add a citation verifying that pink and sockeye salmon inhabit the Upper Yukon basin and the project area. Define the area included in the Upper Yukon River basin. Use recent, species-specific citations. g. Correct the text to indicate that chum, not chinook salmon, is the most abundant salmon in the Upper Yukon and Tanana River basins near the project area. Chum and coho salmon are likely more abundant, though not as widespread. h. Juvenile chinook overwinter in streams and small rivers. Adult spawning habitat is medium to large cobble where flowing waters are pushing into the river bed such as the lower end of pools just above riffles. i. Coho salmon migrate up the main steam of the Yukon River. Additionally, the largest spawning aggregation is the Delta Clearwater in the Yukon River Drainage. j. Broad whitefish are an important subsistence species in the Coleville, Yukon, Tanana, and Koyukuk Rivers. k. Humpback whitefish also occur in the Yukon, Tanana, and Koyukuk Rivers. l. Arctic lamprey: "…and sheefish (*Stenodus leucichthys*), locally known as inconnu (Mansfield 2004a)." Inconnu is generally the more formal name; sheefish seems to be the more popular name. Revise text accordingly. m. Replace older citation (Morrow 1980) with a better more recent citation for pond smelt (Mecklenburg et al. 2002). n. State that the Alaska whitefish is also considered to be a humpback whitefish. o. Remove this portion of the last sentence of the broad whitefish text "…except that the resident form is not found in saltwaters." A "resident" fish by definition lives in freshwater. p. Fix contradiction in second paragraph (page 3-16) on sheefish/ inconnu	

		spawning time. Specify at breakup or between late-September and early October. q. The citation BLM 2010a used in Section 3.2.1.3 should be changed to BLM 2010. r. Citations in Section 3.2.1.3 were grouped so that a reader was not able to identify a particular citation with its corresponding information. s. Provide a citation for the sentence – "Some species found in lakes included broad whitefish, round whitefish, Arctic grayling, Arctic char, and Alaska blackfish, and ninespine stickleback." t. How is the last sentence regarding Dan Creek (page 3-19, second paragraph) pertinent to the discussion in this paragraph? Explain relevance or delete. u. Text on page 3-19 states "Small coastal streams are thought to provide only summer rearing habitat for grayling…." However, the FWS believes Ninespine sticklebacks are also likely to be present in these systems. v. The statement "BLM (2010) indicates that the West Fork Chandalar River downstream from the Project crossing has critical overwintering habitat during the summer from May through October…" likely should read "rearing habitat" rather than "overwintering." Provide a citation for the overwintering study. w. Correct the text that states Minnie and Marion creeks are south of Slate Creek. At AMP 232.1 and 239.5, respectively, both are north of Slate Creek (AMP 244). x. Add a citation to the sentence in the last paragraph of the Tanana River Basin section stating that Barry Creek has suitable overwintering fish habitat, although no fish were observed during the survey.	
3-11.	3-6	The RR appears to confuse Bering cisco with Arctic cisco. A relatively small-scale commercial fishery in the lower Yukon River has only developed in recent years. Non-spawning Bering cisco occur along the coasts, but this species only spawns in the Yukon, Kuskokwim, and Susitna rivers. Mecklenburg et al. (2002) does not mention where fish spawn, so it is not certain where the	BLM, FWS

		statement about spawning came from. Also, spawning migrations extend into the upper reaches of larger rivers that drain into the Beaufort Sea and the upper Yukon River.	
3-12.	3-15	The text states that the northern pike occur in "all major drainage basins." Does "all" refer to the North Slope as well?	FWS
3-13.	3-18	Explain how the first sentence "The PT Pipeline will also affect lakes and ponds along the Beaufort Coastal Plain, although it avoids most of the deeper and larger ponds and lakes" ties in with the rest of the paragraph. Clarify the anticipated project impacts on shallow-lake and deepwater lake fish.	BLM
3-14.	3-21	The Chena River is the second largest producer of Chinook salmon in the U.S. waters of the Yukon River, behind the Salcha River, and is listed as being crossed by the pipeline in appendix 3A. Therefore, add the Chena River as an important waterbody to be crossed and include it in the applicable fisheries impacts discussion. For example, The text in the 4th paragraph of the Tanana River Basin section states: "Chinook salmon arrive in the Tanana River as far as Fairbanks and areas upstream in early July, and are known to spawn in the Salcha River (AMP 502.0)." Add the Chena River (AMP 474.8) to this sentence.	BLM, FWS
3-15.	3-22	The Goodpaster and Clearwater Creek drainages provide high-value Chinook salmon habitat.	FWS
3-16.	3-22	Depending on the context, the fisheries of the Little Salcha and Salcha Rivers, and those in Redmond and Shaw Creek may not be "extensive." There are no commercial fisheries in the Salcha River basin.	FWS
3-17.	3-23	Revise the last paragraph to read: "Table 3.5.2-1 identifies fish species the BLM has listed as sensitive on BLM-managed land or that are on BLM's 'watch' list. The 'watch' list is formed during the sensitive species selection process. This list covers species for which data are insufficient to satisfy BLM's sensitive species eligibility criteria, but data indicate a need to re-evaluate their status in the future. These species are thus termed 'watch species,' as they may warrant additional data collection to more accurately determine their status."	BLM
3-18.	3-23	Provide information on whether the Alaskan brook lamprey is found at any	FERC

		stream crossings.	
3-19.	3-24	Regarding table 3.2.1-3: a. The document presents chum salmon in Clear Creek of the Tanana River drainage basin as a BLM Sensitive and Watch List Fish Species on BLM-Managed Lands. A telephone conversation with a local BLM fisheries biologist clarified that this listing is for chum salmon in Clear Creek of the Hogatza/Koyukuk River, not the Tanana River drainage basin (Bob Karlen, BLM, pers. comm.). b. For the statement "Not Present: Clear Creek is in the Tanana River drainage basin; however the Project does not cross the Clear Creek watershed," replace "Tanana" with "Koyukuk."	FWS, BLM
3-20.	3-25	Define "major" as used in the first paragraph of section 3.2.2.2. Add a discussion of marine aquatic inverts such as shellfish and other crustaceans.	FWS
3-21.	3-27	Verify that Pacific salmon species are the only freshwater inhabitants in Alaska covered by a Fishery Management Plan.	BLM
3-22.	3-27, -39	Complete the impacts analysis for marine and freshwater EFH, including proposed conservation measures. The applicant-prepared EFH Assessment should be filed as a Public document rather than Privileged. Those sections of RR 3 that contain the same information as the EFH Assessment may reference appendix 3B instead of repeating the information multiple times.	FERC, NMFS, OFC
3-23.	3-27, -40	Provide an analysis of offshore impacts on fish and fish habitat from noise and dredging associated with dock modifications at West Dock. Be sure to refer to the following reference: Normandeau Associates, Inc. February 2012. *Effects of Noise on Fish, Fisheries, and Invertebrates in the U.S. Atlantic and Arctic from Energy Industry Sound-Generating Activities.* A Literature Synthesis for the U.S. Department of the Interior, Bureau of Ocean Energy Management. Contract # M11PC00031. 153 pp. http://www.data.boem.gov/homepg/data	FERC, NMFS

		center/other/espis/espismaster.asp?appid=1	
3-24.	3-31	Would TC Alaska be required to adhere to any in-water seasonal work limits for protection of sensitive aquatic resources such as anadromous fish species, spawning runs, EFH, etc.? If so, please provide this information.	USCG
3-25.	3-31	Wetland Crossing Maps, MPs 49-50, indicate a crossing through the middle of known anadromous broad whitefish wintering habitat on the west channel of the Sagavanirktok River, both upstream and downstream from the bridge. The FWS recommends avoiding this sensitive habitat location altogether. If TC Alaska believes this location must be crossed by the project, assess the construction and operation impacts on this area and discuss measures that would minimize these impacts.	FWS
3-26.	3-31	When assessing construction and operation impacts on fishery resources, describe which aspect of fish life history (e.g., spawning, migration, overwintering) could be impacted.	FWS
3-27.	3-31	Evaluate the potential impacts on fisheries resources of the Put River as a result of water withdrawals for the GTP reservoir, and give consideration to scheduling water withdrawals in a manner that would avoid and minimize impacts on these fisheries resources.	EPA
3-28.	3-32	Add a list of mitigation measures TC Alaska proposes to use for each potential impact on fish and aquatic habitat resulting from construction and operations.	FERC
3-29.	3-32	The text states that "APP will consult…" and that "APP will work with these agencies…" to develop waterbody crossing and mitigation plans for sensitive waterbodies. Provide these plans. (TC Alaska should have already developed such plans in consultation with the agencies).	FERC, FWS
3-30.	3-34	Provide the referenced engineering designs for frost bulb mitigation.	FERC
3-31.		Provide a discussion of potential impacts on fish or fisheries (including substrate and habitat) associated with permanent operations, including accidental spills and releases, and possible pipeline ruptures near/in a stream crossing.	BLM
3-32.	3-35	The text states: "These streams in this area will be crossed in winter, as	BLM

		described in Section 3.2.1.3, when the fish are expected to have vacated to overwintering habitats." Discuss any anticipated impacts to eggs/fry in these streams, as applicable.	
3-33.	3-39	TC Alaska should not assume that there are no aquatic invasive species in the project area. There are invasive aquatic species in the project area, such as *Elodea*, in the Chena and Tanana drainages, and *Didymo* diatoms in the Tanana and Yukon Rivers and Cripple and Caribou Creeks, that could easily be spread to other places within the project area (personal communication with Daniel Rinella, Aquatic Ecologist, UAA). Provide the measures TC Alaska would use to prevent the accidental introduction of an invasive species from one waterbody to another.	FWS
3-34.	3-40	Provide mapping (1:24,000 scale**)** of vegetation types/habitats/communities potentially affected by the project. Include all project components (including the pipeline, aboveground facilities, and all associated infrastructure, including access roads).	FERC
3-35.	3-39, 3-52	Add a discussion about preventing the introduction of any noxious or invasive species into the project area. Non-native plants are well documented along the Dalton Highway. Invasive plants are frequently found in disturbed sites (gravel pits, road side ditches, and construction and revegetation areas). Vectors (i.e., machinery) and preventative measures for spreading of invasive species to stream side habitat from this project's activities should be discussed. Update the impact analysis on invasive and noxious species. Include a detailed invasive species prevention and management plan that identifies: • invasive plants that could be found within the footprint of the project; • the methodology for surveying for invasive species prior to all ground disturbance; • measures to prevent introduction or spread of invasive species to construction and restoration; and • control measures to be utilized during operation.	BLM

		Provide the supplemental surveys for invasive plants and the updated impact analysis on invasive and noxious species.	
3-36.	3-47 – 3-48	Provide the vegetation mapping supplemental data collected during the 2011 field season. Ensure that the supplemental upland data points and existing data sets are used to spot check and refine vegetation classification mapping.	FERC
3-37.	3-49	Surveys for rare plants were not conducted over the entire ROW. Complete surveys for the area of project disturbance if habitat exists for any rare species. Include updated consultations with the BLM concerning sensitive plant species. Alternately, if surveys are not to be conducted, provide a detailed rationale for this, including the applicable consultation with the appropriate federal/state agencies.	FERC
3-38.	3-49	Describe plant species (by MP) with commercial, recreational, or aesthetic value.	FERC
3-39.	3-51; Appendix 3C	Expand the discussion of direct and indirect impacts of construction. Provide acreages of vegetation types affected by construction, including a distinction between permanent and temporary impacts. Include in this discussion: • nearshore habitats; • rare, unique, sensitive, significant, or protected habitats/ecosystems/communities/individual trees or other plants or species by MP (including length and width of crossings); • a discussion of the possibility of a major alteration to ecosystems or biodiversity. Provide information (e.g., within a table) on the revegetation potential along the entire right-of-way and other areas of temporary disturbance (access roads, borrow pits, camps, etc). Describe direct and indirect impacts of project operations on vegetation. Provide acreages of vegetation types affected by operation, and any mitigation	FERC, OFC

		measures proposed to avoid or reduce impacts. Describe mitigation proposed to avoid or minimize impact on significant/ sensitive/unique plant resources. Provide copies of correspondence and/or consultation with the applicable federal and state concerning their recommendations to avoid or limit impact on vegetation and any special mitigation or restoration measures they may have suggested. With any measures presented in this correspondence, confirm if TC Alaska would adopt. Note that this information should be included for all associated infrastructure and aboveground facilities, e.g., access roads, compressor stations, meter stations, staging areas, laydown areas, West Dock (including new or expanded access roads), disposal areas, GTP water reservoir and transfer line, additional temporary work space, construction camps, storage yards, borrow pits, helipads, and airstrips.	
3-40.	3-51	Provide a detailed description (by vegetation type, as appropriate) of what TC Alaska would do with vegetation cleared from any project disturbed areas. Ensure that this description details methods TC Alaska would utilize so that vegetation cleared would not be stacked in a manner that would create a barrier to wildlife.	FERC
3-41.	3-52	The FWS does not concur with the assertion regarding fragmentation. The natural landscape to be crossed by the Point Thomson portion of the project is largely unfragmented, and this project would introduce the first permanent infrastructure that would fragment this portion of the Arctic Coastal Plain. The natural landscape to be crossed by the mainline portion of the project is minimally fragmented, and keeping the ROW and infrastructure within already fragmented areas is desirable.	FWS
3-42.	3-52	Discuss impacts on plant species outside of the construction right-of-way from edge-induced effects created by fragmentation. It has been shown in forested areas that edge effects can be realized as far as 300 feet from clearing, and in some cases even more.	FERC

3-43.	3-61, -116	The applicant-prepared BA should be filed as a Public document rather than Privileged. Those sections of RR 3 that contain the same information as the BA may reference appendix 3D instead of repeating the information multiple times. Additionally, information on marine mammal species not listed as threatened or endangered under the Endangered Species Act (ESA) should not be included in the BA.	FERC, NMFS
3-44.	3-61	Section 3.4.2.1 contains the wrong MMPA definition of "take." The definition provided is the regulatory, not statutory, definition. Revise the sentence to read as follows: "Under the MMPA, take is defined as 'to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.'"	NMFS
3-45.	3-61	Provide results of consultation with the Alaska Eskimo Commission and Native groups that conduct subsistence hunting on MMPA species.	FERC
3-46.	3-61, -64	Table 3.4.2-1 and the spotted seal description incorrectly describe the status of the spotted seal. On October 20, 2009, NMFS published a proposed rule to list the southern distinct population segment of the spotted seal as threatened under the ESA (74 FR 53683). At that time, NMFS also determined that it was unnecessary to list the Okhotsk and Bering Sea distinct population segments as threatened or endangered under the ESA. Although the U.S. stock is not listed under the ESA, add this information to accurately reflect NMFS' determination.	NMFS
3-47.	3-62	The beluga whale description does not list the correct population estimate for the Beaufort Sea stock. Angliss and Allen note a population estimate of 39,258 individuals. Additionally, although unlikely, there is the potential for individuals from the eastern Chukchi Sea stock of beluga whales to occur in the area.	NMFS
3-48.	3-67 – 3-70	Update the following regarding caribou herds: a. In figure 3.4-1 and table 3.4-1 cite the sources and dates of the caribou herd	FERC, BLM

		ranges depicted/listed and disclose whether they are winter, summer, or year-long ranges. b. Add the Hodzana Caribou Herd range to figure 3.4-1 and discuss in the corresponding text. The Alaska Mainline would likely go through the herd's range. c. Include a recent population estimate that is available for the Western Arctic Caribou Herd. d. Move the discussion of the Macomb and Nelchina Caribou Herds out of the "Other Caribou Herds" section since, according to figure 3.4-1, the Alaska Mainline would run right through their ranges. The BLM suggests that the "Other" section be used only for peripheral herds. e. Provide MP information for the Central Arctic and Macomb caribou herds important habitat areas (e.g., calving areas, migration areas, winter concentration areas). f. Expand the write-up of the Nelchina Caribou Herd whose range crosses the proposed route from about MP 600-745. Provide verification or updates of MP information for this herd. The information provided is from mapped data (done for the renewal of TAPS) that is at least 10 years old.	
3-49.	3-71 – 3-90	Provide MP information for the following: • moose winter and calving concentration areas; • Dall sheep lambing and mineral licks areas; • areas known to be suitable for brown bear and American black bear dens; • American bison calving and major movement areas; • gray wolf den site areas; • trumpeter swan, goose, duck, and shorebird nesting and/or spring and fall concentration areas; and • sharp-tailed grouse lek areas.	FERC, BLM
3-50.	3-72	In the second paragraph, cite more recent moose density estimates from the 2008 ADFG moose report.	BLM
3-51.	3-73	In the last paragraph, cite more recent (2004 and 2009) Central Brooks Range sheep census from ADFG sheep biologist Steve Arthur.	BLM

3-52.	3-74	The BLM 1989 citation for Brooks Range grizzly bear populations is outdated and may not be accurate. Check with the ADFG for more recent (2009) population estimates and update the text, citing the ADFG data.	BLM
3-53.	3-78	The currently available information regarding the location of eagle nests is not sufficient for the Bald and Golden Eagle Protection Act (BGEPA) take permit process. Surveys for eagle nests would need to be conducted in the spring prior to work on each construction spread so that the location of each nest can be accurately identified.	FWS
3-54.	3-78	If the FWS is to utilize the FERC EIS for eagle permitting purposes, the cumulative effects analyses must be conducted at two distinct spatial scales, the eagle management unit scale and the local eagle population scale, for each eagle species. Information about eagle management units and local area populations can be found in the Service's *Final Environmental Assessment, Proposal to Permit as Provided Under the Bald and Golden Eagle Protection Act*, at http://wwwfws.gov/migratorybirds/baldeagle.htm.	FWS
3-55.	3-85	Specifically mention golden eagles in the Brooks Range Ecoregion Bird section due to the high habitat quality present and the take prohibitions in FWS regulations.	BLM
3-56.	3-90 – 3-93	Our NEPA analysis must contain sufficient raptor species and nest location information for us to assess impacts and evaluate compliance with the Migratory Bird Treaty Act (MBTA); thus, the filing must contain adequate project-specific data. However, it appears that TC Alaska is relying on historical data and general agency-conducted surveys (some of which have not been completed) for raptors, rather than project-specific surveys. Further, no survey information was provided for tree-nesting owls, snowy owls, short-eared owls, merlins, American kestrels, and northern harriers. Provide confirmation from the FWS that the above approach is sufficient to address and mitigate for project impacts on raptors in compliance with the MBTA. Alternately, ensure that all necessary surveys are conducted in 2012 for inclusion in the application filing.	FERC

3-57.	3-90	The BLM Central Yukon Field Office has conducted more recent (2010) raptor surveys than what is cited for the Dalton Highway management unit (2003). Update the section with the more recently available data.	BLM
3-58.	3-90	Clarify what raptor survey results were used to for the project areas between Fox and Eielson AFB (the 40 miles between E456-E495), and the area east of Delta Junction, the Non-TAPS area of the project. Whereas the area along the Alaska Highway has probably had a variety of survey work done, it is less clear if the 40 miles between Fox and Eielson has had any.	FWS
3-59.	3-91; Appendix 3E	Provide appendix 3E (raptor nest mapping). Raptor maps and/or data tables should provide species name, nest location, any required nesting season avoidance dates, and any required avoidance buffer zone (radius) and its intersection with the pipeline ROWs. RR text discussion should clearly state how TC Alaska would adhere to the appropriate timing and distance restrictions for active nests.	FERC
3-60.	3-91	Inclusion of BLM raptor survey data may alter the number of nests displayed in table 3.4.3-3 and subsequent discussions of MP breakdowns. Provide the data source(s) for the table.	BLM
3-61.	3-93	Additional trumpeter swan data may be available from the BLM Glennallen Field Office. Add if available. Also include trumpeter swan data from the Tetlin National Wildlife Refuge; they have a long dataset of swan occupancy and productivity.	BLM
3-62.	3-95, -114; Appendix 3F	Page 3-114 states that the Migratory Bird Conservation Plan "would be developed prior to construction and…would address avian issues associated with the MBTA, BGEPA, the ESA, and other avian management and habitat issues." However, our NEPA analysis must contain our assessment and conclusions regarding the project's potential impacts on these species and issues. Therefore, the application must include TC Alaska's evaluation of MBTA impacts and an FWS-approved draft Migratory Bird Conservation Plan.	FERC, FWS
3-63.	3-95	In the description, explicitly state whether or not the wood frog is present in the project area.	BLM
3-64.	3-97	The "Watch List" birds identified in table 3.4.6-2 are not correct; refer to the	BLM

