



US Army Corps of Engineers

# Donlin Gold Project



## Final Environmental Impact Statement

CEPOA-RD

P.O. Box 6898

JBER, AK 99506-0898

April 2018

*Village of Crooked Creek*

*Native Village of