		BLM policy for the correct list.	
3-65.	3-98	The scenic values and natural values of the Galbraith Lake Outstanding Natural Area (ONA) have recently been severely compromised by a new material site that, from the FWS' perspective, was poorly planned and lacked sufficient public and agency review. Use of borrow sites in this area should be very carefully planned and be in keeping with the intent of the ONA designation for the Galbraith Lake area.	FWS
3-66.	3-100	Identify which aspects of the project would be within 0.25 mile of ANWR, e.g., compressor station(s), pipeline, etc.?	OFC
3-67.	3-100	Discuss how TC Alaska would comply with any BLM requirements (e.g., special mitigation plans or protective stipulations) regarding the following designated Areas of Critical Environmental Concern (ACEC): the Toolik Lake Research Natural Area and the Galbraith Lake ONA.	FERC
3-68.	3-103	Throughout section 3.4.7.2, discuss potential mitigation measures that would be used to minimize wildlife mortality. An oft-repeated statement is made that the applicant will work with appropriate agencies to establish and implement appropriate mitigation measures. Provide examples of such measures.	FERC
3-69.	3-103 – 3-104	Provide quantification of potential habitat loss and modification (and percentage of existing habitat throughout the study area) for major wildlife species addressed in section 3.4.7.2. Provide a more complete discussion of potential <u>operational</u> impacts on wildlife. Expand the discussion of operational impact on caribou (such as from periodic flyover inspection activity, an issue raised during scoping), with citations.	FERC
3-70.	3-103	The Central Arctic Caribou Herd may not be the only caribou herd potentially affected by the proposed action. Address any herd whose range is bisected by the pipeline (as shown in figure 3.4-1). For example, include a discussion of the Teshekpuk Caribou Herd, Western Arctic Caribou Herd, Nelchina Caribou Herd, and possibly the Forty-mile Caribou Herd, since the proposed action is within the range extent of these herds.	BLM
3-71.	3-103	Include the potential impacts on caribou from the construction of the GTP,	OFC

		mining at Put 23, reservoir construction and operation, construction and operation of the water line, and the VSMs between the GTP and the CGF.	
3-72.	3-116	In section 3.5.1, present results of surveys for threatened and endangered species (those species listed in table 3.5-1). Requested information includes but is not limited to: • name(s) and qualifications of person(s) conducting survey; • methods and dates of the survey; • areas surveyed, including MP locations along the pipeline routes; • areas where species or potential habitats were located, including MP locations along the pipeline routes; • potential impact on the species or habitat, both positive and negative, that could result from construction and operation of the project; and • proposed mitigation that would avoid or minimize potential negative impact.	FERC
3-73.	3-116	In section 3.5.1, provide additional data regarding the locations of known or potential habitats for threatened and endangered species (those species listed in table 3.5-1), particularly those locations or habitats that may occur within the ROW and other affected areas. Describe the characteristics of the habitat in terms of quality and potential use by listed species. Spatial information that may be useful includes (but is not limited to) critical habitat boundaries, aerial surveys, nesting densities, telemetry observations, potentially suitable habitat (i.e., GAP models), and recorded incidental observations. Data used in the Point Thomson draft EIS would be useful, as well as any additional site-specific data within the affected project area.	FERC
3-74.	3-116	Marine barge/vessel traffic may result in potential conflicts with threatened and/or endangered marine mammals and their migration patterns and routes. Identify the Alaska port(s) of entry that would be used to bring in modules, pipeline supplies and materials/equipment for the construction of the project and describe the vessel/barge class(es), size(s), and draft(s), number, and frequency	EPA

		of the marine barge/vessel traffic into and out of these ports of entry in order to ensure that impacts on marine and nearshore habitats are fully assessed. Describe the barge/vessel traffic schedule, patterns and marine transportation routes, as well as the migration period, patterns, and routes of potentially affected marine mammals, such as bowhead whales on the North Slope, and Beluga Whales in Cook Inlet. The direct, indirect, and cumulative impacts from barge/vessel traffic on marine mammals, threatened and endangered species, and critical habitats should be analyzed.	
3-75.	3-117	Provide MP information for polar bear confirmed and potential coastal denning areas.	FERC
3-76.	3-127	Provide an explanation as to why range maps are present for the Steller's and spectacled eiders, but habitat or range maps for the other species are not included in the section. These maps are helpful and should be provided where available. For example, the FWS published the polar bear range map with the latest rule.	OFC
3-77.	3-127	A 2006 survey estimated a minimum population size for Pacific walrus of 129,000 (FWS 2010). Citations: • FWS (2010) Pacific walrus (*Odobenus rosmarus divergens*); • Alaska marine mammal stock assessments, 2009. NMFS technical memorandum NMFS-AFSC-206; and • http://alaska.fws.gov/fisheries/mmm/walrus/reports.htm.	FWS
3-78.	3-134	In section 3.5.3, provide more detailed information regarding impacts from construction and operations. For example, what assumptions are used to determine the level of vehicle and vessel traffic that might influence the risk of collision-related mortality? Reference survey data for listed and sensitive species to support these impact evaluations. Consider indirect impacts in greater detail, such as those related to fugitive dust generation and the facilitated spread of diseases, predators, and invasive species.	FERC
3-79.	3-134	In section 3.5.3, provide discussion of impacts of construction and operation noise on special status species. Draft RR 3 mentions that these impacts would	FERC

		be evaluated prior to construction; however, this information is needed at the time of filing for our NEPA analysis and to assist us in ESA consultation with the FWS/NMFS.	
3-80.	3-134	Clearly identify potential avoidance, minimization, and mitigation measures for each impacting factor on a special status species. Provide a table or bulleted list of proposed measures for species and their habitats.	FERC
3-81.	3-135	Replace the word "hazing" with "deterrence."	FWS
3-82.	3-136	Provide the referenced "Polar Bear and Wildlife Interaction Plan."	FERC
3-83.	3-137 – 3-138	Include the potential impacts that may result on ringed seals from ice road construction in section 3.5.3.3. When considering the activities that may occur, if ice roads will be constructed at a time of year when ringed seals are inside their subnivean lairs, consideration must be given as to whether or not individuals could be crushed beneath the ice.	NMFS
3-84.	3-138, -140	From the description of GTP construction provided in draft RR 1, it is difficult to tell if the entire footprint will be disturbed prior to the summer. In order to minimize impacts on the spectacled eider and Steller's eider, include a discussion of specific timing windows so that the site will not be disturbed during sensitive times. Also, provide a map for the entire route showing which spreads will be constructed in the winter and summer.	OFC
3-85.	Appendix 3A; Table 3A-1	Add information about fisheries issues for each water body crossing as directed in table 3.1-*2 of the FERC Guidance Manual for Environmental Report Preparation*. This would include identification of whether: • protected species (state or Federal) are present; • significant recreational fisheries, commercial fisheries, or subsistence fisheries would be supported. (The current draft RR 3 identifies whether a given fish species is present, but not whether a fishery exists); • the affected portion of the stream is a primary fish migration route; and • spawning habitat occurs at or near the crossing. TC Alaska states that it will consult with the BLM and ADFG to determine	FERC

		which streams crossings contain BLM sensitive species and sensitive fishery habitat (pages 3-23 and 3-32). It appears that TC Alaska has surveyed stream crossings for fish habitat; however, the field survey report has not yet been provided. Therefore, we cannot confirm at this time whether the forthcoming information will be sufficient.	
3-86.	Appendix 3A	For the critical summer and winter habitat column in table 3A-1, use "N" for those streams not designated as such by BLM (2010), and "Unknown" or "No Data" for those streams not covered by BLM (2010).	FERC
3-87.	Appendix 3A	Provide information on the methods used in the 2010 TC Alaska fishery field survey of stream crossings, including the use of any protocols developed in consultations with agencies.	FERC
3-88.	Appendix 1L	Update appendix 1L to ensure that <u>all</u> concurrence letters and other correspondence between TC Alaska and FWS/NMFS are filed.	FERC
3-89.	Table 3C-3	Include the Brackish Water Aquatic Herbaceous cover type if encountered near the coastline.	FWS

Comment Number	RR Location Reference	Comments on Draft RR 4 – Cultural Resources	Source
		NOTE REGARDING CULTURAL RESOURCES: All material filed with the Commission containing **location, character, and ownership** information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: **"CONTAINS PRIVILEGED INFORMATION--DO NOT RELEASE."**	
4-1.	General	Draft RR 4 indicates that to date, 2010 field surveys (Phase I survey summary report provided with draft RR 4) have only covered 122 miles of the current Alaska Mainline route and 49 miles of the Point Thomson route, and 2011 field surveys (no report provided with draft RR 4) have only covered an additional 380 miles of the Alaska Mainline route. a. Please explain/clarify how TC Alaska intends to complete identification-level surveys and full reports (not "summary" reports) for the entire Point Thomson and Alaska Mainline project routes, and ancillary facilities/areas (excluding those areas where access has been denied) by its filing deadline of October 2012. b. Provide the report(s) and the State Historic Preservation Office's (SHPO), BLM's, and other appropriate land-managing agencies' comments on the report(s). c. If survey report(s) for the entire pipeline routes and ancillary facilities/areas (excluding those areas where access has been denied) are not filed with the application, the application does not meet the minimum filing requirements [see 18 CFR Part 380.12(f)(1)(ii) and 380.12(f)(2)] and will be subject to rejection [see 18 CFR Part 380.12(a)(3)].	FERC
4-2.	General	Provide an understanding of where sites are located relative to the planned facilities, what kind of sites they include, how much testing they were subjected to, an indication of significance, and the need for site avoidance or mitigation.	BLM

		Address the potential need for mitigation.	
4-3.	General	Provide a visuals/viewshed/landscape identification and impacts assessment. This may be included as part of the survey report.	FERC
4-4.	General	Draft RR 4 and the survey summary report (appendix 4D) do not discuss survey of project access roads. These must be included in the project's area of potential effects (APE) and surveyed. Provide the report and the SHPO's and land-managing agencies' (as appropriate) comments on the report.	FERC
4-5.	General	Address marine underwater cultural resources such as the potential for shipwrecks or other sites of significance to Alaska Native Organizations. Consult the SHPO regarding the need for surveys for the dredging area and dock modifications. Provide the SHPO's comments, any related report required by the SHPO, and the SHPO's comments on the report.	FERC, EPA
4-6.	General	Draft RR 4 and the survey summary report do not address the potential for deeply buried deposits and the possible need for deep testing. Please discuss this in a revised draft RR 4 and the survey report.	FERC
4-7.	General	Verify that TC Alaska would avoid sites CHN-00007, CHN-00018, and XBP-00020, as recommended in the survey summary report.	FERC
4-8.	General	Please ensure that any Alaska Native tribe requesting additional information and/or copies of report(s) is provided with such. Additionally, provide any resulting comments on the information/report(s).	FERC
4-9.	General	Provide full-size project alignment sheets (similar to those found in appendix 1O) with cultural resources information superimposed (i.e., areas surveyed including pipeline corridors, access roads, extra work areas, staging/storage areas, contractor yards, borrow pits, work camps, etc.; and resources identified, with eligibility status, where available).	FERC
4-10.	4-4	Regarding section 4.2.1, provide all previously unfiled correspondence (and all documentation of consultation) to and from the SHPO, including the SHPO's June 17, 2010 letter/permit, the SHPO's response to TC Alaska's August 31, 2011 request to initiate consultation, and the SHPO's comments on the survey report(s).	FERC

4-11.	4-4	Delete the text following "underway" (lines 8-11).	FERC
4-12.	4-5	Regarding section 4.3.1, provide all previously unfiled correspondence (and all documentation of consultation) to and from the BLM, including the BLM's June 18, 2010 letter/permit, the BLM's response to TC Alaska's August 31, 2011 request to initiate consultation, and the BLM's comments on the survey report(s).	FERC
4-13.	4-6	Section 4.3.1 provides no documentation of contact or consultation with other involved agencies regarding cultural resources. Provide all documentation of consultation with the FWS, Department of Defense, Air Force, Army, COE, Bureau of Indian Affairs, USCG, and any other applicable state and federal agencies (e.g., DOT, NMFS). Identify in a table, by MP segment, where each land jurisdiction would be crossed and if any cultural resources/issues have been identified to date.	FERC
4-14.	4-5 – 4-6	The term "Consultations with Federal Land Managing Agencies" is used. Revise the text to refer to these as "meetings."	BLM
4-15.	4-6	Include the following information in the ethnographic/traditional cultural knowledge studies and summarize non-confidential information in RR 4. Evaluate the historic extent and condition of the environment to adequately address impacts to cultural resources of concern to tribal governments. Potential impacts to resources of concern to the tribes may include, but are not limited to, impacts to cultural resource areas, archaeological sites, traditional cultural properties of landscapes, sacred sites, and environments with cultural resources significance. Disclose the Native Alaskan historical and traditional significance of the project area, the importance of ethno-botany, hunting, fishing, and gathering uses of the area by Alaska Natives, any long term traditional ecological management of the area, and any significant historical events (e.g., tribal wars, establishment of trade routes, etc.) that took place there. The tribal government(s) must be specifically engaged and consulted with in accordance with Section 106 of the NHPA. The scope of impacts on these resources should include the direct, indirect, and	EPA

		cumulative impacts on: • sacred sites; • traditional cultural properties or landscapes; • hunting, fishing, gathering areas (including impacts to ecosystems that support animals and plants that are or once were part of the Tribes and tribal descendants traditional resource areas); • access to traditional and current hunting, fishing and gathering areas and species; • changes in hydrology or ecological composition of springs, seeps, wetlands and streams, that could be considered sacred or have traditional resource use associations; • travel routes that were historically used, and travel routes that may be currently used; and • historic properties, districts or landscapes.	
4-16.	4-6	Section 4.4 states that tribal groups were identified based on discussions with the SHPO and BLM; however, no details of these discussions are provided indicating how these decisions were made. Provide any meeting summaries and phone call summaries, and all written correspondence with the various agencies discussing which native groups were to be consulted.	FERC
4-17.	4-6 – 4-7	Section 4.4 discusses consultation with Alaska Native organizations and groups. However, TC Alaska provided only an initial consultation letter to 16 Alaska Native tribes (dated September 15, 2011, contained in appendix 1L) and no responses. Therefore: a. Describe TC Alaska's follow-up and continuing efforts regarding consultation with Alaska Native tribes, groups, and organizations. b. Provide all previously unfiled documentation (letters, meeting notes, phone logs, etc.). c. Based on TC Alaska's conducted and continuing outreach, include cultural resources issues identified to date and what steps are being taken to address them.	FERC
4-18.	4-7	Section 4.5 states that "no local historical groups or county/borough entities have been identified that warrant consultations for cultural resources concerns."	FERC

		Provide a discussion of the organizations that were considered for consultation and the process employed to determine that the groups did not warrant consultation. Provide all documentation concerning discussions/consultations with "other interested parties."	
4-19.	4-7	Section 4.6 states that the results of the 2001 Alaska Gas Pipeline Producers Team archaeological sensitivity model were applied to determine areas of high and low archaeological sensitivity for the project. Provide a copy of this model.	FERC
4-20.	4-7	Provide documentation of the approval of TC Alaska's survey methodology (stratified sensitivity model) by the SHPO, BLM, and other appropriate land-managing agencies. If the sensitivity model has been previously approved (since it is based on earlier studies), provide copies of those approval(s).	FERC
4-21.	4-7	Section 4.6 states that the corridor was stratified into areas of Type A and B sensitivity. Provide a discussion summarizing the distribution of Type A and B by MP.	FERC
4-22.	4-7	Section 4.6 indicates a 100- to 800-meter-wide corridor was surveyed. The survey summary report indicates a 100- to 200-meter-wide corridor was surveyed (p.32). Please clarify this discrepancy. Also identify and include a discussion of the APE for indirect effects in this section.	FERC
4-23.	4-8	Section 4.7 states that summaries of existing surveys are provided in appendix 4D. a. Provide all previous surveys that are being relied upon for archaeological survey coverage, not just summaries. b. Provide documentation of SHPO, BLM, and other appropriate land-managing agencies' concurrence with the findings of the previous surveys. c. Provide a discussion of any mitigation or future research required as a result of the previous surveys.	FERC
4-24.	4-8 – 4-9	Section 4.7 indicates that four sites were identified along the planned Point Thomson Pipeline route, and 150 along the Alaska Mainline route. Table 4C-1 (appendix 4C) identifies only 1 site along the Point Thomson route, and 121 along the Alaska Mainline. Please clarify these discrepancies.	FERC
4-25.	4-9	Summarize the survey coverage referenced in section 4.7.	FERC

		a. Include how many miles of ROW were physically examined during the 2010-2011 surveys. b. Quantify survey coverage in the APE (e.g., number of miles flown by MP, number of miles examined by previous surveys, amount of the previous survey that involved on the ground inspection vs. aerial flights). c. Also include locations of shovel testing by MP. Tables may be used, as necessary. Include this information in the survey report.	
4-26.	4-9	Section 4.8 indicates that 109 miles of the Alaska Mainline route were examined by desktop review. Please clarify if TC Alaska is intending the desktop review to serve in lieu of field surveys. If so, provide documentation of acceptance of this method from the SHPO, BLM, and other appropriate land-managing agencies.	FERC
4-27.	4-10	Please clarify if "restricted access" referenced in section 4.8 is the same as "denied access." Describe TC Alaska's efforts to gain survey access to denied-access areas. Provide a table, by MP, of areas where access has been denied by the landowner. Also identify the land jurisdiction (e.g., private, state, etc.).	FERC
4-28.	4-10	Update and revise table 4.8-1 to specifically identify how many miles (by specific MP) were covered by desktop, Type A, and/or Type B surveys. Provide a similar table for the 2011 surveys.	FERC
4-29.	4-10	Provide the unanticipated discovery plan to the FERC, BLM, SHPO, and other appropriate land-managing agencies.	FERC, BLM
4-30.	4-11	The Advisory Council on Historic Preservation (ACHP) requests that TC Alaska list the tribes involved in ethnographic/traditional cultural knowledge studies and describe the protocols for participation in those studies. Clarify the ways in which those studies provide the tribes the opportunity to communicate to FERC their concerns about properties of religious and cultural significance, such as landscapes, traditional cultural properties, sacred sites, and other locations of significance that might be directly or indirectly affected by the undertaking.	ACHP
4-31.	4-11	Provide the Ethnographic Report (including traditional cultural properties identification/evaluation). Ensure that Pump Station Hill is addressed, assessed,	FERC

		and any necessary mitigation measures proposed.	
4-32.	Appendix 4A	Include actions to be taken under the plan for unanticipated discoveries, which could include human remains.	BLM
4-33.	Appendix 4C	Table 4C-1 identifies the National Register of Historic Places (NRHP)-eligible Tanana Valley Railroad and NRHP-listed Davidson Ditch along the Alaska Mainline route. Please verify that TC Alaska would avoid these sites by boring/drilling. Also, please clarify what "No 2010 survey" means.	FERC
The following comments pertain to appendix D (2010 Phase I Survey Report).			
4-34.	Survey Summary Report	Ensure that the next draft and any further reports submitted comport with the FERC's *Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects* (2002).	FERC
4-35.	General	Individual site descriptions need to be provided in the text of the report.	FERC
4-36.	General	Provide a table (by MP) of what was surveyed by what method (Type A [specify helicopter or vehicular] and/or Type B).	FERC
	General	Please indicate the survey corridor configuration (centered on the proposed centerlines, or off-set). If off-set, indicate the widths surveyed on either side of the pipeline centerlines by MP segment.	FERC
4-37.	General	Include the total acreage surveyed.	FERC
4-38.	D-1	In section 1, the APE is not defined nor discussed in detail. Also, no corroboration from the SHPO or federal and state land managing agencies on the boundaries of the APE is demonstrated in the report. Provide a detailed written description and maps clearly identifying all portions of the APE for both direct and indirect effects. Include documentation that the SHPO and land managers and state agencies concur with the APE.	FERC
4-39.	D-17	Previous surveys are acknowledged in section 4.1. However, it is unclear if the resources identified by these projects are within the current APE. Please clarify this. The NRHP eligibility status of these sites and the potential effects of the APP on these sites are also not clearly described. Please do so. a. Integrate the information from these surveys into the current report along	FERC

		with site descriptions and NRHP status of these resources. b. Identify what additional research is needed to assess the effect of the current project on the resources that were previously identified. c. Identify the effect of the project on these resources.	
4-40.	D-17	The discussion of the 2001 survey in section 4.1.3 states that models were developed to aid in the surveys conducted for this previous project, but there is no detailed discussion of the contents of the models and how they were applied, nor is there a discussion of the effectiveness of the models or of the SHPO and federal land-managing agencies' approval of the models. a. Provide a detailed discussion of the contents and the application of the models being relied on for the surveys, along with any correspondence/comments from the SHPO and land managing agencies concerning the model. b. Provide maps showing the results of the model for the current APE. c. Identify areas that were not surveyed in 2001 due to access issues, and if any, indicate how these locations have been/will be addressed.	FERC
4-41.	D-19	The text in section 4.1.3 states that none of the 122 resources encountered by the 2001 survey were evaluated for NRHP eligibility. a. Provide plans for addressing this issue. b. Provide a detailed discussion of what sites are currently in the APE, and any updated NRHP status. c. Identify whether the sites have been or will be revisited.	FERC
4-42.	D-25	Section 5.1 indicates that helicopter overflights were used in conjunction with the models to determine archaeological sensitivity. Provide the criteria used during the overflights to help determine sensitivity. Provide a discussion of how this information from the overflights was recorded and synthesized into the model.	FERC
4-43.	D-25	Based on the discussion in section 5.1.1, it is unclear what was surveyed and what was not. a. Provide a detailed discussion, supplemented by tables, as necessary, of previously surveyed areas that were revisited.	FERC

		b. It is stated that "Previously surveyed routes where no or inadequate test methods may have been conducted and areas where site-potential exists" were surveyed. Indicate specifically how much of the APE falls into this category. c. Discuss how it was determined that previous surveys were inadequate, including the metric used. d. Provide MPs and distances for these areas that were resurveyed and complete descriptions of what was found.	
4-44.	D-26	Provide an explanation for why areas with high site densities would be avoided during surveys. These areas are of greatest concern for the APP as they have the highest potential for containing additional resources.	FERC
4-45.	D-29	Section 5.4 states that logs were kept of the results of pedestrian surveys. Provide summaries of the areas covered by pedestrian survey. Include total miles covered, MP information, and the positive and negative results. Use tables, as necessary.	FERC
4-46.	D-33	Clarify what is meant by "archaeologists pedestrian surveyed portions of this locale, but avoided the significant concentration of sites…" (i.e., did the archaeologists avoid the area, or is the APP avoiding the area)? If the archaeologists avoided this area, please explain why.	FERC
4-47.	D-36	Clarify what is meant by "used a helicopter…to bypass portions of the corridor…". Was this area aerially surveyed or actually "bypassed"? And if so, please explain why.	FERC
4-48.	D-37	Clarify why the Rosebud Knob District was avoided during the survey discussed in section 6.1.3. Clarify the number of sites found in the Rosebud Knob area that are in the APE and whether they are included in the list of sites noted as being in this segment. Identify the NRHP status of these sites and how many would be affected by the proposed project.	FERC
4-49.	D-38	Provide the borehole report referenced in section 6.1.5.	FERC
4-50.	D-47	In line 1 of section 8, delete "the SHPO with".	FERC
4-51.	D-47	The text of section 8 indicates that the report is intended to meet conditions	

		identified in the BLM and Alaska Office of Historic Archaeology permits. Provide the approved permits (if other than those requested above).	
4-52.	D-47	Section 8 indicates that only 122 miles of this survey addressed the current APE. Indicate how many sites (and which ones) from the 2010 survey are within the current project APE.	FERC
4-53.	D-49	Revise table 17 to include survey type (A, B, vehicular) by MP.	FERC
4-54.	Attachment B: Site Forms	In attachment B, Alaska Heritage Resource Survey Site Forms are provided for new sites only. Provide copies of the original site forms (and subsequent forms when revisited) for previously identified sites in the APE.	FERC
4-55.	Attachment C: Mapping	Ensure that survey coverage mapping included with the next draft report(s) submitted matches the planned APP routes/work areas, or clearly identifies the routes/areas surveyed in comparison to (vs.) the APP routes/areas. Revise the summary report mapping to reflect this. The maps also need to include MP (in 1-mile increments, or less to ensure that one reference MP is included on each page), the centerline, and match lines. Identify/differentiate 2010, 2011, 2012, and other (previous) survey areas.	FERC
4-56.	Attachment C: Mapping	Provide original page size (as stated in the key) 11 x 17 attachment C maps (as opposed to 8 ½ x 11).	FERC
4-57.	Attachment C: Mapping	Provide a more comparable scale map for the segment PA-A-01 map key (currently 1:301,300) as those provided for the other segments (e.g., 1:31,420, 1:40,430, 1:54,410, etc.).	FERC
4-58.	Attachment C: Mapping	Provide attachment C mapping for the Point Thomson Pipeline survey.	FERC

Comment Number	RR Location Reference	Comments on Draft RR 5 – Socioeconomics, Transportation, Environmental Justice, and Subsistence	Source
5-1.	General	Ensure that RR 5 fully describes the following: • existing conditions found within the transportation (and marine) corridors; • the "mixed, subsistence – markets" commonly found in the communities located within the pipeline corridor; • the existing conditions of the tourism and recreation components of the Alaskan and "inside pipeline corridor" communities economies; and • the existing cost-of-living within the "inside pipeline corridor" communities. (This description should identify the current prices of Alaska-specific goods and services, based on an appropriate "basket of consumer goods" typically used in estimation of the Consumer Price Index).	FERC, OFC
5-2.	General	Provide analyses of the potential impacts on demographics; economics; housing; infrastructure/transportation; public services; tax revenue; mixed, subsistence-markets; tourism/recreation; and cost-of-living resulting from construction and operation expenditures and activities. These analyses should also address potential cumulative impacts. Identify the measures TC Alaska would implement to avoid, minimize, and mitigate potential adverse socioeconomic impacts on a state and specific community level. (The information about impacts during each phase to the communities gets lost in the context of the entire census area or borough area. There will likely be certain communities that will see more of the population impacts than others and so while the impact may be low across a census area it does not seem reasonable to exclude the impacts on communities within a particular area that may see greater effects. This is a common theme throughout the document since community specific information along the pipeline corridor is not included.)	EPA, BLM, OFC
5-3.	5-3	Define the width of the "pipeline corridor" referred to throughout RR 5.	BLM

		a. Identify the facilities that would be located within the boundaries of Wainwright, Alaska. b. Confirm that all communities identified as "inside pipeline corridor" meet the definition provided in appendix 5-B. c. Provide a comprehensive list of communities "inside pipeline corridor."	
5-4.	5-3	Define the width of the "transportation corridors" referred to throughout RR 5. Also, identify and define "marine transportation corridors" and provide a list of communities located within the transportation and marine corridors.	FERC
5-5.	5-4	Clarify the terms "pipeline corridor," "inside pipeline corridor," "outside pipeline corridor," and "immediate region of influence" as they relate to socioeconomics and to each other. The terms appear to be used inconsistently and broadly.	BLM
5-6.	5-6	Thirty Alaskan stakeholders with experience and expertise in the state's leading industries and policy areas were interviewed. Provide information about this group, their background, and the interview questions. Indicate whether any of those interviewed were Alaska Native.	EPA
5-7.	5-6	Identify and provide the specific rationale for the REMI model assumptions not included in the set of model assumptions and reasonable foreseeable future actions summarized in appendix 5D.	FERC
5-8.	5-11	Within table 5.4.3-1 the numbers (from the State's Comprehensive Annual Financial Report) do not match the numbers in the Alaska Department of Revenue Fall 2011 Revenue Sources Book. For example, the table shows $105.9 million in 2010 revenue from non-petroleum taxes, while the department's fall 2011 report reports $293.7 million. The table says the state received $114 million from licenses and permits in 2010, but the Revenue Department's fall 2011 report puts that number at $43 million for the general fund (the account referenced in the table) and about $30 million in non-general fund revenue. Reconcile these apparent discrepancies.	OFC
5-9.	5-11	Table 5.4.3-1 excludes Alaska Permanent Fund earnings as a source of state revenue, but Table 5.4.3-2 counts Permanent Fund dividends as state expenses. The Permanent Fund's revenue and expenses should be handled consistently in these two tables.	OFC
5-10.	5-11	Confirm that "interest and investment income" identified in table 5.4.3-1 includes	FERC

		Alaska Permanent Fund earnings.	
5-11.	5-12	Revise table 5.4.3-2 and any other applicable tables to account for inflation.	FERC
5-12.	5-6	Provide a description of each community located within the pipeline corridor. These descriptions should include applicable community characteristics – history, traditions, distinct languages spoken, unique societal systems and activities, Alaska Native Corporation, public services, and a micro-economic summary (available goods and services).	BLM, OFC
5-13.	5-17	It is important to recognize that Prudhoe Bay is a work camp, there are not families living there and so including their information in the NSB census area is misleading. This requires additional clarification throughout the report, otherwise the reader may interpret to believe that there are people living there with families in homes.	EPA
5-14.	5-17	The statement about residents of rural villages located on the road system and the Coldfoot, Wiseman, and Livengood appear to be linked. The rural villages are not the same type of community as Coldfoot, Wiseman, and Livengood (please see the information from the Alaska Community Summary Database). Clarify the data that discusses the rural village residents moving to Fairbanks or Southcentral Alaska. This could be done by simply showing the data you are referencing, otherwise it appears you are drawing this conclusion by discussing three small towns that were originally developed for gold mining, which is not necessarily the same as a “rural village,” which tends to be historically primarily Alaska Native.	EPA
5-15.	5-19	Table 5.5.1-3 shows Skagway's population growing from 1,120 in 2015 to 2,330 in 2050. Considering that Skagway's population of 862 in 2000 rose to just 968 in 2010, the projection for Skagway seems implausible. Is it reasonable, even for a long-term outlook such as this report, to simply assume straight-line, escalating population growth in any community? The Skagway estimates should be revised or explained.	OFC
5-16.	5-23	Further clarify the information in paragraph 2 discussing the survey results of Insights (2004). There is currently no information about the study to put it into perspective or to draw a conclusion.	EPA
5-17.	5-15, -87;	No mention is made in the "Demographic Characteristics" or "Environmental	OFC

	Appendix 5A	Justice" sections of the Russian-speaking population near Delta Junction. The report should consider whether the project could have a special impact on this group. Similarly, table 5A-13 on shows a large percentage of ethnic Asians in Barrow (10.9 percent of the population), and RR 5 should disclose and discuss how the project might uniquely affect, positively or negatively, this group.	
5-18.	5-16	In section 5.5.1, identify the percentage break-down of “full” versus “part-time” workers.	FERC
5-19.	5-25	Regarding the statement about children within the NSB--there are no children living in Prudhoe Bay as it is a work camp and so this section is misleading and requires additional clarification.	EPA
5-20.	5-31	In section 5.5.2, estimate total contract worker expenditures by year and within “inside pipeline corridor” communities.	FERC
5-21.	5-31	Throughout section 5.5.2, the report discusses the need for workers during construction. The report needs to quantify how many workers might be needed in specific skill categories and whether TC Alaska would work with the state, industry, and trade unions to promote and encourage training of Alaskans to fill many of the jobs.	OFC
5-22.	5-36	Include additional data to clarify the last paragraph, otherwise it appears that every shareholder could be doing quite well; however, not every Alaska Native person is a shareholder and the dividends are quite varied amongst the ANCSA corps.	EPA
5-23.	5-40 – 5-44	Explain why twice as many jobs during the development phase are located outside of Alaska vs. within the state, and why just as many construction-related jobs would be located outside Alaska as within Alaska.	OFC
5-24.	5-50	In the first paragraph, TC Alaska inadequately discusses the inflationary effects on the Alaska economy from gas pipeline project construction. The report assumes development of such other major projects as the Pebble Mine, Donlin Creek Mine, Knik Arm Bridge and Watana Dam on the Susitna River, plus a robust state public works budget all at about the same time. This could cause significant inflationary pressure on wages and housing.	OFC
5-25.	5-50, -52	Address the personal and regional impact of North Slope natural gas availability for	OFC

		Alaskans, particularly in Fairbanks but also for the Southcentral region.	
5-26.	5-52	Estimate and provide the value of agricultural land and lands managed for timber production potentially impacted by the planned APP facilities.	FERC
5-27.	5-55	Provide support for the estimates of new housing units in Alaska. For example, the Municipality of Anchorage reported building permit applications for approximately 900 new housing units in 2007, before the construction slowdown. Yet this report assumes a rate double that total from 2015 to 2050, resulting in 63,000 new housing units in Anchorage. Explain the projections.	OFC
5-28.	5-58	Provide a more focused description of existing housing conditions inside and adjacent to the pipeline corridor. Including housing information for the entire borough(s)/census area(s) may not accurately depict existing conditions adjacent to and "inside pipeline corridor," and could affect the housing impacts analysis. The last line of the "Operations Phase" section refers to demand on housing, but does not indicate what that demand would be, or indicate if it is included in table 5.5.3-4 or if it would be a reduction from the forecast in that table. Update the section accordingly.	OFC, BLM
5-29.	5-58	The report should address impacts from indirect population and job growth due to the project. Table 5.5.1-9 (see page 5-26), shows the population impact after operations start of 14,000 to 37,000 more people in Anchorage, 6,000 to 16,000 in Mat-Su and 4,000 to 6,000 in Fairbanks North Star Borough (FNSB). That would represent significant growth for those communities.	OFC
5-30.	5-61 – 5-62	Include references to Fairbanks Natural Gas, which trucks liquefied natural gas from its facility in the Matanuska Valley to several dozen Fairbanks customers.	OFC
5-31.	5-63	Include relevant data to support the statement regarding the level of impacts to the schools and class rooms and provide a more detailed discussion of the demands on local law enforcement as well as an estimate of the cost this would impose on local and state governments.	OFC, EPA
5-32.	5-64	The predicted permanent jobs are considerably higher than the estimate for the Alaska Stand Alone Pipeline Project (50 – 75). The APP permanent job estimate is 35 – 50 full time Alaska employees (for pipeline, meter stations, and compressor	EPA

		stations); 200 on-site workers for the GTP with an additional 200 for on and off site rotation; and 100 off-site support workers. How many of the 400 – 500 rotation and support workers would be Alaska residents? Are there programs being developed to hire local people? If so, please include this information in the discussion.	
5-33.	5-65	FERC regulation 380.12(g)(6) seeks a fiscal analysis on incremental local government expenditures and revenue. That information is missing from draft RR 5. The report makes note of financial impact on the state but not on local governments. It does describe existing local finances in section 5.5.5.1, but section 5.5.5.2 is limited to a look at future impacts to state finances while saying little about local, other than saying the effects would be minor. Provide additional analysis.	OFC
5-34.	5-66	The report addresses the difference in local government spending between two boroughs. The explanation does not address the NSB's high education spending per pupil vs. the FNSB's, nor the additional types of expenditure for the NSB (e.g., health care, debt service). While the massive size of the NSB compared to the FNSB does lead to higher transportation cost, it is not the only reason education is not as high a percent of NSB expenditures as for the FNSB, particularly where transportation costs have also increased education expenses. Update the section accordingly.	BLM
5-35.	5-67	Specify Valdez local tax-revenue sources in table 5.5.5-1 as that community imposes an oil and gas property tax and it is a possible port of entry for gas pipeline project equipment and material. Also include local tax revenue sources for the City of Fairbanks in the table.	OFC
5-36.	5-74	Provide a description of each highway that may be impacted by the APP. This description should include highway base/materials composition, width, number of lanes, length, regular maintenance activities, seasonal closures and/or considerations, scheduled work, bridge weight capacities, speed restrictions, significant incline/grade issues, travel amenities, and typical/seasonal use. Include results of discussions with the Alaska Department of Transportation and	DOT

		Public Facilities regarding haul road traffic. Discuss any proposed mitigation in RR 5 and cross-reference to section 1.6.1.14. The DOT disagrees with statements on pages 1-22 and 5-83 that seem to suggest there would be no road construction improvements needed as a result of the project. The DOT states that portions of Parks Highway, Dalton Highway, Richardson Highway, Glenn Highway, Tok Cutoff, Haines Cutoff, and Klondike Highway would need to be refurbished after 2020 to repair APP and spur-line related construction effects. Please ensure that all of TC Alaska's assumptions regarding road repairs and improvements are discussed with DOT and clarified in the applicable RR sections.	
5-37.	5-74	Provide an estimate of the number (and frequency) of truck trips that would be required on each highway on a daily and seasonal basis during construction of the planned facilities to deliver the necessary supplies and materials to project work areas. Also, provide a description of the types of trucks that would be used to deliver supplies and materials. Identify and discuss any TC Alaska-related transport that would occur through the Chugach National Forest.	OFC
5-38.	5-74	Describe the types of vehicles that would be used to transport laborers from work camps to construction work areas. Estimate the number of daily trips required to transport laborers to and from the work camps.	FERC
5-39.	5-74	Estimate the amount of total and summer tourist use of each highway potentially impacted by the APP.	FERC
5-40.	5-74	Provide the following: • a comprehensive list (including locations) of seasonal ice roads that may be impacted by the planned project; • a description of these ice roads including, but not limited to, their size, communities/facilities served, purpose, and amount of use; and • a description of how TC Alaska would ensure local users of these ice roads the ability to retain access and usage during project construction.	FERC

5-41.	5-76	In section 5.5.6.1: • provide estimates of the available rail car capacity in Alaska and the project's expected demand for rail cars; • provide an estimate of the number (and frequency) of trips by rail that would be required during construction to deliver the necessary supplies and materials to project work areas; and • describe the capacities/limitations of the rail cars and rail lines.	FERC
5-42.	5-76	Describe the marine shipping and barge vessels that would be used to transport project supplies and materials and identify and describe the use of existing marine and waterway shipping routes. Clearly indicate which ports are being referred to for the delivery of modules, pipes, and other materials/supplies (e.g., West Dock, Port of Anchorage, Port of Seward, Port of Whittier, Port MacKenzie, etc.), and what port upgrades may be necessary. Provide an estimate of the number (and frequency and seasonality) of trips by ship that would be required during construction and operation to deliver the necessary supplies and materials to project work areas. Provide the quantity of stockpiled pipe at each port and how the pipe would be stored and moved (these actions can have significant impacts on the transportation system and the adjacent local communities). Disclose logistics information to the extent that it is known. Cross-reference the above to section 1.6.1.10, as appropriate.	FERC, EPA, OFC, DOT
5-43.	5-76, -79	Clarify why Dutch Harbor is included. Is this to ship something to or from Asia, as mentioned in the section? Does it relate to shipments to Prudhoe Bay, which is not mentioned in the section? Other ports have some geographical relation to the pipeline corridor or mention a specific intertie.	BLM
5-44.	5-79	Estimate the capacity of existing airports that may be used for transportation of supplies, materials and laborers, and provide an estimate of the Project's expected use of these airports. Also, provide an estimate of the number (and frequency) of	FERC

		trips by air that would be required during construction to deliver the necessary supplies and materials to project work areas.	
5-45.	5-83	Describe direct effects to the traveling public related to increases in congestion due to movement of material and construction traffic, traffic delays associated with traffic control, and use of highway ROWs as a staging area for pipe placement.	DOT
5-46.	5-83	Provide preliminary summaries of the marine, rail, and road-wear analyses referenced in section 5.5.6.2. Also, identify measures to avoid, minimize, and mitigate potential adverse impacts on these transportation systems.	DOT
5-47.	5-85; Appendix 5D	Discuss how the APP might compensate the state and municipalities for the additional expense of repairing the increased wear of roads and bridges from construction activity.	
5-48.	5-87	Provide a revised description of existing conditions based on 2010 census blocks directly affected by the project facilities as well as alternative facility routes and/or locations. Also, include in this revised section a geo-spatial display of the minority and low-income populations relative to the project facilities and all alternative facility routes and locations. Include analysis related to Executive Order 12898.	OFC, BLM, EPA
5-49.	5-89	Provide a human health screening analysis that assesses which aspects of health (including, but not limited to public, environmental, mental, social, cultural, etc.) could be impacted by the APP. The EPA recommends that TC Alaska work with local, state, tribal, and federal health officials and organizations to conduct the appropriate analysis, and to determine appropriate and effective mitigation of health impacts.	EPA
5-50.	5-89	Provide updated descriptions (by community) of the subsistence use areas potentially impacted by the planned APP facilities and associated activities. a. Include a description of the subsistence use areas potentially impacted by alternative facility routes and locations, and associated activities. These descriptions should incorporate the State of Alaska's wildlife regulatory harvest data (WinfoNet), and if available, the data from the ongoing subsistence	EPA

		surveys. b. In addition to these descriptions, provide a preliminary analysis by community of potential impacts on subsistence use areas and resources including, but not limited to harvest abundance, availability, and access. c. This analysis should also identify measures to avoid, minimize, and mitigate potential impacts on subsistence use, and should address all subsistence-related comments received to date filed at the FERC and/or received by TC Alaska.	
5-51.	5-89	Address the potential for the project to affect subsistence resources for National Wildlife Refuges, as well as for other federal land managers such as the National Park Service and the BLM. Refuges that will be crossed by the project or are in its vicinity have concerns about potential direct and indirect effects to natural resources that utilize the Refuges. There is concern, in particular, about actual or perceived changes in access to and availability of subsistence resources. Cross-reference to section 3.4.6.3.	FWS
5-52.	5-89	Describe how TC Alaska would solicit community (including the appropriate villages, tribal councils, native corporations, subsistence regional advisory councils and local, state and federal agencies) input regarding the potential impacts on subsistence and its measures to avoid, minimize, or mitigate these impacts.	FERC
5-53.	Appendix 5A	In appendix 5A, revise the tables as appropriate to reflect conditions found within the "transportation (and marine) corridors."	FERC
5-54.	Appendix 5B; 5B-5	While the APP would be within the boundaries of the NSB, it is not within the boundaries of any Census-Designated Place (CDP) or city within the NSB other than Deadhorse, though every NSB village is listed as "inside the Pipeline Corridor" on table B2.3.1-1. Please clarify. It may be better to identify cities, CDPs, and Alaska Native Village Statistical Areas actually on the corridor as a section, then boroughs and census areas if the entire borough/area is going to be included in subsequent analysis. The same is true of other communities on the list, as well. The alternative is to redefine the pipeline corridor.	BLM
5-55.	Appendix 5D;	Provide the rationale for TC Alaska's assumptions regarding resident versus non-resident labor, specifically in-and-out-migration. This rationale should address in-	EPA

	5D-25	migrants expected by year, during construction and operation of the project, in each Borough/Census Area. Also estimate the number of non-resident laborers expected to leave at the end of their employment.	
5-56.	Appendix 5D; 5D-10, -11	Update the time frames -- and any calculations/assumptions throughout RR 5 that are based on them -- for production start-up from the Liberty and Point Thomson fields as well as the National Petroleum Reserve—Alaska. Those developments are behind the schedules appendix 5D cites.	OFC
5-57.	Appendix 5E	In addition to revising the figures provided in appendix 5E based on the results of the ongoing subsistence surveys; for each community, provide a comprehensive map depicting the specific subsistence use areas associated with that community. The map (and figure 5E-1) should show those federal public lands that are open to federal subsistence activities (i.e., "unencumbered lands"). As appropriate, figures depicting multiple subsistence use areas should also be provided. **Note**: The "all resources" figure is too general. See the TAPS Renewal EIS for example figures. Ensure that labels do not obscure map features.	FERC, BLM
5-58.	Appendix 5E	Regarding the figures: a. Revise all figures to include the applicable planned project-related facilities. Also, provide figures depicting alternative facility routes and locations and the applicable subsistence use areas. b. Correct or clarify figure discrepancies regarding "multiple years" boundaries outside of "lifetime" boundaries. c. Provide the electronic source data used to create the figures.	FERC

Comment Number	RR Location Reference	Comments on Draft RR 6 – Geology	Source
6-1.	General	While detailed information by MP cannot be shown clearly on a one-page map (such as the scale of figure 6.2-1), other aspects of this report can and should be illustrated for clarity. As such, provide additional figures in RR 6 to depict mining projects; energy resource areas; historical earthquake locations and magnitudes; USGS mapping of seismic hazards; key seismic zones; faults and fault crossings; and volcanic features.	FERC
6-2.	General	Include report(s) documenting the analyses and mapping of mile-by-mile geological resources and geo-hazards as appendices in RR 6.	FERC
6-3.	General	RR 6 generally lacks a review of relevant studies by the Alaska Division of Geologic and Geophysical Surveys, USGS, and other similar studies (e.g., TAPS). Use these information sources to identify resources, geologic hazards, and mitigation measures, and cite references that are used.	FERC
6-4.	General	Provide geotechnical investigations which support all planned aerial-span bridge crossings referenced in RR 1. Include foundation recommendations that take permafrost conditions into consideration.	FERC
6-5.	General	Provide the geotechnical investigations and reports for the planned pipelines and aboveground facilities.	FERC
6-6.	6-3	Include a general description of potential effects of hazards on facilities in the first paragraph on page 6-3, per FERC guidance.	FERC
6-7.	6-3	Provide a geologic map showing the entire pipeline and aboveground facilities. Superimpose the TAPS pipeline on it between Prudhoe Bay and the Delta Junction divergence area.	FERC, BLM
6-8.	6-3	Provide a discussion and table describing the anticipated surficial geologic and geotechnical conditions that are anticipated during trenching and HDD operations along the planned Alaska Mainline and Point Thomson Pipeline routes. Provide similar discussion for construction of the aboveground facilities.	FERC

6-9.	6-3	Provide a summary, by MP, of where bedrock is anticipated to be less than 8 feet below ground surface.	FERC
6-10.	6-3	Ensure definitions for "Project area," "Project footprint," and "Project vicinity" (included in footnote 6) are consistent with the other RRs. Because cross-referencing between reports occurs frequently, continuity of definitions across them is critical.	FERC
6-11.	6-4	Combine and make consistent tables 6.2-1 and 7.3-1 and make this an appendix to RR 1. These tables present some of the same information, but MPs are rounded differently and ecoregions/physiographic regions/major land resource areas are presented and referenced inconsistently.	FERC
6-12.	6-7	Add the Sagavanirktok River, mentioned in paragraph 2, to figure 6.2-1.	FERC
6-13.	6-10	Clarify whether the planned Alaska Mainline route overlaps the Fort Knox mineral holding.	FERC
6-14.	6-10	Clarify the statement "gold exploration activities…were reported by 126 individuals and companies." Were these 126 activities performed across Alaska, within the Eastern Interior Region, or within the APP area/vicinity? Of those sites in the project vicinity, provide locations on a map and in a table.	FERC
6-15.	6-10	Provide an updated summary table of existing borrow sites within this RR 1. Appendix 1G lists existing and proposed borrow sites that may be used for the Project. Identify any existing borrow sites not intended to be used by the project, if the project will impact them.	FERC
6-16.	6-11	Update the discussion in section 6.3.2 (**Energy Resources**) to include the new oil and gas assessment which was recently released by the USGS for the North Slope. See the following link: http://www.usgs.gov/blogs/features/usgs_top_story/usgs-releases-first-continuous-oil-and-gas-assessment-for-alaska-north-slope/.	USGS
6-17.	6-13	In table 6.3.2-1, include which Unit (group of leases) each Alaska Division of Lands number is associated with and the leasor name(s).	FERC
6-18.	6-14	There is an underground placer mine near Gold Creek along the Dalton Highway. Identify the direction and distance from the planned Alaska Mainline	BLM

		centerline to this placer.	
6-19.	6-14	Section 6.3.3 states "The Project does not cross any known active or abandoned underground mines …" However, section 6.3.3.1 states "The Project could cross unknown or abandoned mines." Clarify this language and meaning. Explain how the referenced source (USGS 2010, groundwater map of the U.S.) was used to determine that no active or abandoned underground mines are within the project area. Cite additional sources, as needed.	FERC
6-20.	6-14 – 6-15	In the discussions of **Construction and Operations Impacts and Mitigation** in sections 6.3.3.1 and 6.3.3.2: • provide specific efforts that would be taken to initiate and maintain communications with all parties affected by the project construction activities; • describe the efforts at communication that have been made already; • describe the types of field surveys that will be performed; and • if mineral extraction activities are discovered, describe how the owners/operators will be identified.	FERC
6-21.	6-16	Identify by MP in table format specific, significant geologic hazards to the planned pipelines and aboveground facilities, and provide mitigation for these hazards. Locate the following geologic hazards that may affect the pipelines and aboveground facilities on the alignment sheets in appendix 1O: active or potentially active faults; liquefiable areas; landslides; avalanche zones; rock glaciers; karst; acid rock drainage areas; active or abandoned mines; oil or gas wells; areas of flood risk; and significant paleontological resources.	FERC
6-22.	6-16	For both the Alaska Mainline and the Point Thomson Pipeline provide light detection and ranging data which supports the location of geologic hazards such as active or potentially active fault zones; rock glaciers; slope creep; and flooding and landslide areas that cross the planned pipeline routes.	FERC
6-23.	6-16	Provide construction details by MP to accommodate permafrost conditions for the planned GTP, compressor stations, and along the entire pipeline route.	FERC

6-24.	6-16	Provide a discussion on tsunami hazards for the planned pipelines and aboveground facilities located along the Arctic Ocean coastline.	FERC
6-25.	6-16	Identify if surficial soil contamination is present along the pipeline routes or in proximity to any areas of project-related disturbance.	FERC
6-26.	6-16	Provide specific mitigation measures for construction of aboveground facilities in permafrost, e.g., gravel blanket thicknesses and extent; number and depth and types of heat pumps; foundation systems; etc.	FERC
6-27.	6-16	Provide surficial geologic reconnaissance mapping data along the planned pipeline alignments to support evaluations of active faults, landslides, rock glaciers, slope creep, and flooding. Provide these data on USGS topographic maps. Also provide summary maps at an appropriate scale to identify each significant individual hazard for each planned pipeline.	FERC
6-28.	6-16 – 6-17	Regarding the discussion on geologic hazards, describe the impact each hazard could have on the project.	BLM
6-29.	6-18	Correct the title of table 6.4.1-2 to end with "... IV to VIII" or include the intensity number and description for the intensities below and above the range presented. If the title is corrected, include a footnote that there are also intensities less than and greater than those presented in the table so readers are aware that this is not the minimum and maximum levels of intensity.	OFC
6-30.	6-18	Revise the discussion presented on this page to clearly state that two earthquakes of intensity VIII have occurred since 1904.	FERC
6-31.	6-18	Table 6.4.1-3 presents earthquake magnitude by “body wave” and “surface wave.” Provide a description of the differences. Move discussion in section 6.4.1.3 prior to this table to enhance clarity.	BLM
6-32.	6-19	Using the most recent USGS data, provide the peak acceleration that would be exceeded (for each station) and for the pipelines in 50 years based upon a 2- and 10-percent probability of occurrence. Indicate that these numbers are not adjusted for site soil amplification effects.	FERC
6-33.	6-20	Provide figure 6.4.1-1, referenced in the second paragraph on this page.	FERC, OFC

6-34.	6-20	The earthquake information listed in the third bullet is shown in decimal g. At the bottom of the previous page, the acceleration is described as a percentage of g. Provide a consistent description of the acceleration information. Also provide a magnitude for the 1964 earthquake.	BLM
6-35.	6-21	Include a figure(s) that locates and further identifies faults and seismic activity of the three seismic zones (Minto Flats, Fairbanks, and Salcha) relative to the Alaska Mainline.	BLM, OFC
6-36.	6-22	Identify by name, title, qualifications, and affiliation the "geologists familiar with the neotectonics, seismicity, and paleoseismology of the region" and the "field team that included two senior paleoseismologists."	FERC
6-37.	6-22	Clarify whether the mitigation procedures for engineering the pipeline to cross active or potentially active fault traces would be conducted by a structural engineer. We suggest this information also be included in RR 1, section 1.6.3.6, page 1-75.	USGS
6-38.	6-22	Prepare and submit an earthquake preparedness program and specifications for earthquake monitoring system for the project. Refer to TAPS information in the article prepared by Douglas Nyman , et al., "Trans-Alaska Pipeline Emergency Response and Recovery Following the November 3, 2002 Denali Fault Earthquake," published through the American Society of Civil Engineers Technical Council on Lifeline Earthquake Engineering (August 2003). See the following link: http://www.alyeska-pipe.com/inthenews/techpapers/5-post%20denali%20eq%20taps%20(revised%206-25-03).pdf.	FERC
6-39.	6-23	The final sentence on this page refers to RR 1 for "Additional information regarding mitigation and techniques for crossing potentially active faults." a. Identify where additional information (beyond three figures in appendix 1E) on mitigation and crossing techniques is provided in RR 1. b. In section 6.4.1.1, provide mitigation details for each fault crossing.	FERC
6-40.	6-23	Provide a figure associated with table 6.4.1-4 that locates the referenced faults.	BLM
6-41.	6-23	For each Holocene-aged, active fault crossed by the Alaska Mainline route, provide the anticipated displacement magnitude and direction of movement.	FERC

6-42.	6-23	Table 6.4.1-4 (Potentially Active Fault Crossings), table 6.4.3-1 (Existing Landslides Within the Vicinity of the Alaska Mainline), table 6.4.3-2 (Existing Mudflow Occurrences Within the Vicinity of the Alaska Mainline), and table 6.4.3-3 (Potential Slope Instability within the Pipeline Facilities) are all in areas where the soil features could have an impact on pipeline construction and operational safety. More detail is needed regarding the process and procedures TC Alaska would use to determine the design/operational parameters for crossing the geological hazards outlined in section 6.4.	PHMSA
6-43.	6-25, -44	The quantity of "less than 7.5 miles" of soil liquefaction referenced in section 6.4.6.1 was not stated in section 6.4.1.2 (which lacks a discussion of potential lateral spread). Revise and clarify both sections for consistency and clarity.	FERC
6-44.	6-24 – 6-25	Provide a table that cross-references data from RRs 7 and 2 to determine where soil liquefaction is possible based on the bulleted items beginning on the bottom of page 6-24 (i.e., average summer flow greater than 15 cubic feet per second; bank heights greater than 3 feet; etc.).	FERC
6-45.	6-25	Provide justification for the statement that TC Alaska "concluded the likelihood of liquefaction-induced buoyancy or settlement of the pipe in relatively level areas is likely non-existent owing to the development of a frost bulb around the pipe in non-permafrost soils." Discuss what evidence exists of the type and size of frost bulb expected to develop. Provide references to support this conclusion.	FERC
6-46.	6-25	Identify on a map the locations referenced by the statement "results of the analyses indicate that potential liquefaction-induced effects of buoyancy or settlement are limited to locations on the Alaska Mainline between AMPs 533 and 745 where the seismic potential is high enough to initiate liquefaction in certain soil conditions." Provide a table of specific locations with soil liquefaction hazards within this interval.	FERC
6-47.	6-25	Provide specific mitigation measures for the liquefiable soil underlying the following: • the planned site of the Tetlin Junction Compressor Station, and • 2 miles of cross slopes along the Alaska Mainline route (MPs 636-714).	FERC, OFC

6-48.	6-26	Provide a figure associated with table 6.4.2-1 that locates the volcanic feature with the planned pipeline route and indicates the radius of influence of the volcanic activity.	FERC, BLM
6-49.	6-26	Add missing information for the Klawesi Group to table 6.4.2-1.	FERC
6-50.	6-27	Discuss the possible impacts of volcanic activity such as the duration of an explosive ash-producing event (both pre- and post-construction). Events such as this could result in drainages being susceptible to inundation by volcanic mudflows (lahars) from the Wrangell and Bona-Churchill volcanoes and could affect the general operation of a pipeline. As fallout could also potentially affect operations, provide an estimate of potential ash fallout trajectories and plausible amounts from nearby or Cook Inlet volcanoes. Discuss the size and impacts of an eruption of the Bona-Churchill volcanic complex (like the one that occurred about 1200 to 1400 years ago and produced the White River ash). A similar eruption in the future could interfere with land, sea, and air travel to and from Alaska and also could have some impacts on pipeline operation.	USGS
6-51.	6-33	Please resolve the apparent discrepancy between the number of snow and slushflow avalanche chutes presented in table 6.4.3-4 and the final sentence in section 6.4.3.2. Also, review the number of snow/slushflow avalanche chutes and the table reference on page 6-45, section 6.4.6.3. These discussions should be consistent.	FERC
6-52.	6-33	Provide a definition for rock glacier in the text. a. Describe what Terrain Symbols in tables 6.4.3-5 and 7A-1 are associated with which Interpretations in table 6.4.3-5 and which Terrain Unit Names in table 7A-1. b. Make “Interpretation” column in table 6.4.3-5 consistent with “Terrain Unit Name” column in table 7A-1. c. Provide some measure of risk associated with the presence of each rock glacier listed in table 6.4.3-5. d. The text states that two rock glaciers cross the planned Alaska Mainline centerline; however, table 6.4.3-5 identifies two locations with terrain symbol “Cg” that cross the planned centerline, but these are labeled as	FERC

		"colluviums and till" and "colluvial apron similar to rock glacier," not as rock glaciers. Please resolve this apparent discrepancy by making the text and table language consistent.	
6-53.	6-37	Footnote 15 identifies an incorrect section; correct it to section 6.4.3.4.	OFC
6-54.	6-38	The third bullet on this page states that shale units have a potential for acid rock drainage (ARD), and that limestone has buffering capacity. Describe the potential for buffering along the pipeline at the local scale and identify significant shale stretches that would lack limestone units.	FERC
6-55.	6-38	Justify the use of a non-intrusive field reconnaissance or explain what the next step of the field reconnaissance will be. Field data should be collected and presented, perhaps following the standardized EPA protocol for ARD characterization of soil and overburden. Explain when reconnaissance will be performed on the additional 17 of 78 potential metal leaching /ARD sites. Describe the intended monitoring program for ARD.	FERC
6-56.	6-39	Provide mapping of known mineral occurrences and secondary iron sulphides along the planned Alaska Mainline route (referenced in first bullet) to complement information in table 6.4.4-1.	FERC
6-57.	6-39 – 6-42	Fill the data gaps in table 6.4.4-1 where it is noted in many places "No assessment on bedrock available in area at this time." Describe how these data gaps will be filled.	FERC
6-58.	6-43	Recalculate the distances between MPs for each segment with ARD potential that is in the six categories ranging from none to high on table 6.4.4-1. Same comment for discussion on page 6-45 in section 6.4.6.4.	FERC
6-59.	6-43	Provide a detailed discussion of flood zones and potential impacts due to flooding. Currently, there are circular references to flooding in RRs 2, 6, and 8; however, all text is generalized. Address specific potential hazards and appropriate mitigation measures at individual waterbody crossings.	FERC
6-60.	6-43, -46	Provide analysis of streambed scour at buried crossings and at bridge sites for both pipelines. (If the pipeline is supported on a bridge, provide a scour analysis of the bridge abutments and pilings). The planned pipeline routes crosses	USGS, OFC

		several dynamic rivers that are subject to both lateral migration and streambed scour. Although the pipe would be buried, existing and potentially new bridges for access and/or general transportation of personnel, equipment, and supplies may be curtailed if significant scour events occur. More information may be found at http://ak.water.usgs.gov/usgs_scour/index.php?pageId=4.	
6-61.	6-43, -46	Provide analysis and mitigation for stream/river encroachment from bank erosion and channel migration towards the planned pipeline alignments, aboveground facilities, and pipe storage/contractor yards.	FERC
6-62.	6-44 – 6-46	Provide a more robust description of the types of mitigation practices for geologic hazards that actually would be implemented, and, as applicable, cite specific technical or guidance manuals. Provide justification (i.e., backup field data, cited sources, technical evaluations, etc.) for generalized conclusions of risk and associated mitigation specifically for each risk, by MP.	FERC
6-63.	6-44	In the discussion of **Fault Rupture Displacement**, list and provide a brief overview of the seismological engineering standards which TC Alaska plans to use.	FERC
6-64.	6-45	Provide a description of how the hazard of deep-seated landslides would be mitigated.	FERC
6-65.	6-46	Verify the total miles of potential flooding hazard, given other revisions in this RR.	FERC
6-66.	6-46	Suggest changing "Blasting will be employed to create an excavated water reservoir impoundment southwest of the GTP" to "Blasting will be employed to excavate a water reservoir southwest of the GTP."	FERC
6-67.	Appendix 1E	Provide remedial designs for aboveground, pipeline fault crossings for each active or potentially active fault that would be crossed by the planned pipelines. Verify that the design would enable the pipeline to accommodate potential future fault displacement.	FERC
6-68.	Appendix 6A	Revise appendix 6A as follows: a. Clarify in the title or in a footnote that table 6A-1 contains information only	FERC, BLM

		for the Alaska Mainline, as no active non-energy resource leases or claims were identified on or adjacent to the planned Point Thomson pipeline ROW. b. Define what is meant by "active industrial mineral claims." The table includes none of the existing BLM, state, Alyeska, or private mineral material locations along the planned pipeline routes (see RR 1, appendix 1G). c. The table needs to include all pending federal claims, and differentiate those claims which are pre-1955 and maintain stricter surface management rights.	
6-69.	Appendix 6C	Regarding table 6C-1: a. Specify land ownership (state or federal) for each blasting interval. b. Provide a column with a brief explanation of why the blasting is required for each MP length.	FERC, BLM

Comment Number	RR Location Reference	Comments on Draft RR 7 – Soils	Source
7-1.	General	Provide the following: a. tables: 7A, 7B-4, and 7B-5; b. assessment of soils information for the Point Thomson Pipeline, the Alaska Mainline and the planned aboveground facilities, associated infrastructure, airstrips and helipads, and access roads referenced at the end of section 7.4.9 and within section 7.5.3.2; c. an updated estimate of the percentages and numbers associated with winter construction, soil erodibility, soil compaction, etc., as discussed in section 7.5; and d. information on soil impacts greater than 5 acres as discussed in section 7.5.3.2.	FERC
7-2.	General	Although draft RR 7 references the appendices in RR 1 as mitigation, it fails to provide a detailed analysis of how these mitigation measures would reduce impacts on soils. Draft RR 7 also fails to discuss other mitigation measures TC Alaska would take, besides its Plan and Procedures (which need considerable revision and specificity—see comment G-2).	FERC
7-3.	General	Provide a more detailed analysis throughout RR 7 of the methods used to assess the impact of construction on soils.	FERC
7-4.	General	Address climate change and its effects on permafrost in RR 7. Provide references of data used to evaluate change in permafrost soils condition due to climate change.	FERC, BLM
7-5.	General	Provide a table that cross-references specific potential impacts (for permafrost, erosion, hydric soils, etc.) matched to specific mitigation measures for specific terrain units, Major Land Resource Areas (MLRA), or soil types.	FERC
7-6.	General	Because RR 7 lacks sampling information, please provide a plan for soil testing	FERC

		during trenching that would provide the necessary soil quality/ limitation information so that the appropriate measures from the TC Alaska Plan and Procedures Toolbox could be utilized. Detail how this information would ultimately be provided to the FERC in a report.	
7-7.	General	The EPA recommends that TC Alaska develop and provide a Soil Handling Plan to address unknown soil contamination that may be encountered during pipeline construction.	EPA
7-8.	7-4	Discuss any fieldwork investigations conducted by TC Alaska to verify the validity and accuracy of the datasets referenced. Provide citations for all of the data sources used including digital elevation, TAPS, and Alaska Natural Gas Transportation System (ANGTS) datasets. The datasets used appear to be a valid way to overcome the limitations of existing published data, though some of the datasets (e.g., TAPS [early 1970s] and ANGTS [1976]) may be outdated, and surface conditions (e.g., ground ice conditions and other features) may have changed due to human disturbance, surface hydrology, coastal erosion and climatic changes, etc. in the past several decades. If data provided are more recent (e.g., related to the TAPS Renewal EIS), reference the specific data source and/or date throughout the report as relevant. If data provided are older, justify their use.	FERC
7-9.	7-4	Clarify whether the 2004 MLRA products are the newest product available or if the state of Alaska is indeed revising its MLRA products. The Natural Resources Conservation Service (NRCS) website states that "The Alaska portion of the revision is completed and approved. The updated map and descriptions for Alaska represent a new, mostly original, classification." If newer MLRA products are available, these should be utilized throughout the RR.	FERC
7-10.	7-4	Indicate that if the state of Alaska updates its MLRA map units and general digital soil survey products prior to filing the application, TC Alaska will include them with the application filing.	FERC
7-11.	7-5	Clarify if the field transects referred to in section 7.2.2 are descriptions of NRCS work/dataset development, or those done by TC Alaska. Provide the interval at which field transects were performed.	FERC

7-12.	7-6	Provide sources and dates for the stereo aerial photography cited in the first paragraph that was used for terrain mapping. Clarify whether this aerial photography is different than that used for topographic information. Provide a broader discussion of the various sources, seasons, etc., of the aerial photography and how it influences interpretation of the data.	FERC
7-13.	7-6	Provide the ANGTS terrain mapping data used.	FERC
7-14.	7-8	Provide a detailed explanation as to how TC Alaska developed its Digital Elevation Model (DEM) from the three digital elevation datasets (as reported on page 7-8). Provide a percentage of the composite TC Alaska DEM derived from each of the three datasets listed here. Provide the width of the composite DEM along the corridor.	FERC
7-15.	7-9	Provide the following: a. references for each of the "other route data" datasets used and indicate if these are publicly available resources: the continuous landform cross-section, the geothermal cross-section, the bedrock cross-section, the borehole database, and observations of ground ice conditions and other features; b. a detailed description of the geothermal cross-section dataset, when it was created, and the changes that may have occurred since to permafrost soils; and c. citations for the "suite of digital maps and reports on surficial geology, active faulting, bedrock geology, permafrost distribution, and engineering geology along the Alaska Highway Corridor between Delta Junction and the U.S.-Canada border, and other publications and preliminary information from various sources" that were used to confirm route conditions.	FERC
7-16.	7-9	Provide thermister data and results, locations by MP and describe their depths and methods of installation.	FERC
7-17.	7-9	Provide tabular summary by MP of continuous landform cross sections showing type and thickness of landform to 50 foot depth as described in section 7.2.5. Include typical representative cross sections.	FERC
7-18.	7-9	Provide tabular summary by MP of continuous geothermal cross sections showing active layer thickness, frozen state of ground and associated permafrost	FERC

		designation to 50 foot depth as described in section 7.2.5. Include typical representative cross sections.	
7-19.	7-9	Provide tabular summary by MP of continuous bedrock cross sections to 50 foot depth to bedrock, bedrock type and degree of weathering as described in section 7.2.5. Include typical representative cross sections.	FERC
7-20.	7-9	Provide a summary table of ground ice conditions and other features by MP.	FERC
7-21.	7-9	Provide summary tables of data obtained from the referenced 8,000 borings.	FERC
7-22.	7-9	Provide whiplash and trumpet curves to define the bottom of the active soil layer (undergoes annual freeze/thaw cycle) and the top of the permafrost along the planned pipeline alignment and for above ground facilities. Provide a table summarizing the results by MP.	FERC
7-23.	7-9	Provide a discussion, justification, and field verification of the TC Alaska-developed algorithms used to merge various datasets. Tables and appendices should specify which datasets were used for the information presented in each.	FERC
7-24.	7-10, -13	Clarify the number of MLRAs recognized by the NRCS that the Project would be located within. Provide a justification (and agency correspondence if available) for grouping MLRAs 244 and 234. These MLRAs are distinct in the 2004 NRCS report, and a cursory review of the soil description for each indicates they are significantly different (e.g., percent soil cover). The statement “most of the Brooks Range is barren of vegetation” is not supported by the cited text, particularly considering that the project would be located in the areas of the Brooks Range most likely to contain vegetation.	FERC
7-25.	7-13	The second paragraph references a footnote 9 that does not seem to fit in this location.	OFC
7-26.	7-13	Clarify the typical depth of permafrost soils with gravelly and very gravelly substrates within the Arctic Coastal Plain (MLRA 246). Discuss whether these soils would remain thaw-stable after being mixed with deeper ice-rich mineral soil layers below as part of trenching. If these soils would not remain thaw-stable, provide measures that would implement to mitigate possible impacts.	FERC
7-27.	7-15	Provide a detailed description of the Terrain Erodibility Index and the	FERC

		methodology used to assign soils a value. Provide field verifications of this model to determine its validity.	
7-28.	7-15	Provide a map with MP designations showing the soil types along the planned Alaska Mainline and the Point Thomson Pipelines.	FERC
7-29.	7-15	Provide a permafrost map (with project MPs) which shows continuous, discontinuous, and seasonal permafrost limits relative to the pipeline alignment. Provide mitigation recommendations for permafrost thawing following construction disturbance.	FERC
7-30.	7-15	Provide a detailed explanation on how permafrost soils were characterized as part of terrain mapping to a depth of 50 feet. Table 7.2.3-1 indicates that the terrain mapping data extends to a depth of 20 feet. Clarify the source of the dataset being referred to in section 7.4.1, as the statement is inconsistent with the information presented in section 7.2.3.	FERC
7-31.	7-15	Provide a description of changes observed in permafrost soils in the project area, including a robust literature review on this topic. Be sure to address permafrost degradation and aggradation due to both natural and artificial causes. Provide a discussion of potential frost bulb or thaw bulb growth around a chilled or non-chilled section of pipeline.	FERC
7-32.	7-20	Address the following: a. Discuss how fire can impact permafrost soils and how deep permafrost can be affected. b. Identify the maximum temperature the soil can reach and at what depth during a fire. c. Describe mitigative measures to ensure the buried pipeline and associated infrastructure (e.g., transitions to and from aboveground) do not transmit heat from forest fires sufficient enough to cause melting of permafrost or pipeline damage.	FERC
7-33.	7-20	Provide a more detailed discussion in the last paragraph, giving specific examples, and cite statistics, if available, of impacts on permafrost soils from land clearing, compaction, excavation, and filling.	FERC
7-34.	7-22	Provide justification and field verification for use of the ANGTS data for	FERC

		estimates of permafrost conditions in the project area. ANGTS data may be outdated for estimating current and future permafrost properties. For example, the average number of tundra travel days on the Arctic Coastal Plain (based on surface permafrost soil properties) has decreased markedly since the ANGTS data were collected.	
7-35.	7-22	Provide a detailed description of the following datasets and how they were merged to perform an assessment of permafrost in the Project area: APP terrain mapping permafrost attributes, ANGTS terrain mapping, ANGTS borehole data, ANGTS geophysical surveys, and ROW footprint. Were all of these datasets merged by TC Alaska or were some of them previously merged by ANGTS? Provide a justification for merging these datasets and field verification of the resulting dataset about permafrost in the project area.	FERC
7-36.	7-23	In section 7.4.2, clarify what is meant by Pipeline Facility locations.	FERC
7-37.	7-23	Because of the overly broad slope class categories used by STATSGO2, use site specific field data to evaluate the soil erodibility at all areas where soils would be disturbed during construction (including, but not limited to, access roads and ports, aboveground facilities, work camps, etc).	FERC
7-38.	7-26	Define winter construction and what variables (soil temperature, frozen precipitation cover, etc) would be used to indicate that winter construction could proceed.	FERC
7-39.	7-26	Justify the statement “compaction is not likely to be an issue where winter construction is planned” and include examples.	FERC
7-40.	7-26	Discuss the possible impacts of heavy equipment on soils (and associated vegetation) if ice roads and pads are not sufficiently thick, or if equipment strays from the ice roads and pad. Provide measures that would be implemented to prevent this from occurring.	FERC
7-41.	7-26	Discuss if the project would use special weight-distributed equipment (e.g., terragons, rollagons, etc.) for construction off of constructed ice roads and pads. If so, where would this equipment be utilized?	FERC
7-42.	7-26	Discuss solar and heat absorption of compaction-prone soils if snow is cleared.	FERC

7-43.	7-26	In areas of compaction-prone soils, detail the mitigation measures that would be used during winter construction to ensure compaction doesn't occur. Also, identify the measures TC Alaska would implement if soils do become compacted.	FERC
7-44.	7-27	Provide a more detailed discussion of soil properties that may contribute to poor revegetation potential including the presence or absence of saline soils in the Arctic Coastal Plain and any difference in salinity due to depth.	FERC
7-45.	7-27	Discuss the nutrient levels and the locations within the soil profile in the various soil types as it relates to potential for poor revegetation potential. Provide a discussion of how construction could result in mixing of nutrient layers and/or leaching.	FERC
7-46.	7-27	Discuss how soil trenching and backfilling would be managed to ensure soil from one area (e.g., coastal area) isn't transported or used in a different area with different salinity and nutrient properties (e.g., 20 miles inland) in an effort to promote revegetation and minimize the spread of invasive species.	FERC
7-47.	7-28	Clarify whether the tables in the draft RR 7 appendices incorporate data from the other datasets cited (TAPS, ANGTS, Nowacki, Jorgenson, USGS, Everdingen, suite of other reports, etc.). The characteristics and limitations presented in the appendices reference only STATSGO2 data (appendix 7B) or stereo aerial photography (terrain attribute) data (appendix 7A). Are the Terrain Units (referenced in appendix 7A) referencing only the terrain units described in section 7.2.3, or does this table also incorporate data from the TC Alaska-developed algorithms mentioned in section 7.2.6?	FERC
7-48.	7-28	Specify why the longitudinal and cross slopes associated with the Point Thomson pipeline are not provided or necessary; otherwise, provide them.	FERC
7-49.	7-28	Table 7A-5 (for the Point Thompson Pipeline) lacks the detail provided in table 7A-1 for the Alaska Mainline. Modify table 7A-5 so that it is comparable (in the level of detail) to table 7A-1.	FERC
7-50.	7-29	Provide procedures for avoiding introduction of invasive biological/plant species where non-native backfill materials are used for access roads.	FERC
7-51.	7-30	Identify the thicknesses of the active permafrost layer along the Alaska Mainline	FERC

		and Point Thomson Pipeline, by MP.	
7-52.	7-30	Identify and provide support for the predicted increase in thickness (by MP) of the active layer along the pipeline alignment following placement of the pipeline along the Alaska Mainline and Point Thomson Pipeline.	FERC
7-53.	7-30	Determine the mitigation for frost bulbs around the buried pipeline.	FERC
7-54.	7-30	Discuss buoyancy forces on the buried pipeline with respect to poor drainage conditions, high water table, fine grained silty soils that become plastic with low moisture contents, a thick active layer above the permafrost, and the presence of permafrost below the pipe. Describe anticipated mitigation for buoyancy forces.	FERC
7-55.	7-29	Provide a description of impacts on soils and permafrost from fugitive dust fallout generated by construction and operation activities.	FERC
7-56.	7-29	Describe in detail how each ROW configuration would reduce impacts on soils.	FERC
7-57.	7-30	Describe the impacts on soils that could be anticipated based on whether they are thaw-stable or thaw-sensitive, the time of year, and the method of construction. Describe the specific measures would be taken to reduce impacts on soils that result from construction across thaw-sensitive soils during the summer.	FERC
7-58.	7-31	Identify whether "possibly other route data," referenced in the last sentence of the sixth full paragraph of section 7.5.1.1, would include the most recent field data.	FERC
7-59.	7-32	The majority of the soils along the planned Point Thomson route are stated to be thaw-sensitive; however, the discussion on the Arctic Coastal Plain MLRA of Alaska (MLRA 246) in section 7.3 describes thaw-stable, gravelly, and poorly drained permafrost soils located along terraces and floodplains of the Sagavanirktok River. Because both thaw-stable and thaw-sensitive permafrost exist along the Point Thomson route, provide percentages of thaw-stable and thaw-sensitive permafrost along this route and include them in table 7.5.1-1.	FERC
7-60.	7-32	In the third paragraph of section 7.5.1.1, please change table 7A-4 to table 7A-3.	FERC
7-61.	7-32	In section 7.5.1.1, justify the statement "it is unlikely that solifluction, soil creep, or thawed layer detachment would be issues either during construction, reclamation, or for operations and maintenance" on the Point Thomson Pipeline. Explain how the low-relief nature of this area justifies the statement, or what	FERC

		possible exceptions might occur. Provide citations and references to other North Slope projects, if needed.	
7-62.	7-34	Identify any significant differences in descriptions of permafrost features presented in the 1983 and 2009 guidebooks for the Dalton Highway Field Trip Guides. Identify whether any trends in permafrost feature changes are applicable.	FERC
7-63.	7-35	Provide the special pipeline construction protocols in thaw-sensitive soils that are referred to in the fourth paragraph of page 7-35. This paragraph refers to section 1.6.3.10 of RR 1. Section 1.6.3.10 needs to expand on how thaw-sensitive soils would be protected. Provide the tool kit practices referred to in section 1.6.3.10.	FERC, PHMSA
7-64.	7-41	Justify the statement “impact on hydric soils are expected to be minimal in areas constructed during winter.” Provide a discussion of possible exceptions that might occur.	FERC
7-65.	7-41– 7-42	In section 7.5.4.1, justify the statements “construction equipment traveling over wet unfrozen soils could temporarily disrupt the native soil structure, reduce pore space, increase runoff potential, and cause rutting” and “permafrost soils that remain frozen during construction are not typically considered compaction-prone.” Cite other similar North Slope projects where this has held true based on experience, or what possible exceptions might occur. Identify mitigation measures to prevent long-term damage from rutting or compaction in sensitive soil habitats.	FERC
7-66.	7-43	In section 7.5.1.4, the text states that "in undisturbed land that is crossed by construction during summer, most direct impacts…" What portion of the ROW would this be? Indicate where these areas are by MP.	OFC
7-67.	7-45	Clarify the significance of the reference to table 7.5.1-7 in the final paragraph on this page in section 7.5.1.6. Provide an explanation as to why topsoil data in this table is only presented for Alaska Mainline MPs 505.0 – 625.0.	FERC
7-68.	7-45	The text in section 7.5.1.5 states that "for the PT Pipeline, based on the data summarized in Table 7.5.1-6 the terrain data suggests that most of the right-of-way has few or no subsurface stones greater than 3 inches in size." The table does not make any references to stone size; please clarify. Also, the use of the terms "few or no subsurface stones" does not seem appropriate as the table indicates that	OFC

		over 420 acres (about 30 percent) of the Point Thomson route consists of a "frequent" distribution of subsurface cobbles and boulders. Please clarify.	
7-69.	7-45	The text states that "the establishment of stable surfaces will represent an additional natural landform after the area has been stabilized and allowed to revegetate." Provide additional information regarding what this could look like (how high of a hump this would result in, expected vegetation) and include a discussion in the wetlands section about how this could result in the loss of wetlands in some areas, in particular the Point Thomson Pipeline.	OFC
7-70.	7-46	Provide a column in table 7.5.1-7 for the 12-18 inch topsoil depth class as described in section 7.5.1.6. The text in section 7.4.6 describes five thickness ranges of component soil horizons: 0-6 inches, 6-12 inches, 12-18 inches, 18-24 inches, and greater than 24 inches.	FERC
7-71.	7-47	Provide specific reasons why segregation of topsoil and surface soils may not be practicable along the planned routes. Discuss how the decision would be made and factors that would be considered to determine whether it is practicable or not.	FERC
7-72.	7-47	Explain how the integrity of dense peat mat topsoils would be maintained for use in revegetation efforts (e.g., tundra plugs).	FERC
7-73.	7-47	Provide mitigation for construction through thaw-sensitive permafrost slopes.	FERC
7-74.	7-47	Provide trench/slope support mitigation for trenching operations made in slopes with solifluction lobes or thawed detachment layers. Describe how active layer glides, block slides and/or detachment failures would be prevented during trenching operation on slopes.	FERC
7-75.	7-47	Provide trench/slope support mitigation for trenching operations through rock glaciers identified along the Alaska Mainline route.	FERC
7-76.	7-50	Verify the percentage of droughty soil along Alaska Mainline route. Table 7.5.1-10 indicates 5 percent.	FERC
7-77.	7-51	In section 7.5.2.1, impacts are only described for 163 acres of the 235-acre footprint for the GTP. What are the impacts on the remaining acres? Clarify whether impacts are permanent or temporary.	OFC
7-78.	7-51	Identify and discuss other potential options for material, sand, and gravel required	FERC

		for construction (besides those listed) to reduce impacts created by new borrow pits. Discuss the feasibility of using gravel from legacy drill pads on the North Slope or remediated gravel and fines from contaminated sites. Provide applicable correspondence with ADEC representatives.	
7-79.	7-52	Explain what is meant by the row "Exclusion Area (Undisturbed)" in the text of table 7.5.2-1.	OFC
7-80.	7-53	Repeat top row on table 7.5.2-2.	FERC
7-81.	7-53	Explain what project components are included in section 7.5.3.1; i.e., not the GTP pad itself, but its supporting facilities.	OFC
7-82.	7-54	Discuss impacts as a result of the access roads for the Point Thomson Pipeline.	OFC
7-83.	7-54	The statement on mitigation measures does not provide enough information to determine what impacts there could be on soils from access roads. Provide more information.	OFC
7-84.	7-62	Discuss how many borrow sites are "privately owned."	OFC
7-85.	7-62	Provide some general mitigation measures or possible reclamation scenarios for the different types of mine sites; i.e., open-hole pits versus hillside sites. For example, some sites will be flooded and the soils will be submerged.	OFC
7-86.	Appendix 7A	Provide sums of acreage of permafrost and erosion potential in table 7A-1.	FERC
7-87.	Appendix 7A	Provide sums of acreage per each longitudinal slope gradient class and cross slope gradient class in tables 7A-2 and 7A-4. Ensure consistency with tables 7.5.1-8 and 7.5.1-9.	FERC
7-88.	Appendix 7A	Provide a similar table as table 7A-3 for the Point Thomson route.	FERC
7-89.	Appendix 7A	Provide a table 7B-6, “Selected Physical and Interpretative Characteristics,” for the access roads.	FERC
7-90.	Appendix 7B	Provide sums of miles of water, wind, hydric, compaction-prone, and droughty soils in table 7B-2.	FERC

Comment Number	RR Location Reference	Comments on Draft RR 8 – Land Use, Recreation, and Visual Impacts	Source
8-1.	General	Provide a more in-depth land ownership discussion or table showing all small parcel owners and third party interests affected by the planned APP ROW on BLM-administered lands (e.g., other ROWs leased, crossed, etc.).	BLM
8-2.	General	RR 8 should include a discussion of impacts on Section 6f (Land and Water Conservation Fund) Lands, if any.	USCG
8-3.	General	Include a Visual Resource Analysis (see comment G-10).	FERC
8-4.	8-5	Update tables 1.3.1.-2 and 1.3.1-3 to include all MP locations where the pipeline ROW would at least partially coincide with an existing utility ROW and where it would be adjacent to an existing ROW. Provide the following: • photographs/textual descriptions of representative locations along the planned ROWs in which existing infrastructure similar to that planned is already in place; and • copies of existing federal, state, and tribal visual resource management plans for lands located within 25 miles of the pipeline, including plans for lands which are already disturbed or set aside for a ROW.	FERC
8-5.	8-5	In table 8.2.2-1 describe why the land crossed by the Point Thomson Pipeline route is classified as Commercial/Industrial and not as Open. Open land is defined in section 8.2.2.1 to be a maintained utility right-of-way and tundra. Please clarify.	OFC
8-6.	8-6	Update table 8.2.2-2 to reflect land use classifications and identify land ownership.	FERC
8-7.	8-7; Appendix 1H	Appendix 1H indicates a 100-foot-wide permanent ROW is necessary along the entire pipeline based on the need for helicopter access. (This is double the permanent width frequently applied for large-diameter pipelines in the lower 48 states.) Provide additional justification for why a 100-foot-wide ROW is required during operations.	FERC
8-8.	8-7	Provide a letter from the appropriate state and federal agencies stating compliance	FERC

		with management plans concerning the disposition of timber cleared from the project area.	
8-9.	8-7	This section contains two references to BLM 1980. Contact the BLM to determine current status and collect updated information, because planning is ongoing on BLM land along much of the route. Provide updates.	FERC
8-10.	8-8	Section 8.2.2.3 states that "the majority of agricultural land uses will continue within the permanent, operational" ROW. Clarify what agricultural land uses would not continue. Explain why some agricultural land use would be prohibited near the pipeline during operation.	FERC
8-11.	8-9	Identify typical crops and the location (by MP) and type of specialty crops that would be impacted by the project.	FERC
8-12.	8-9	Confirm that the structures identified in table 8.2.2-3 are only seasonally occupied. If occupied during construction, provide site-specific plans that would minimize potential impacts. Also, describe what measures TC Alaska would implement to minimize impacts on structures within 50 feet of construction work areas not already identified but encountered during construction.	FERC
8-13.	8-10	Provide a Dalton Highway to Prudhoe Bay Area Traffic Management Plan developed in consultation with the Alaska Department of Transportation and Public Facilities.	FERC
8-14.	8-10 –8-11	RR 8 states that there are no residences within 50 feet of the construction work areas. From a visual impact perspective, 50 feet does not provide a sufficient "buffer" from the construction impacts associated with the equipment, activities, or worker presence. Additional analysis is necessary depending on the activities that are conducted. Therefore, identify additional residential/other substantive structures that are within 25 miles of the planned pipeline and associated infrastructure and provide viewshed analyses from typical residential locations in order to determine if APP components would be visible and if so, what impact may result. Update section 8.8 and/or the Visual Resource Analysis accordingly.	FERC
8-15.	8-11	Update tables 8.2.3-1 and 8.2.3-2 summarizing land requirements for aboveground facilities and identifying lands classified as "T/A."	FERC

8-16.	8-16; Appendix 8C	Delete the column labeled "Open Water" in table 8.2.3-2. Same comment for tables 8.2.4-4 (pages 8-28 through 8-30) and 8C-1. "Open water" is not a land type.	FERC
8-17.	8-18--8-19; 8-22--8-23	Provide a separate table that identifies the type and use of acreage that would be disturbed for all aboveground project facilities to include borrow sites, water lines, access roads, airstrip modifications, etc.	FERC
8-18.	8-18	Provide the land use impacts associated with the existing borrow site (Putuligauuk-23) that would be a source of sand and gravel required for the GTP.	FERC
8-19.	8-22	Provide a table identifying all expected airstrip requirements. The BLM notes that minor upgrades to existing non-commercial airstrips may require additional NEPA analysis and permitting.	FERC, BLM
8-20.	8-24; Appendix 8C	Modify tables 8.2.4-3 and 8C-1 regarding construction camps, pipe storage areas, and contractor yards to include whether the site is new or existing.	FERC
8-21.	8-27	Describe the duration of activities required to disassemble, remove, and restore surface facilities at the temporary camps following construction.	FERC
8-22.	8-27	The referenced table should indicate the existing and proposed users of the pits as well as type and quantity of material needs by each, along with potential additional expansion acreage.	BLM
8-23.	8-32	Expand the discussion of private lands. Include issues associated with lands to which TC Alaska has been denied access, and address specific issues raised during scoping regarding these areas.	OFC
8-24.	8-32	To complete the cumulative visual impact analysis, provide the following for existing or planned developments within the radius of analysis for cumulative impacts: • descriptions of the activities/planned work to document potential visual impacts, including general descriptions of visual characteristics of the proposed projects/activities; and • a list of potential opportunities for joint mitigation. As part of the potential mitigation for visual resources, some efforts may be able to be combined or coordinated with other projects in order to eliminate potential visual impacts	FERC

		associated with transportation, equipment, and worker presence. Update section 8.8 and/or the Visual Resource Analysis accordingly.	
8-25.	8-33	Update table 8.4-1 (land ownership/management of all land crossed by the APP).	FERC
8-26.	8-34, -43	Provide an update regarding the project's compliance with all land management plans. Include in the update information regarding the project consistency with land management goals and identify the proposed mitigation developed in discussions with both federal and state land management agencies.	FERC, EPA, OFC
8-27.	8-43	Describe how TC Alaska's proposed crossing of the Tetlin National Wildlife Refuge would be consistent with the FWS' management objectives for the Refuge.	FERC
8-28.	8-34 –8-47	The area of analysis of visual impacts in RR 8 is too small and is inconsistent with BLM requirements; it also fails to include a full range of potentially affected visual resources. Provide the following: a. An extension of the visual analysis of all lands (i.e., federal, state, and municipal) within 25 miles of the APP, including associated infrastructure. b. A map of the BLM utility corridor from the 1991 Resource Management Plan EIS and show the location of the two ACECs identified within Special Management Areas. c. Documentation of VRM plans and resource prescriptions as described in comment G-10. d. Identification of any special land uses (within 25 miles of the of the APP and associated infrastructure) that are managed by federal agencies and were designated in part due to the scenic value of the resources contained within them. e. A map of the ROW and project area with all sensitive visual resource areas (SVRA) within 25 miles of the planned APP, including associated infrastructure. The map should include the BLM Distance Zones (or other federal management system zones) and SVRAs. SVRAs should include, but are not limited to: • National, state, county, and local parks; recreation areas; conservation areas; preserves; historic landmarks; scenic or historic areas, trails, and highways; and wildlife refuges;	FERC

		• National Monuments and other National Park Service Units; • National and state Wild and Scenic Rivers; and • Wilderness and Wilderness Study Areas.	
8-29.	8-59	The introduction to section 8.5 states that no Wild and Scenic Rivers would be crossed by the planned pipeline. This analysis does not address potential impacts on nearby rivers that may meet Wild and Scenic criteria but are not actually crossed by the pipeline. Provide the locations of boat launches or public access to waterways, as these may be areas in which visual resources are important to the use of the land, as well as to provide a link to the recreational resources and potential subsistence fishing evaluation.	FERC
8-30.	8-43	Provide a table(s) that contain the information presented in tables 8.4.1-2 and 8.4.1-3 for Department of Defense, NMFS, and COE facilities, and for FWS managed lands.	FERC
8-31.	8-45	The standard categories used in table 8.4.1-4 do not reflect the actual uses of the land. Modify the columns of the table to specifically state what "Open Land" and "Commercial/Industrial" are referring to.	FERC
8-32.	8-46, -59	Would the APP cross designated Special Recreation Management Areas? Identify planned mitigation in compliance with the BLM's Utility Corridor Resource Management Plan EIS and Fortymile Management Framework Plan. Provide documentation from the BLM indicating that the APP would be in compliance with all federal land management plans.	FERC, BLM
8-33.	8-50	Provide updated land ownership information for section 8.4.2.1.	FERC
8-34.	8-52	The planned Alaska Mainline route crosses multiple management units within the Tanana Valley State Forest. Provide documentation that the project would be in compliance with the management plan (2001 update) for this area.	FERC
8-35.	8-53, -59	Address BLM recreation sites along the Dalton Hwy, Elliott Hwy, and the White Mountains Recreation Area. It appears that the planned route would pass near most of the BLM recreation sites along the Dalton Highway, specifically the Marion Creek administration site and campground. The planned construction camp at Coldfoot could impact tour buses and the Arctic Interagency Visitor Center.	FERC, BLM

		Provide a Draft Implementation Plan as required by the Dalton Highway Master Plan that includes or responds to the recommendations from all interested parties.	
8-36.	8-58	Section 8.4.2.6 states that no municipal or private lands would be affected by the Point Thomson Pipeline. This section also states 2 percent and 15 percent of the Alaska Mainline route crosses municipal and private lands, respectively. Update the section to accurately reflect impacts on municipal and private lands.	FERC
8-37.	8-59	Even though the Coastal Zone Management authority has lapsed, applicable issues of consistency with Alaska's coastal policies should be addressed in the text of the resource report.	FERC
8-38.	8-62	Add a discussion of the rights reserved under 17(b) of ANCSA (i.e., 17(b) easements) to the federal government across native lands. This should include a table or combined with the RS 2477 - table 8.5.4-1, since many of these overlap. Also discuss 17(b) easements in sections 8.5.6.3 and 8.5.6.4.	BLM
8-39.	8-63	Make the following corrections to table 8.5.5-1: • MP 431.3 should be "Wickersham Creek Trail (designated); BLM" not "Ski Loop; State of Alaska"; • MP 431.3 should be "Summit Trail (designated); BLM" not "State of Alaska"; and • MP 470.5 should be "Winter Trail; State of Alaska" not "BLM."	BLM
8-40.	8-65	Make the following corrections to table 8.5.6-1: • MP 472.2 should be "Potlatch Creek; State of Alaska"; not "BLM"; • MPs 475.0 and 475.4 should be "Chena River (designated); Military"; not "BLM"; • MP 481.5 should be "Moose Creek (designated); Military"; not "Military/BLM"; • MP 594.4 should be "Sears Creek; State of Alaska"; not "BLM"; and • MP 597.5 should be "Berry Creek; State of Alaska"; not "BLM."	BLM

8-41.	8-64	Identify undesignated areas along the Point Thomson Pipeline or the Alaska Mainline routes that may be important for general recreation use and add these to table 8.5.6-1. Include the BLM ACEC and Tetlin National Wildlife Refuge in this section because of their recreation values. Contact land management agencies to identify undesignated areas with important recreation values.	FERC
8-42.	8-65 –8-66	The RR is missing numerous BLM recreation sites along the Dalton Highway; e.g., the White Mountains National Recreation Area (e.g., Wickersham Creek Trailhead, Colorado Creek Trailhead, and Fred Blixt Cabin). Add the planned gravel pit at the Marion Creek Administration Site.	BLM
8-43.	8-70	Figure 8.7.2-1 is missing BLM national areas – please add.	BLM
8-44.	8-73	Section 8.7.3 should include a table with all authorized landfills (including their capacity), as well as any proposed landfills. TC Alaska should discuss the amount of solid waste that would be generated and where precisely it would be disposed. (The BLM notes some landfills authorized to Alyeska are not open to the public.)	BLM
8-45.	8-76 –8-77	Section 8.8.3.2 identifies measures that would be used to screen the planned aboveground facilities. Provide more discussion regarding how this task would be accomplished, or if other measures are available to address screening of APP components. Provide a list of site-specific mitigation measures per project phase. These measures should include commonly accepted practices as well as those developed specifically for the APP.	FERC
8-46.	8-77	The statement "Therefore, the VRM and other Federal or state visual or scenic quality prescriptions for this infrastructure are the same as those associated with the pipeline or Aboveground Facility at a specific MP location," is confusing. Please explain or revise.	FERC
8-47.	8-73 –8-78	The analysis of impacts currently lacks sufficient detail. The analysis requires a description of common impacts by project phase. For the proposed route and route alternatives and variations that meet the project objective, provide:	FERC

		• a description of impact analysis methodology and impact criteria; • a general description of visual impacts associated with equipment/ infrastructure and construction/operation/decommissioning activities, including photographs/textual descriptions of the activities/planned work to document potential visual impacts (e.g., clearing the ROW or grading/placing gravel on ROW); • a description of common direct and indirect impacts by phase of development, including both daytime and nighttime activities; • a lighting plan for all activities/facilities in order to conduct the nighttime impact analysis; • a full listing of appropriate visual impact mitigation measures; • identification/description of KOPs for sensitive visual resource areas (see comment 8-28 for examples of the included areas) within the APP viewshed; • viewshed analyses from KOPs; • Visual Resource Inventory/VRM values (for BLM lands) and Visual Contrast Ratings or similar evaluation from KOPs; • spatially accurate and realistic visual simulations – depicting both summer and winter conditions; • a discussion of applicable visual resource/land use management plans and prescriptions for lands within 25 miles of the APP and associated infrastructure (e.g., Tanana Valley State Forest Management Plan, Dalton Highway Plan, etc.); and • an evaluation of consistency with VRM classes (for BLM lands) and other visual resource management plans and prescriptions, as applicable (for non-BLM lands).	

Comment Number	RR Location Reference	Comments on Draft RR 9 – Air, Climate Change, and Noise	Source
9-1.	General	Provide a fugitive dust control plan. The plan should specify the following: a. the precautions that would be take to minimize fugitive dust emissions from construction activities, including any mitigation measures to control fugitive dust emissions of total suspended particulates and particulate matter of 10 microns in diameter or smaller (PM_{10}), including, but not limited to: • spraying the construction work areas with water or a palliative, • measures to limit track-out onto the roads, • halting operations during high wind events, • the speed limit that would be enforced on unsurfaced roads, and • covering open-bodied haul trucks, as appropriate; b. the individuals with the authority to determine if/when water needs to be reapplied for dust control; c. the individuals with the authority to determine if/when a palliative needs to be used; and d. the individuals with the authority to stop work if the contractor does not comply with dust control measures. Provide documentation of consultation with the Alaska Department of Transportation and Public Facilities regarding supply and application of calcium chloride to the Dalton Highway during the summer season. Also, provide a comparison of the project fugitive dust control plan with appropriate portions of Eielson AFB's fugitive dust control plan.	FERC, OFC, BLM, EPA
9-2.	General	It is unclear whether worker vehicle (commuter traffic) and delivery truck emissions have been included in the RR 9 calculations. Quantify the emissions from that portion of commuter and delivery traffic occurring in the NSB	FERC, EPA

		nonattainment area/maintenance area for both pipeline construction and Joining Yard operations.	
9-3.	General	Provide updated emission estimates for General Conformity Applicability based on the construction emissions questions asked elsewhere in this section. If the APP would exceed the General Conformity Applicability thresholds, provide a discussion of how the project would conform with the applicable State Implementation Plan. Include appropriate consultation with the ADEC and EPA regarding the purchase of pollutant offsets, mitigation commitments through state or federal programs, or accountability or revisions of the State Implementation Plan.	FERC, EPA
9-4.	General	Include information regarding vibration impacts due to drilling, bridge pier placement, etc. during construction.	USCG
9-5.	9-2	Provide copies of air permit applications as required under table 9.1-1. Also, identify applicable air permits in table 1.11 of RR 1.	SPCO
9-6.	9-3	There is an Alaska Range and an Aleutian Range but not an Alaska-Aleutian range of mountains. Correct text.	OFC
9-7.	9-6	Include definitions of all acronyms at bottom of table 9.2.1-1 (ASOS and COOP are there, but ACRC and NCDC are not.)	SPCO
9-8.	9-6 – 9-9	Reconcile figure 9.2.1-2 (which shows 15 meteorological stations) with table 9.2.1-1 (which has 13, lacking data for Prudhoe Bay and Chandalar Lake). Also update table 9.2.1.2 to include the climate summaries for the Prudhoe Bay, Happy Valley Camp, Chandalar Lake, Cold Foot WBAN, and Prospect Creek meteorological stations. Provide wind roses at representative meteorological stations. The Cold Foot WBAN meteorological station is incorrectly shown off of the pipeline route. Correct this discrepancy.	FERC, OFC
9-9.	9-12	Provide a description of the different air quality control regions (AQCR) within the state of Alaska in accordance with 40 CFR 81, and describe the APP-related facilities and pipeline(s) by MP that are within each AQCR.	FERC

9-10.	9-12	The boundaries for the non-attainment area for $PM_{2.5}$ is not exactly the same as the maintenance area for carbon monoxide (CO). Revise the description of these areas to clarify and correctly describe the difference between each area.	SPCO
9-11.	9-12 – 9-14	Update table 9.2.2-1 to reflect the most current National Ambient Air Quality Standards (NAAQS). Also, present concentration units in tables 9.2.2-1 through 9.2.2-3 consistent with the NAAQS regulations (e.g., parts per billion or parts per million for gaseous pollutants).	FERC
9-12.	9-13	Clarify how the data presented in table 9.2.2-2 (from the coastal plain) can truly be representative of air quality nearly 200 miles away in the Brooks Range.	OFC
9-13.	9-13 – 9-14	The 98^{th} percentile 2010 monitoring data for the 24-hour $PM_{2.5}$ at the state office building in Fairbanks recorded concentrations more than 10 micrograms per cubic meter higher than the 2008 values shown in table 9.2.2-3. Update background levels in tables 9.2.2-2 and 9.2.2-3 to present the average of the three most recent years of data for each monitoring location, based on the same statistic the NAAQS are evaluated on for each pollutant and averaging time (maximum, average, 98^{th} percentile, etc.)	FERC
9-14.	9-14	Provide an anticipated schedule for completing preliminary determinations of acceptability of background measurements with ADEC, and in the event that additional data are required, likely completion dates for the monitoring program, analysis of the collected data, and acceptance of the results by ADEC.	FERC
9-15.	9-16	Correct the statement in first paragraph: "One exception ... VOCs (volatile organic compounds) are regulated criteria pollutants." VOCs are <u>not</u> criteria pollutants.	FERC
9-16.	9-16	The term "essential" is used in the description of the common equipment for the GTP. Describe what makes those units essential as opposed to all the rest.	OFC
9-17.	9-16 – 9-17	Provide the approximate power ratings for each of the common equipment proposed for the GTP site and compressor stations.	FERC
9-18.	9-16	Use of the terms "estimated potential to emit" and "estimated operational emissions from normal operations" requires clarification. Identify whether the emissions presented are based on "potential to emit" (as used to define major	FERC

		sources) or estimated actual emissions.	
9-19.	9-16 – 9-19	Clarify whether, as indicated in the column headers in tables 9.2.4-1 and 9.2.4-2, the listed emissions are "potential to emit," as would be calculated for determining whether a source exceeds the major source thresholds or significance criteria for Prevention of Significant Deterioration (PSD), or whether these emissions are estimated normal operational emissions as stated in the text references to these tables on pages 9-16 and 9-17. Provide the same clarification for table 9.2.4-3 which has a column header specifying only "Emissions."	FERC
9-20.	9-16 – 9-17	Section 9.2.4.1 states that H_2S would be removed in the processing trains. Clarify whether the H_2S would be compressed with the CO_2 removed and piped back to the producers, or if the H_2S would be separated and vented/emitted. If emitted, provide the detailed H_2S emission calculations, identify any emission control devices (including control efficiency), and compare emissions with the PSD significant emission rate threshold.	FERC
9-21.	9-17 – 9-18	Section 9.2.1.5 states that the coldest locations for the APP are on the North Slope at Prudhoe Bay and on the north side of the Brooks Range near Galbraith Lake. However the GTP site emissions rates were based on reference temperatures of 10 ºF and the compressor stations were based on 0 ºF. Revise emissions for the GTP site to reflect the coldest conditions or provide justification why the GTP site emissions are not based on the coldest temperatures. Also, the GTP site and compressor stations may experience temperature variations ranging from temperatures in the negatives during the winter to summertime highs in the 70s. Provide a range of emission estimates (including detailed emission calculations) that may result due to extreme temperature changes and identify which facilities would be subject to experiencing ranges in operating emissions.	FERC, OFC
9-22.	9-17 –9-18; Appendix	Emission factors for much of the equipment for the GTP site and compressor stations are based on vendor-provided data. Provide copies of the manufacturer	FERC

	9A	data sheets (or equivalent) supporting the identified emission factors based on the identified reference temperatures.	
9-23.	9-17 –9-18; Appendix 9A	Appendix 9A identifies a GE PGT25+G4 DLE compressor for each proposed compressor station. Clarify whether TC Alaska has selected this gas turbine for all compressor stations or if a range of manufacturers and turbines are being considered. If a range, provide the detailed emissions calculations for several manufacturers and turbines being considered supporting a "worst case scenario" unit, on a per-pollutant basis.	FERC
9-24.	9-18 –9-19; Appendix 9A	Emissions may not be the same for each compressor station. Page 1-16 of RR 1 notes that gas chillers would be used in areas with permanent permafrost. Identify which compressor stations would require gas chillers and quantify the station emissions both with and without gas chillers, including equations, emission factors, and other required parameters in the spreadsheet format of appendix 9A.	FERC
9-25.	9-19	Quantify emissions associated with: • pig launches and receivers; • mainline block valves; and • intermediate gas delivery points. Specify whether there are non-greenhouse gas (GHG) emissions (e.g., VOCs) associated with these sources and, if there are, quantify these emissions.	FERC
9-26.	9-19	Provide text describing the process to be used for initial facility startup at the GTP (including drying out of the facility and process systems). Include information about which gas would be used to purge/dry the system, quantity of gas to be used for the initial system conditioning, duration of the conditioning process (for the entire project), and how the purge/conditioning gas would be disposed of (e.g. venting or flaring).	FERC
9-27.	9-19	Provide the following information: • a list of emission points and an emission estimate for all stages of initial facility startup at the GTP (including drying out of the facility and process	FERC

		systems); • emission estimates for criteria pollutants (CO, nitrogen oxides, sulfur dioxide, PM_{10}, $PM_{2.5}$, VOCs, and lead); and • emission estimates in metric tons per year from all stages of the initial startup process for GHGs (methane, nitrous oxide, CO_2, and total CO_2 equivalent).	
9-28.	9-19	Regarding the GTP: a. Describe the potential for gas turbine startup/shutdown cycles, calculate associated emissions, and provide modeled short-term ambient impacts. b. Discuss the potential for daily/weekly shutdowns. c. Provide data showing anticipated number of annual startup/shutdown cycles and variation by season, source of emission factors for startup/shutdown events, startup/shutdown emission rates, and annual emissions due to startup/shutdown. d. Model short-term ambient impacts from startup/shutdown events. e. Provide a description of the modeling procedure and a data table showing modeled maximum impacts.	FERC
9-29.	9-19	Routine maintenance and emergency shutdown for maintenance typically requires purging natural gas from compressors, pipes, and other equipment. Provide the following: • data on the expected number of routine maintenance and emergency venting/blowdown events per year; • duration of each type of event; • anticipated emissions of criteria pollutants and GHGs from each type of event and annual totals (include detailed calculations and assumptions); and • disposition of gas from routine maintenance and emergency venting/blowdown events (e.g. flaring or direct venting) at the GTP and at the compressor stations.	FERC

9-30.	9-19	For the compressor stations, quantify emissions (including detailed calculations and assumptions) associated with startups and shutdowns.	FERC
9-31.	9-17 – 9-21	It is not clear whether off-site vehicle emissions, if any, have been included in the inventory. State whether off-site vehicle emissions have been included and: • if they are in the inventories, identify them and break them out in tables 9.2.4-1, 9.2.4-2, and 9.2.4-3 or in a separate table; or • if they are not in the inventories, quantify them and specify with which of the three sources (GTP, Compressor Stations, or Miscellaneous) they are associated.	FERC
9-32.	9-21	Correct the first bullet to 40 CFR Part 52.21(i)(2). 40 CFR 52.21(j)(3) is applicable if the proposed project is a modification rather than a new facility.	SPCO
9-33.	9-22	Considering the 10-kilometer distance with respect to Class I areas under the PSD, clarify whether an analysis of the impacts on air quality and air quality-related values at Class I areas need to be considered for any of the compressor stations near the Denali National Park and Wilderness and whether federal land managers would be notified.	FERC
9-34.	9-22 –9-23; Appendix 9A	Provide additional discussion of each New Source Performance Standard (NSPS) potentially applicable to the APP, including: • a description of the requirement and what types of sources it applies to (including sizes, power rating, dates of construction, fuel sources, etc); • the pollutants controlled by the standard; • the limitations/requirements of the standard; • the sources at the facility the standard may apply to; • a discussion of why the source at the facility is or is not applicable to the regulation; and • if applicable, how the source would meet the requirements of the standard. At a minimum, section 9.2.4.4 should include a discussion of NSPS Subparts Db,	FERC

		Kb, VVa, KKK, LLL, IIII, JJJJ, and KKKK. Any additional subparts included in a PSD permit should also be included. Also, specify whether the NSPS limits were assumed to be met in making the emissions estimates in appendix 9A, and what quantitative limits were applied to which sources.	
9-35.	9-24 –9-25; Appendix 9A	Provide additional discussion of each National Emission Standard for Hazardous Air Pollutant (NESHAP) or Maximum Achievable Control Technology (MACT) potentially applicable to the APP, including • a description of the requirement and what types of sources it applies to (including sizes, power rating, dates of construction, fuel sources, etc.); • the pollutants controlled by the standard; • the limitations/requirements of the standard; • the sources at the facility the standard may apply to; • a discussion of why the source at the facility is or is not applicable to the regulation; and • if applicable, how the source would meet the requirements of the standard. At a minimum, section 9.2.4.5 should include a discussion of NESHAP/MACT Subparts A, H, HH, HHH, JJJJ, YYYY, ZZZZ, and DDDDD. Any additional subparts included in the PSD permits should also be included. Also, specify whether applicable NESHAPs were assumed to be met in making the emissions estimates in appendix 9A, and what quantitative limits were applied to which sources.	FERC, SPCO
9-36.	9-24	Address the following: a. Provide a regulatory description of the chemical accident prevention provisions, codified in 40 CFR 68, and identify all potentially applicable substances the APP would include.	FERC

		b. Identify whether those substances would exceed the thresholds identified in the regulation (and identify the threshold). c. Include a discussion of why the substance/facility is or is not applicable to the regulation, and if applicable, provide a copy of the risk management plan. d. Also, identify whether TC Alaska would be required to meet the general duty provisions of section 112(r)(1) of the 1990 Clean Air Act Amendments if there were to be any regulated substance or other extremely hazardous substance on-site.	
9-37.	9-26	State what the requirements are under the GHG Reporting Rule and how those requirements would be met.	FERC
9-38.	9-26; Appendix 9A	Address the following: a. Provide additional discussion regarding title 18 of the Alaska Administrative Code, parts 50.215 and 50.910, with respect to construction camps. b. Identify the length of time construction camps would be present to support their definition of "temporary." c. Identify whether stationary sources of emissions (e.g., generators) at the construction camps would be required to be permitted or would also fall under the definition of "temporary construction." d. Appendix 9A emission calculations for construction camps do not appear to include tailpipe emissions associated with construction equipment to create the construction camps. Update the construction emissions associated with construction camps to include all associated emission activities.	FERC
9-39.	9-26	Discuss the basis for the determination that compressor station construction would qualify as a temporary construction activity. Is this qualification based on the premise that the construction of each individual compressor station would take less than 2 years from start to finish? Also, provide clarification on what activities are considered to be within the scope of the compressor station construction activities. For example, it appears a weather station and 15 meter tower for air quality modeling are included, but this work is done in advance.	SPCO
9-40.	9-26	Discuss the State of Alaska opacity of smoke regulations from marine vessels. Evaluate the applicability of these regulations on the APP.	EPA

9-41.	9-27	Provide detailed emission estimates from the construction of new haul and access roads and the expected locations of these roads. Include emissions associated with temporary/portable concrete batch plants, if any.	FERC
9-42.	9-27	Provide detailed construction emission estimates from marine vessels/barges. Evaluate emissions for dredging operations and transportation of equipment and pipeline supplies starting when the vessel enters state waters (breakdown emissions associated with transit, idling/hotelling, dredging, etc.).	FERC, EPA
9-43.	9-27	Include a discussion of the potential emissions of black carbon, a form of particulate matter, from sources like ships and diesel engines associated with the project. Because of its location in the Arctic and the fact that increased amounts of black carbon could increase snow or ice melting in the nearby areas, provide information on black carbon emissions and alternative types of fuels that could be considered.	EPA
9-44.	9-27	New pads would be part of the construction activities at compressor stations. Emission estimates for the preparation of concrete do not appear to have been included in the emissions estimates. Provide detailed emission calculations associated with the preparation of concrete for the new pads at compressor stations and state what equipment would be used.	FERC
9-45.	9-27	Disclose whether vehicular air toxics emissions would result from project construction and operations, discuss the cancer and non-cancer health effects associated with air toxics and diesel particulate matter, and identify sensitive receptor populations and individuals that would likely be exposed to these emissions.	EPA
9-46.	9-27	Identify distances to human activity centers and sensitive receptor locations (particularly parks, schools, hospitals, day care centers, outdoor recreation facilities, etc.) to the nearest proposed construction work areas. Provide an assessment or accounting (qualitative or modeled depending on the severity of existing and projected conditions) of all the factors that could influence the degree of adverse impact on the population due to increased construction emissions. As appropriate, provide a hotspot analysis for air toxics and particulate matter and identify mitigation measures as necessary.	EPA

9-47.	9-27 –9-34; Appendix 9A	The emissions from the Pipe and Double Joining Yard have not been included in the construction emissions. In addition, emission estimates should include transportation of the pipe segments by truck from the Pipe and Double Joining Yard and the return trip of each truck. These emissions should be added to the pipeline construction totals for each calendar year that they would occur in. Also, specifically identify the portion of applicable emissions that would occur within the nonattainment or maintenance areas of Fairbanks for General Conformity applicability.	FERC, EPA
9-48.	9-28	Provide a brief listing of the sequence of construction for the compressor stations so it is clearer what the logical progression of emissions would be over the various construction seasons. Also, provide the missing $PM_{2.5}$ and CO_2 air emission estimates for the George Lake Compressor Station.	SPCO
9-49.	9-29	Footnote (a) in table 9.2.5-1 leaves the status of fugitive $PM_{2.5}$ unclear. Clarify whether fugitives are included in the estimates of $PM_{2.5}$.	FERC
9-50.	9-30	Provide detailed emission estimates associated with open burning activities.	FERC
9-51.	9-30	Provide an air dispersion modeling protocol for the GTP and the compressor stations. This protocol should include documented correspondence with the ADEC, EPA, and FERC staff and should identify the source of meteorological data.	FERC, BLM
9-52.	9-30	Correct the text which limits the source of fugitive dust to roads to include other sources of dust. Fugitive dust can also be a concern when soils and construction materials are stockpiled. In those cases covering the piles can be a feasible mitigation measure	SPCO
9-53.	9-30 – 9-32	Provide a modeling analysis that presents air impacts as a result of operating emissions at the GTP and compressor stations. This analysis should incorporate correspondence with the ADEC, EPA, and FERC staff. a. Include a discussion on whether air modeling impacts are required on the worker housing located at the GTP and compressor stations. b. Identify whether the EPA or ADEC require an ozone modeling analysis. If so, provide a draft modeling protocol and modeling analysis for ozone impacts.	FERC, BLM

9-54.	9-32	The "10 percent" rule has been rescinded. Delete it from use in the conformity evaluation.	FERC
9-55.	9-32	Clarify whether the Transportation Conformity Rule would also be applicable to the APP. Describe the rule, the project's applicability, and if applicable, provide a discussion of how the project would conform with the State Implementation Plan.	EPA
9-56.	9-33	Indicate how the projected emissions presented in table 9.2.6-1 were calculated and what assumptions were made.	SPCO
9-57.	Appendix 9A	The detailed emission calculations for construction emissions appear to use emission factors sourced from NONROAD and MOVES. Provide clarification that these sources are appropriate in the cold climates in Alaska, or update emission factors based on appropriate sources.	FERC
9-58.	9-35	Provide the estimated GHG inventory for the State of Alaska and provide the percent increase in emissions as a result of construction and operation of the APP.	FERC
9-59.	9-36	Present mitigation measures to reduce GHG emissions during construction and operation periods.	FERC
9-60.	9-39	The U.S. Global Change Research Program (USGCRP), in a 2009 report *Global Climate Change Impacts in the United States*, identifies climate change impacts in Alaska, including "the number of days per year in which travel on the tundra is allowed under ADNR standards has dropped from more than 200 to about 100 days in the past 30 years. This results in a 50 percent reduction in days that oil and gas exploration and extraction equipment can be used." Provide a discussion on how a shortened winter season, and ADNR restrictions (e.g., frozen ground and ice roads for travel) would impact the multi-year construction of the project.	FERC, BLM
9-61.	9-39	The USGCRP report identifies that permafrost temperatures have increased throughout Alaska resulting in land subsidence and infrastructure risks. Section 9.3.2.3 briefly identifies modeling TC Alaska has performed to predict the warming trend in Alaska and mitigate for risks to the project. Provide a more thorough discussion on what considerations have been incorporated in the design of the APP, including details about the modeling analysis performed and detailed	FERC, BLM

		engineering/design measures to adapt to these climate change impacts.	
9-62.	9-39	Based on the USGCRP report, the rate of erosion along Alaska's northeastern coastline has doubled over the past 50 years, and coastal storms are projected to increase, leading to increased coastal erosion. Provide a discussion on what considerations have been incorporated into the design of the West Dock and GTP site to adapt to these climate change impacts.	FERC, BLM
9-63.	9-39	The USGCRP report identifies that closed-basin lakes within the southern two-thirds of Alaska have decreased over the past 50 years. Identify any cumulative impact the APP would have (in addition to climate change) as a result of using these water sources for project-related construction of ice roads. Also, identify any impacts on the project or adaptation measures which have been developed because of this impact and the availability of water to meet the project's needs.	FERC, BLM
9-64.	9-40	Quantify background noise levels at the GTP site, at compressor station sites, and along the two planned pipeline alignments.	FERC
9-65.	9-40 – 9-41	Provide a discussion of impacts. Provide the potential impacts, generic and specific, associated with the typical activities that are described. Quantify noise levels from commonly used construction equipment based on sample distances from a pipeline or ROW.	FERC
9-66.	9-41	Identify whether pile driving activities would be required at the GTP site. If so, provide estimated noise levels from pile driving activities based on sample distances from the activity.	FERC
9-67.	9-40 – 9-42	Address noise levels from construction activities including pipeline spread construction, pile driving, blasting, dredging, HDD entry and exit sites, access road use, GTP construction, and compressor station construction. Provide: • any differences in noise levels expected between summer and winter construction of pipeline spreads; and • any differences in noise levels expected between Alaska Mainline spreads north of the Brooks Range (permanent permafrost) and south of the Brooks Range (thaw-sensitive permafrost).	FERC

9-68.	9-40 – 9-42	Address noise from increased truck traffic along the highways between Fairbanks and Deadhorse.	FERC
9-69.	9-40 – 9-42	Address noise levels associated with the modifications to Dock Head 2 and construction of the West Dock Area.	FERC
9-70.	9-40 – 9-42	Identify the noise metric to be used in assessing construction.	FERC
9-71.	9-40 – 9-42	Address the potential noise impacts of increased helicopter and aircraft flights, routine maintenance, blowdowns at mainline block valves and compressor stations, and local vehicular traffic.	FERC
9-72.	9-40 – 9-42	Provide the anticipated mitigation measures for construction and operation periods at GTP, new compressor stations, and along the pipelines including those to be used for reducing noise to acceptable levels at NSAs and vibration at NSAs, especially for HDDs, pile driving, and blasting.	FERC
9-73.	9-42	Provide a noise analysis, including all supporting detailed calculations, for all noise-sensitive areas (NSA) within 0.5 mile of each HDD entry and exit site. This analysis should include: • the distance and direction to the NSAs from each HDD entry or exit site and identify the NSAs on a topographic or aerial map; • the proposed length of time HDD activities would occur; • estimated drilling noise contributions at the NSAs for each HDD; • a noise mitigation plan identifying measures that would be implemented at each HDD location where estimated drilling noise contributions would exceed 55 dBA L_{dn} at a nearby NSA, and the resulting noise levels with the mitigation measures; and • site-specific plans identifying any noise walls or barriers, equipment locations, equipment barriers, or any other noise mitigation measures.	FERC
9-74.	9-43	Identify any applicable Occupational Safety and Health Administration (OSHA) noise standards (short- and long-term noise levels) for workers living at the GTP site. Quantify noise levels due to operation of the GTP facility and compare impacts with any applicable OSHA standards. Also identify any mitigation as	FERC

		required.	
9-75.	9-43	Provide the 55-dBA L_{dn} contours for the compressor stations.	FERC
9-76.	9-43	Provide composite noise levels at a reference distance for the GTP and compressor stations.	FERC
9-77.	9-43; Appendix 1B	Clarify the status of identification of NSAs for the George Lake and Tatalina River Compressor Stations. There appears to be an inconsistency between tables 9.4.2-1 and 9.4.2-2, and the corresponding figures in appendix 1B (the number of identified NSAs differ).	FERC
9-78.	9-43	Describe the proposed compressor units and cooling equipment (if required) at each compressor station, including horsepower, type, and energy source.	FERC
9-79.	9-43	Identify all proposed noise control equipment for compressor stations and the noise absorption capabilities of the equipment. Include cooling equipment if gas cooling is required.	FERC
9-80.	9-43	Provide estimates of distances to nearby NSAs for each compressor station (a statement that no NSAs occur within 1 mile is insufficient).	FERC

Comment Number	RR Location Reference	Comments on Draft RR 10 – Alternatives	Source
10-1.	General	For each alternative, address its ability to meet project objectives and provide the environmental impacts in each resource area.	FERC
10-2.	General	Provide additional details to descriptions of route alternatives to allow a comprehensive analysis/assessment. Compare the environmental impacts associated with the various alternatives to those of the corresponding portion of the proposed project. Describe the advantages and disadvantages of the alternative versus the planned APP. Be sure to also provide details of the minor route alternatives or variations. Or, as the EPA says, RR 10 should provide a clear and detailed description of the specific criteria that were used to develop the route alternatives, including the process for eliminating alternatives from detailed consideration. In developing evaluation criteria for alternatives, factors such as reducing the direct, indirect, and cumulative environmental impacts, costs, technology, and logistics should be considered in the RRs. Criteria could also be based on factors such as conservation of aquatic and terrestrial habitats, maintaining wildlife and fish passage, economics, subsistence resources, and public safety. Additional considerations for alternatives evaluation criteria could include avoiding known contaminated sites, co-locating development with existing facilities and ROWs, and maintaining safe distances from existing operating facilities and population areas. A good model for identifying specific criteria for alternative selection is the COE's Point Thomson draft EIS – www.pointthomsonprojecteis.com .	FERC, EPA
10-3.	General	Several figures and alignment sheets are filed as Critical Energy Infrastructure Information (CEII) including figures 10.5.2-2, 10.5.2-3, 10.5.2-4, 10.5.2-5, and	FERC

		10.5.2-6. No reasons have been provided for filing these items as CEII. Explain the reason(s) for filing as CEII each figure and alignment sheet so filed.	
10-4.	General	It is not clear why the identified route variations were selected. Was it to assess alternate crossings of a feature (like a waterbody, sensitive area, proximity to residence) or was it the consequence of an iterative process that looked at a couple of crossings of a feature with the end result being the selected route. If the variation(s) presented is the result of this, then there needs to be a more clear connection to this process and TC Alaska's conclusion to include one of the routes as the proposed route. Update the information about all of the alternative routes and route variations to address this issue.	FERC
10-5.	General	We recommend that TC Alaska evaluate an aboveground pipeline alternative to the planned buried Point Thomson Pipeline in order to avoid and minimize adverse impacts to tundra wetlands and permafrost on the Arctic Coastal Plain. Include a table that compares the advantages and disadvantages of each in the relevant resource areas.	FERC, EPA
10-6.	General	Include a discussion of alternatives which would avoid or minimize impacts from marine dredging, and open-water spoil disposal. a. Include an evaluation of on-land disposal of the dredge spoil. b. Evaluating a barge and bridge system similar to the proposal for the Point Thomson project to minimize, if not avoid, the need for ocean dumping of dredged material.	EPA
10-7.	10-3	The discussion of the no-action alternative is incomplete. No action is what may happen if the FERC declines to issue the certificate or the pipeline is otherwise not constructed. This is the option that should be discussed.	OFC
10-8.	10-6	Better defining the purpose and need would help to limit the range of reasonable alternatives. The report could more easily limit the alternatives if the purpose were stated as to deliver North Slope gas to North American markets, or to the Canada/Alaska border. We suggest using language from the Alaska Natural Gas Pipeline Act. Because the need is unclear, the report discusses nuclear, conservation, and renewables, which might reduce demand but would not necessarily meet the purpose and need of the APP.	OFC

10-9.	10-7	The discussion in the final paragraph should mention the U.S./Canada agreement under which the United States agreed to the border crossing point.	OFC
10-10.	10-9	Provide location maps for the Alaska Stand Alone Pipeline, the Trans-Alaska Pipeline System, and Valdez LNG Alternative.	FERC
10-11.	10-10	Sections 10.4.3.3 and 10.4.3.4 indicate that above-ground construction of the planned pipelines would be an alternative to underground installation. RR 1 indicates on page 1-9 that "APP may decide not to bury the Alaska Mainline in locations of major potentially active seismic activity (i.e., active fault crossings)." The decision to build above- or below-ground would be based on technical arguments, similar to those considered prior to TAPS construction. a. Provide details about the technical considerations that would be used to evaluate whether to bury the pipeline or to install it above-ground. b. What criteria would indicate that a segment of the pipeline should be installed above-ground? Provide MP locations of the areas where such an analysis is indicated.	FERC
10-12.	10-11	The reasoning behind the choice of 48-inch vs. 52 inch pipe is unclear and hard to follow. Please clarify the text.	OFC
10-13.	10-12	Please provide in the appendix the supporting cost documentation for the statement "The cost of an aboveground installation has been estimated at 1.5 – 2 times the cost of a belowground installation." Provide estimates for installing the natural gas pipelines below ground versus above ground.	EPA
10-14.	10-12	The statement that an aboveground configuration of the pipelines "may" face significant challenges due to "lack of historic industry experience" does not mean such an alternative is technically infeasible or not capable of being done. Explain more about outage conditions as identified in the materials bullet.	OFC
10-15.	10-13	Regarding the statement "By use of carefully developed construction and reclamation practices, the right-of-way can be successfully reclaimed and revegetated": a. The existing Plan and Procedures do not contain specific performance standards that could be defined as successful reclamation or revegetation. Also, within how much time would successful reclamation and revegetation	OFC

		take place? This statement is overall very broad and misleading. b. It is "likely infeasible" is different than it is not capable of being done. Clarify why there is uncertainty.	
10-16.	10-13	**Route Alternatives**. Brooks Range Foothills, Atigun Pass, Yukon River, Fairbanks Bypass, Eielson Air Force Base, and Delta Junction are difficult to review without a map. a. Please include a detailed map of these route alternatives in this portion of the RR. b. Add more rationale for why these alternatives were rejected. The current discussion for several of the minor route variations does not provide enough information. c. Avoiding the Tetlin National Wildlife Refuge is a reasonable alternative…add this to the list of Minor Route Alternatives and explain why it was rejected. d. Tetlin Ridge Route Alternative – would this alternative avoid impacts to the Tetlin National Wildlife Refuge? Would this alternative avoid the need for a land exchange?	EPA, OFC
10-17.	10-14	The Alaska Department of Geology and Geophysical Surveys completed a comprehensive characterization of a broad hypothetical ROW for that portion of the gas pipeline that diverged from the existing TAPS ROW, with the specific intent of facilitating pipeline siting. How has this information been used to develop the proposed route and to evaluate alternative routes and route variations?	FERC
10-18.	10-25	Provide more information about the residential development that would be crossed by the Fairbanks Bypass Route Alternative, including beginning and ending MPs, number of residential properties, number of residences within 50 and 25 feet of the construction right-of-way.	FERC
10-19.	10-25	Regarding the private property discussed on page 10-25: a. Provide the beginning and ending MPs for where the Alaska Mainline would cross each property. b. Explain if the private property is a residential or commercial and quantify the amounts (number of properties, feet crossed by the pipeline, number of residences or commercial buildings within 50 and 25 feet of construction	FERC

		workspaces) for each. c. Is the private property part of the same development that would be crossed by the alternative route? If it is, or if it is not, this should be explained/described and compared to the alternative route.	
10-20.	10-27	What are the "proposed land developments" and "commercial and residential developments east of Fairbanks" that are mentioned on page 10-27?	FERC
10-21.	10-27	What are the Fairbanks-Chena Hot Springs Trail and the Chena River Recreation Area that are mentioned on page 10-27? Who manages them and how are they used? Cross-reference to RR 8 as appropriate and include in RR 10 a summary of this information and a comparison of the environmental impacts of the Alaska Mainline route and any alternative or route variation that crosses these areas.	FERC
10-22.	10-27	What are the existing "commercial and residential developed areas" south of the town of North Pole mentioned on page 10-27? Are these or other commercial/residential properties crossed by the Alaska Mainline route? Quantify the amounts (number of properties, feet crossed by the pipeline, number of residences or commercial buildings within 50 and 25 feet of construction workspaces) along the alternative. Compare the impact on these resources to the impact to similar resources along the corresponding portion of the proposed pipeline route.	FERC
10-23.	10-27	Provide a comparison table for section 10.5.2.6.	FERC
10-24.	10-27	The last paragraph of section 10.5.2.6 states that "smaller reroutes are being considered based on consultations with the Eielson AFB." Also see table 10.5.3-1. The variations and the consultation process should be included to document how the route through this area was developed and explain the advantages and disadvantages of the routes considered. Provide an update for this consultation.	FERC
10-25.	10-29	The comparison table on this page is incorrectly labeled as "10.5.2-6," although the title (Delta Junction Route Alternative) is correct. Also, comparison table numbering after this page is not consistent with the text sections.	FERC
10-26.	10-29	Both the planned and alternative routes would cross private property; 56 and 58 properties are listed in table 10.5.2-6, respectively. While there is some information about private property along the alternative route (farmland,	FERC

		developed residential subdivision are mentioned) there is no information about the private land along the Alaska Mainline route. a. Provide quantifiable data about the private resources that would be affected along the planned and alternative routes so they may be compared. At a minimum provide the feet crossed through farmland and residential land; the number of properties, the number of residential properties, and the number of residences within 50 and 25 feet of construction workspaces. b. What's the name of the residential subdivision development? c. Describe the private land crossed by the planned route and provide similar data about it.	
10-27.	10-31	Please define footnotes b, c, and d in table 10.5.2-7.	FERC
10-28.	10-31	Table 10.5.2-7 lists a trail that would be crossed by both the planned and alternative routes; however, there is no information provided about this trail. a. What is the trail's name, who manages it, and how is it used? b. How would it be crossed/maintained/restored, or where is information related to these activities found in the RRs? c. Describe the topography and other physical features that would be involved in crossing the trail along both routes. d. Would one be more technically challenging to cross or have different environmental impacts? If yes, then describe.	FERC
10-29.	10-31	Table 10.5.2-7 lists 67 private properties over about 34.5 miles along the planned route and 23 private properties over about 17.7 miles along the alternative route yet there is no mention of this difference in the text. The alternative route seems to have an advantage over the planned route when considering impact on private property. a. Discuss the advantages and disadvantages of each route and provide a comparison table. b. Address the amount (acreage) of tree clearing along both routes and access issues related to the use of the alternative route compared to the planned route. c. It appears that the alternative route would move the pipeline farther from the	FERC

		Tetlin National Wildlife Refuge; however, this is not mentioned nor are the advantages and/or disadvantages of both routes explained. Please include such a discussion. d. Provide a conclusion for this section that clearly explains why the planned route was selected rather than the alternative.	
10-30.	10-33	Respond to similar questions and comments (as presented in the previous comment) for the Upper Tanana Route Alternative. Table 10.5.2-8 lists 140 private properties along about 140 miles but the alternative lists only 6 private properties along about 4.1 miles. The alternative route seems to have an advantage over the planned route when considering impact on private property.	FERC
10-31.	10-36	In table 10.5.3-1, explain what is meant by a "highway pinch point" and how the Little Gerstle South Side Route Variation would cause it.	FERC
10-32.	10-36, -37	Regarding table 10.5.3-1, for the Nutirwik Creek, Dietrich Camp, Sukakpak Mountain, Fort Hamlin Hills, and Beaver Creek Route Variations: Does "rugged terrain" mean the variation would entail more sidehill construction, or is there a slope gradient that is used to define this descriptor?	FERC
10-33.	10-38	Provide a history of the alternative technologies as well as facility locations you considered for the GTP. Include in your answer alternatives for waste management and disposal. What were the advantages and disadvantages? Explain why you concluded that proposed technology and facilities would meet the purpose of the APP and minimize environmental impacts.	FERC
10-34.	10-42	Why would additional compression be needed for Alternatives 2 and 3 (as reflected in table 10.6.1-2)?	FERC
10-35.	10-49	In table 10.6.1-3, the "Disadvantages" column contains comments such as "Impacts PBU operations during improvement and during offloading," "May complicate docking operation when barges are in place," "Complicates in-water docking operation," and "Complicates onshore offload operation." Provide a fuller explanation for how the alternatives would impact or complicate these activities and why the selected alternative would minimize the issues.	FERC
10-36.	10-50	Section 10.6.1.4 states that no dredging method has been eliminated from consideration and that all are feasible. Update this information by providing the	FERC

		preferred/planned dredging method.	
10-37.	10-51	Provide a map which shows the locations of the proposed and alternative dredge disposal sites.	FERC
10-38.	10-52	Section 10.6.2 states that the proposed compressor station sites are based on the desk-top study and are not the adjusted locations that were modified as a result of field investigations. Update the information about the proposed and alternative compressor station sites by incorporating field investigations.	FERC
10-39.	10-56	Page 10-56 states that all of the alternative sites would be "in the BLM Galbraith Area of Critical Environmental Concern (Area)." What would the impact on the ACEC be and how would it be addressed by the proposed and alternative sites? If the planned site's impact on the ACEC is addressed in another RR, it should be referenced and summarized in this section. Explain whether or not the alternatives would have the same impact on the ACEC and describe these impacts.	FERC
10-40.	10-58 – 10-67	It appears from the discussion in section 10.6.2.4 that the site of the Fort Hamlin Hills Compressor Station may be changed to one of two alternative sites. a. Update this section to reflect the evaluation of the three facility sites, include a table that compares the advantages and disadvantages of each, and identify the "final" planned site. b. Same comment for the Tatalina River Compressor Station discussed in section 10.6.2.5. c. Same comment for the Johnson Road Compressor Station discussed in section 10.6.2.6. d. Same comment for the Tetlin Junction Compressor Station discussed in section 10.6.2.8.	FERC

Comment Number	RR Location Reference	Comments on Draft RR 11 – Safety and Reliability	Source
11-1.	General	Draft RR 11 did not address the reliability and safety of the planned pipelines and associated facilities. Include data and information needed for the NEPA analysis. In particular: • identify potential accidents that could compromise the integrity of the pipeline and associated facilities; • assess the likelihood of such accidents; and • discuss the consequences if they were to occur. The accidents considered should include the internal events (e.g., equipment failure and human error) as well as those caused by natural phenomena (e.g., earthquakes and landslides).	FERC
11-2.	General	The revised RR 11 should provide the most current status of the special permit application review, including dates when the special permit was filed with PHMSA.	FERC
11-3.	General	When developing the blasting plan, describe how TC Alaska would limit the blast charges and the impact on surrounding infrastructure. Include the blasting safety procedures that would be used in the vicinity of other critical infrastructure and public areas such as Class 1, 2, and 3 locations along the pipeline. Describe how these procedures would protect public safety.	PHMSA
11-4.	General	Provide information on Quality Management Systems or Quality Assurance programs for all phases of manufacturing, quality assurance testing, transportation, construction, and start-up phases of the pipelines.	PHMSA
11-5.	11-2	Draft RR 11 uses U.S. national data on natural gas incidents applied to Alaska. Given that the operating conditions are more extreme in Alaska than in the remainder of the United States, provide a table that presents Alaska-specific	FERC

		incident data (e.g., data on the ENSTAR pipeline).	
11-6.	11-2	Provide historical incident data for natural gas pipelines in Alaska (based on PHMSA-supplied data), to afford a relative measure of the safety of natural gas transmission pipelines in Alaska. In addition, section 11.2 is based on transmission and gathering pipeline incident data, which are not appropriate for the planned APP. Revise this section to show transmission pipeline incident data only.	FERC
11-7.	11-2	Address historical incidents that have occurred at gas treatment plants in the United States. Include PHMSA incident data on gas processing incidents (based on "Other" incidents as identified in the "PRTSYO" column in the DOT datasets), similar to what was provided for natural gas pipelines.	FERC
11-8.	11-2	Provide information and statistics on expected worker-related industrial accidents and injuries during construction, operation, and maintenance of the project.	FERC
11-9.	11-3	Provide a list or table of "applicable federal, state, and local laws and regulations" that TC Alaska would abide by during design, construction, operation, and maintenance of the APP. These should cover both the health and safety of the workers and general public.	FERC
11-10.	11-3	Section 11.3 indicates that the planned pipelines and aboveground facilities would meet applicable regulatory requirements in 49 CFR 192. Specify any reliability or safety measures that would be implemented which would meet the Minimum Federal Safety Standards.	FERC
11-11.	11-4 – 11-5	Subsections 11.4.1 and 11.4.2 are provided under section 11.3. Re-number Sections 11.4.1 and 11.4.2 as 11.3.1 and 11.3.2.	FERC
11-12.	11-4 – 11-5	Discuss the strain-based design approach for the planned pipelines to maintain integrity with respect to pipe displacements due to frost heave and seismic effects. Provide additional information to establish the potential impacts on pipeline safety and reliability in the event of a major earthquake near the pipeline ROW.	FERC
11-13.	11-4	For all class locations, rivers, compressor stations, road and railroad crossings, TAPS crossings, elevated or bridged sections of pipeline, major geologic fault locations, and bridge crossings, provide the following items:	PHMSA

		• minimum pipe design factor; • pipe material; • pipe wall thickness and grade; • coating type; • girth weld non-destructive testing; and • pressure test factor. For strain-based sections of pipeline, identify whether a different hoop stress design factor would be used. If so, describe how each strain-based section and its corresponding design factor would be determined.	
11-14.	11-4	Clarify that the pipeline would not exceed 1 year without cathodic protection during the construction phase.	PHMSA
11-15.	11-4	Regarding the pipeline coating: a. Describe the coating system that would be applied to the pipeline and girth welds to ensure that they would be protected against corrosion and would not shield cathodic protection. b. According to section 11.4.1, a multi-layer coating system would be applied to the pipelines. However, multi-layer pipe coatings may shield the pipe from cathodic protection during its life cycle. Describe the test procedures to ensure that the coating system would not shield cathodic protection currents, including if the coating disbonds from the pipeline. c. If a special permit application is submitted to PHMSA to use multi-layer coating systems, provide a copy of the application.	PHMSA
11-16.	11-4	Describe how the pipe would be manufactured, tested, and inspected to ensure that pipe joints are not low-strength.	PHMSA
11-17.	11-4	Regarding the strain-based design: a. Describe the procedures and mitigation measures that would be applied in addition to strain-based design to address frost heave, thaw settlement, and other geotechnical issues associated with the arctic or sub-arctic.	FERC, PHMSA

		b. Describe the effect that permafrost and seismic zones/faults would have on the pipeline when strains exceed the 0.5-percent limit. c. Describe the strain-based design approach and respective safety factors mitigation measures and timing of these measures, including material, design, construction, and operational procedures and specifications for piping sections exceeding the 0.5-percent strain limit. d. According to section 11.4.1, an application for a special permit to use strain-based design methodology is under preparation. Provide a copy of this application.	
11-18.	11-6	Indicate the frequency of the operational cleaning pig runs. Describe the procedures to ensure that internal corrosion is minimized and that the requirements of 49 CFR 192.475, 192.476, and 192.477 are satisfied.	PHMSA
11-19.	11-6	According to section 11.4.3, geologic hazards are discussed in RR 6; however, the discussion in section 6.4 **Geologic Hazards** is relatively general. There is no discussion of the likelihood and the severity of natural events that could lead to release of natural gas to the environment from the planned pipelines and associated facilities. See also comments 6-6, 6-21, and 6-22.	FERC
11-20.	11-6, -10 11-11 – 11-12	Section 11.4 starts with subsection number 11.4.3. Re-number subsections 11.4.3, 11.4.4, and 11.4.5 as 11.4.1, 11.4.2, and 11.4.3.	FERC
11-21.	11-6	HCAs are discussed in section 11.4.3. The Pipeline Safety Improvement Act of 2002 requires that all gas transmission operators develop and follow a written Integrity Management Plan (IMP). In the discussion of the details of the APP IMP, discuss how the pipelines would comply with the pipeline classification and pipeline integrity management regulations in 49 CFR 192 by monitoring for potential class location changes and HCAs throughout the life of the project. Include the types of monitoring, such as aerial and ground inspections, review of aerial photography of the route, and/or surveillance during activities associated with operation. Add to the discussion that the pipeline integrity management rule for HCAs also requires inspection of the entire pipeline for HCAs every 7 years.	FERC
11-22.	11-7	Identify whether the pipe would be internally coated. If so, provide a description.	OFC

11-23.	11-8	Provide the baseline assessment plan as stated in section 11.4. Describe the mitigation measures TC Alaska would implement to minimize the likelihood and impacts of a natural gas release.	FERC
11-24.	11-8	Provide the methods that would be included in the IMP to address the effects of frost heave, thaw settlement, and seismic activities on pipeline integrity.	FERC
11-25.	11-9	Twenty-one HCAs are identified. Discuss the safety actions TC Alaska would undertake in these areas.	OFC
11-26.	Appendix 11B	RR 11 states that safety and reliability information related to the GTP "consistent with the FERC guidance" will be provided in the final report (as appendix 11B). The FERC guidance document referred to (Alaska Pipeline Project Engineering Information Requirements), is included in this document as **Attachment 3**. This information must be provided for the application to be considered complete.	FERC

Attachment 1

5.0 Analysis of Beneficial and Detrimental Impacts to the Environment and the Public Interest, and Factual Determinations for Discharges of Dredged or Fill Material. [33 CFR 320.4(a-r), 33 CFR 325 App B, and 40 CFR 230.11 and 230.20 - 230.77]

5.1 Factors.

5.1.1 Physical substrate determinations and Substrate:

5.1.2 Water circulation, fluctuation and salinity determinations, Current patterns and water circulation, and Salinity gradients:

5.1.3 Suspended particulate/turbidity determinations:

5.1.4 Water (nutrients, chemical content, dissolved gas, pH, temperature), water quality:

5.1.5 Flood hazards, floodplain values, Normal water fluctuations, wetlands as storage for storm and flood waters:

5.1.6 Floodplain management (functions, degradation of floodplain values and functions, practicable alternatives):

5.1.7 Wetlands shielding other areas from wave action, erosion, or storm damage:

5.1.8 Shore erosion and accretion:

5.1.9 Wetlands as ground water recharge areas:

5.1.10 Wetlands as maintaining baseflows for aquatic resources:

5.1.11 Proposed disposal site determinations (Mixing zone, in light of the depth of water at the disposal site; current velocity, direction, and variability at the disposal site; degree of turbulence; water column stratification; discharge vessel speed and direction; rate of discharge; dredged material characteristics; number of discharges per unit of time; and any other relevant factors affecting rates and patterns of mixing):

5.1.12 Special aquatic sites (Sanctuaries and refuges, Wetlands, Mudflats, Vegetated shallows, Coral reefs, Riffle and pool complexes), wetlands:

5.1.13 Fish, crustaceans, mollusks, and other aquatic organisms in the food web and aquatic ecosystem and organism determinations:

5.1.14 Essential fish habitat: Adverse impacts to Essential Fish Habitat ☐will/☐will not result from the proposed project. *Explain*.

5.1.15 Wildlife, fish and wildlife values:

5.1.16 Threatened and endangered species: ☐ There are no T/E species and no critical habitat present within the action area. [If none, delete the following and go to 5.1.17]

If there are T&E species, list the common and scientific name for each species and any designated critical habitat that occurs in or near the project.

Species common name	scientific name	critical habitat (Y/N)
_____	_____	_____
_____	_____	_____

5.1.16.1 Identify the ESA "action area", which means: all areas to be affected directly (e.g. earth moving, vegetation removal, construction noise, placement of fill, release of environmental contaminants, etc.) or indirectly by the Federal action and not merely the immediate area involved in the action [50 CFR 402.02].

5.1.16.2 Determination of effects: Describe indirect, direct and cumulative effects.

Remember, anything other than a "No Effect" determination requires a separate letter or email (not the PN) to the Services requesting concurrence.

The proposed project:

(1) Will not affect these threatened or endangered species, or critical habitat:
☐Any/☐ . *Explain.*

(2) May affect, but is not likely to adversely affect:
Species: . *Explain.*
Critical Habitat: *Explain.*

The Services ☐concurred/☐not concurred (meaning formal consultation is required) *Explain and reference response from the Services.*

(3) May affect, likely to adversely affect:
Species: . *Explain or reference the biological assessment if one was prepared.*
Critical Habitat:

The Services ☐concurred/☐provided a Biological Opinion(s). *Explain and reference response from the Services.*

(4) ☐Is likely to jeopardize the continued existence of the . *Explain or reference the biological assessment if one was prepared.*

(5) ☐Will adversely modify designated critical habitat for the . *Explain or reference the biological assessment if one was prepared.*

The Services ☐concurred/☐provided a Biological Opinion(s). *Explain and reference.*

5.1.17 Contaminant determinations:

5.1.18 Water supply and conservation, Municipal and private water supplies:

5.1.19 Recreational and commercial fisheries:

5.1.20 Subsistence:

5.1.21 Water-related recreation, recreation:

5.1.22 Aesthetics:

5.1.23 Wild and Scenic Rivers, National Wilderness Areas, National Seashores, National Parks, estuarine and marine sanctuaries, Parks, national and historic monuments, wilderness areas, research sites, and similar preserves:

5.1.24 Energy needs and energy conservation and development:

5.1.25 Noise:

5.1.26 Navigation:

5.1.27 Effects on limits of the territorial sea:

5.1.28 Activities affecting coastal zones: By operation of Alaska State law, the federally approved Alaska Coastal Management Program expired on July 1, 2011, resulting in a withdrawal from participation in the Coastal Zone Management Act's (CZMA) National Coastal Management Program. The CZMA Federal consistency provision, section 307, no longer applies in Alaska. Federal Register Notice published July 7, 2011, Volume 76, No. 130, page 39857.

5.1.29 Safety, also safety of impoundment structures:

5.1.30 Historic properties. : The proposed project ☐will/☐will not have any effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance based on ☐letter from SHPO/☐ . *Explain*

5.1.31 Land use:

5.1.32 Conservation:

5.1.33 Economics (employment, tax revenues, community cohesion, community services, property values):

5.1.34 Prime and unique farmland: This law requires that Federal agencies take into account the adverse effects of their programs on the preservation of farmland and to consider alternative actions, as appropriate, that could lessen such adverse effects. The Natural Resources Conservation Service advises that there is no Prime or Unique Farmland designated in the State of Alaska. http://www.ak.nrcs.usda.gov/technical/soils/soilslocal.html]

5.1.35 Food and fiber production:

5.1.36 Mineral needs:

5.1.37 Considerations of property ownership:

5.1.38 General environmental concerns, also environmental benefits: Include Climate Change impacts on proposed project.

5.1.39 Other federal, state, or local requirements:

5.1.40 Needs and welfare of the people:

5.1.41 Other Factors Considered:

5.2 Secondary and Cumulative Impacts. [effects on the aquatic ecosystem, associated with discharge of fills]:

The geographic area for this assessment is xxxxxx watershed. (if in coastal area, define the geographic area appropriately)

5.2.1 Secondary Impacts:

5.2.2 Cumulative Impacts:

The area in which impacts resulting from the proposed project will occur is *AREA*. The impacts that are expected in that area from the proposed project are *IMPACTS*. Other actions - past, proposed, and reasonably foreseeable - that have had or are expected to have impacts in the same area are *PAST, PROPOSED, AND REASONABLY FORESEEABLE ACTIONS*. The impacts or expected impacts from these other actions are *PAST IMPACTS, PROPOSED IMPACTS, AND REASONABLY FORESEEABLE IMPACTS*. The overall impact that can be expected if the individual impacts are allowed to accumulate is *OVERALL IMPACT*. Overall, the project will/will not result in minimal environmental impacts and minimal impacts on fish and wildlife values, *DISCUSS REASONS WHY*.

When considering the overall impacts that will result from this project, in context with the overall impacts from similar past, present, and reasonably foreseeable future projects, their cumulative impacts are not considered to be significantly adverse. It is likely we will receive similar projects in the future, which will go through a comparable review process. Also, include Climate Change.

5.3 Mitigation Discussion. [33 CFR 320.4(r), 33 CFR 332; 40 CFR 230 Subpart J, 40 CFR 230.70-77]
[Expand this section commensurate with the level of impact and appropriate level of existing and reasonably foreseeable stress(ors) to aquatic resources in the watershed].
The project affects the following key aquatic resource functions and services (e.g. water quality, flood control, flood attenuation, etc.):

Discuss the magnitude of these effects within the watershed.

5.3.1 Avoidance: *DESCRIBE HOW AVOIDED* IF DIFFERENT FROM 2.1.1 Is avoidance sufficient or is more needed?

5.3.2 Minimization: *DESCRIBE HOW MINIMIZED IF DIFFERENT FROM 2.1.1* Is minimization sufficient or is more needed?
Avoidance and minimization methods will result in

5.3.3 Compensatory Mitigation Determination: The applicant has avoided and minimized to the extent practicable. For the unavoidable impacts to aquatic resources, compensatory mitigation is/is not required because

5.3.3.1 Is compensatory mitigation required? ☐ yes ☐ no [If "no," state why, and do not complete the rest of this section]

5.3.3.2 Is the impact in the service area of an approved mitigation bank? ☐ yes ☐ no
Does the mitigation bank have the appropriate number and resource type of credits available?
☐ yes ☐ no ☐ n/a

5.3.3.3 Is the impact in the service area of an approved in-lieu fee program? ☐ yes ☐ no
Does the in-lieu fee program have the appropriate number and resource type of credits available?
☐ yes ☐ no ☐ n/a

5.3.3.4 Check the selected compensatory mitigation option(s):
- ☐ mitigation bank credits
- ☐ in-lieu fee program credits
- ☐ permittee-responsible mitigation under a watershed approach
- ☐ permittee-responsible mitigation, on-site and in-kind

☐ permittee-responsible mitigation, off-site and out-of-kind

5.3.3.5 Mitigation Summary: Compensatory mitigation, namely and monitoring described herein will result in .

5.3.3.6 Other Mitigative Actions (e.g. voluntary actions that exceed compensatory mitigation as needed to offset resource impacts):

5.4 Public Interest Review General Criteria.

5.4.1 The relative extent of the public and private need for the proposed structure or work: (e.g. Public benefits include employment opportunities and a potential increase in the local tax base. Private benefits include land use and economic return on the property; for transportation projects benefits include safety, capacity and congestion issues.) *Explain.*

5.4.2 The practicability of using reasonable alternative locations and/or methods to accomplish the objective of the proposed structure or work:
☐There are no unresolved conflicts as to resource use.
☐ There are unresolved conflicts as to resource use. One or more of the alternative locations and methods described above are reasonable or practicable to accomplish the objectives of the proposed structure or work but are not being accepted by the applicant.
☐ There are unresolved conflicts as to resource use; however there are no practicable reasonable alternative locations and methods to accomplish the objective of the purposed work.

5.4.3 The extent and permanence of the beneficial and/or detrimental effects that the proposed structures or work may have on the public and private uses to which the area is suited:

5.5 Special Conditions and Rationale for Inclusion.

5.5.1 The following conditions were included in the ADEC Certificate of Reasonable Assurance:

6.0 <u>Compliance with Other Federal, State, or Local Laws and Presidential Executive Orders.</u>

6.1 State 401 Water Quality Certification.

Permit: Certification was issued/waived/denied on DATE.
OR
Provisional Permit: As of this date, the Alaska Department of Environmental Conservation has not issued, waived, or denied a Section 401 Water Quality Certification for the proposed work.

Pursuant to 33 CFR PART 320.4(d), the certification of compliance with applicable effluent limitations and water quality standards required under the provisions of Section 401 of the Clean Water Act are considered conclusive with respect to water quality considerations unless the Regional Administrator, U.S. Environmental Protection Agency, advises of other water quality aspects to be taken into consideration.

6.2 Other state and/or local authorizations (if issued):

6.3 EO 12898, Environmental justice issues. In accordance with Title III of the Civil Right Act of 1964 and Executive Order 12898, it has been determined that the project would not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin nor would it have a disproportionate effect on minority or low-income communities.

6.4 EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians.

☐ This action will have no known substantial direct effect on one or more Indian tribes. *Explain, if appropriate.*
☐ Potential effects on Federally Recognized Tribes are identified and discussed in Parts 5.1.3 and ___.

6.5 EO 11988, Floodplain Management. *[Choose appropriate option, and delete others]*
☐Not in a floodplain.
☐Alternatives to location within the floodplain, minimization, and compensation of the effects were considered above.

6.6 EO 13112, Invasive Species. *[Choose appropriate option, and delete others]*
☐ There were no invasive species issues involved.
☐ The evaluation above included invasive species concerns in the analysis of impacts at the project site and associated compensatory mitigation projects.
☐ Through special conditions, the permittee will be required to control the introduction and spread of exotic species.

6.7 EO 13212 and 13302, Energy Supply and Availability.
☐The project was not one that will increase the production, transmission, or conservation of energy, or strengthen pipeline safety.
☐The review was expedited and/or other actions were taken to the extent permitted by law and regulation to accelerate completion of this energy-related (including pipeline safety) project while maintaining safety, public health, and environmental protections.

6.8 Corps Wetland Policy. [General policies for evaluating permit applications (§ 320.4.b Effects on Wetlands)]. Based on the public interest review herein, the beneficial effects of the project DO/DO NOT outweigh the damages to the wetland resource.

6.9 Other authorizations.

6.10 Significant Issues of Overriding National Importance. 33 CFR 320.4(j)(2) *[Choose appropriate option(s), and delete others]* *Explain.*
☐ NA
☐ National Security
☐ National Energy Needs
☐ Navigation
☐ National Economic Development
☐ Water Quality
☐ Preservation of Special Aquatic Areas with Significant Interstate Importance
☐ Other *Explain, if used.*

7.0 <u>Statement of Findings.</u>

7.1 <u>Public Interest Review</u>.

7.1.1 Public Interest Factors Summary: All public interest factors have been reviewed as summarized here. Both cumulative and secondary impacts on the public interest were considered. Information relevant to the decision is found at the reference location for each factor below.

+ Beneficial effect
0 Negligible effect
- Adverse effect
M Neutral as result of mitigative action

+	0	-	M	
☐	☐	☐	☐	Conservation (Part 5.1.32).
☐	☐	☐	☐	Economics (Part 5.1.33).
☐	☐	☐	☐	Aesthetics (Part 5.1.22).
☐	☐	☐	☐	General environmental concerns (Part 5.1.38).
☐	☐	☐	☐	Wetlands (Part 5.1.12).
☐	☐	☐	☐	Historic properties (Part 5.1.30).
☐	☐	☐	☐	Fish and wildlife values (Part 5.1.15)
☐	☐	☐	☐	Flood hazards (Part 5.1.5).
☐	☐	☐	☐	Floodplain values (Part 5.1.5).
☐	☐	☐	☐	Land use (Part 5.1.31).
☐	☐	☐	☐	Navigation (Part 5.1.26).
☐	☐	☐	☐	Shore erosion and accretion (Part 5.1.8).
☐	☐	☐	☐	Recreation (Part 5.1.21).
☐	☐	☐	☐	Water supply and conservation (Part 5.1.18).
☐	☐	☐	☐	Water quality (Part 5.1.4).
☐	☐	☐	☐	Energy needs (Part 5.1.24).
☐	☐	☐	☐	Safety (Part 5.1.29).
☐	☐	☐	☐	Food and fiber production (Part 5.1.35).
☐	☐	☐	☐	Mineral needs (Part 5.1.36).
☐	☐	☐	☐	Considerations of property ownership (Part 5.1.37).
☐	☐	☐	☐	Needs and welfare of the people (Part 5.1.40).

7.1.2 Public Interest Determination: I find that issuance of a Department of the Army permit, as prescribed by regulations published in 33 CFR 320 to 330:

☐ Is not contrary to the public interest. ☐ Is contrary to the public interest.

7.2 Evaluation of Compliance with 404(b)(1) Guidelines.

7.2.1 Alternatives Test (40 CFR 230.10(a)):

7.2.1.1 Based on the discussion in 3.0 are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the U.S." or at other locations within these waters?

7.2.1.2 Based on 3.0 if the project is in a special aquatic site and is not water dependent, has the applicant clearly demonstrated that there are no practicable alternative sites available?

7.2.2 Special Restrictions (40 CFR 230.10(b)). Will the discharge:

7.2.2.1 Violate state water quality standards?:

7.2.2.2 Violate toxic effluent standards [under Section 307] of the Clean Water Act?:

7.2.2.3 Jeopardize endangered or threatened species or their critical habitat?:

7.2.2.4 Violate standards set by the Department of Commerce to protect marine sanctuaries?:

7.2.3 Other restrictions (40 CFR 230.10(c)): Will the discharge contribute to significant degradation of "waters of the U.S." through adverse impacts to:

7.2.3.1 Human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and/or special aquatic sites?:

7.2.3.2 Life stages of aquatic life and/or wildlife?:

7.2.3.3 Diversity, productivity, and stability of the aquatic life and other wildlife? Or wildlife habitat or loss of the capacity of wetlands to assimilate nutrients, purify water or reduce wave energy?:

7.2.3.4 Recreational, aesthetic, and/or economic values?:

7.2.4 Actions to minimize potential adverse impacts [mitigation](40 CFR 230.10(d)). Will all appropriate and practicable steps [40 CFR 230.70-77] be taken to minimize adverse impacts of the discharge on the aquatic ecosystem?:

7.3 Findings of Compliance or Non-compliance with the 404(b)(1) Guidelines. (40 CFR 230.12)

Attachment 2

The following list includes navigable waterways along the proposed APP route based on the information found in Draft Resource Report 10, including the Valdez Terminal alternative. These waterways fall under the jurisdiction of the U.S. Coast Guard and may require Bridge Permits.

Taniayariak River
Kavik River
Shaviovik River
Ivishak River
Chandalar River (various forks)
Hammond River
Bonanza Creek (north and south forks)
Yukon River
Chatenika River
Chena River
Shaw Creek
Tanana River
Little Gersle River
Robertson River
Scotty Creek
Canning River
Juniper River
Kadleroshilik River
Sagaugauankiklog (Sag) River
Koyukuk River (middle and south forks)
Slate Creek
Fish Creek (middle and south forks)
Hess Creek
Little Chena River
Salcha River
Jarvis Creek
Gersle River
Johnson River
Tok River

Alaska Pipeline Project
Engineering Information Requirements

1. **Facility Description**

PROVIDE a general description of the facility.

1.1. Owner, operator and principal contractors
1.2. Location and site information
1.3. List of major systems and components
1.4. Design features
1.5. Utilities and services
1.6. Safety features for containment
1.7. Safety features for fire protection
1.8. Emergency response
1.9. Operating modes
1.10. Operation and mainten
1.11. ance
1.12. Drawings
- 1.12.1. Area location map
- 1.12.2. Site plan

2. **Site Plans**

PROVIDE a description summarizing the site development and any changes required to improve soil conditions, the type of foundations required, the road system for access and egress, and equipment layout. The proposed layout plans with coordinates and dimensions should be provided, clearly showing the proposed location of all equipment, pipe racks and services.

2.1. **Site Description**
- 2.1.1. Location
- 2.1.2. Site development
- 2.1.3. Soil and site preparation
- 2.1.4. Foundations
- 2.1.5. Roads
- 2.1.6. Equipment layout considerations

2.2. **Drawings**
- 2.2.1. **Site Plans**
  - 2.2.1.1. **Area Plan**

Surrounding area, plant and property lines

2.2.1.1. **Site Plan**

Overall layout of the facilities showing property lines, roads, gates, access control and emergency routing.

2.2.1.2 **Overall Plot Plan**

The plot plan should show the location of all major equipment, pipe racks and spill containments.

2.2.2. **Plot Plans**

PROVIDE unit plot plans for each process area or system showing the locations of all equipment. Each area and piece of equipment should be clearly labeled.

3. **Major Process Systems**

PROVIDE technical descriptions of each process system, which should include a general description of the process, emergency shutdown, isolation and maintenance of the system.

4. **Hazard Detection Systems**

PROVIDE a layout of the hazard detection system showing the location of combustible-gas detectors, fire detectors, heat detectors, smoke or combustion product detectors, and low temperature detectors. Show all combustion/ventilation air intake equipment, the detectors covering the air intake and the distances to any possible hydrocarbon.

5. **Fire Suppression and Response Plan**

PROVIDE a description of the utilization and responsibilities of onsite personnel and offsite personnel and equipment in response to fires.

6. **Hazard Control Systems**

PROVIDE a description explaining the function of the various types of fire suppressant, the location, capacity and discharge rate required. The basis of design should include criteria for sizing the flow and capacity of the suppressant.

7. **Fire Water**

PROVIDE a detailed layout of the fire water system showing the location of fire water pumps, piping, hydrants, hose reels, and auxiliary or appurtenant service facilities.

8. **Security**

PROVIDE a general description of the proposed security that addresses the principal concerns for facility security, and plans of the security fencing.

9. **Piping**

PROVIDE a description of the piping system, which should include the type and design of the piping systems and insulation systems.

10. **Buildings and Structures**

PROVIDE brief descriptions and preliminary plans for the proposed buildings and structures, which should include the type of structure size and any special features, such as pressurization or fireproofing.

11. **Process Drawings**

PROVIDE process flow diagrams showing the process systems.

12. **Design Codes and Standards**

PROVIDE all codes and standards under which the plant will be designed, and any special considerations or safety provisions that were applied to the design of plant components.

PROVIDE a list of applicable codes from the National Fire Protection Association, American Petroleum Institute, American Society Of Mechanical Engineers, American Society of Civil Engineers, National Electrical Code, The Instrumentation, Systems, and Automation Society, Center for Chemical Process Safety, etc. that would be applied in the design, construction and operation of the facility.

13. **Permits or Approvals**

PROVIDE a list of all permits or approvals from local, state, federal, or Native American groups or Indian agencies required prior to and during construction of the plant, and the status of each, including the date filed, the date issued, and any known obstacles to approval. Include a description of data records required for submission to such agencies and transcripts of any public hearings by such agencies. Also provide copies of any correspondence relating to the actions by all, or any, of these agencies regarding all required approvals.

14. **HAZID, Safety Reviews and Recommendations**

PROVIDE copies of HAZID with lists of the recommendations and status of implementation.

15. **Equipment Information**

PROVIDE an equipment list.

16. **Fire Protection**

PROVIDE a preliminary fire protection evaluation. This evaluation should support the types of hazard control systems chosen, general locations, and sizing.

17. **Hazard Consequence Analysis**

PROVIDE an offsite hazard consequence analysis.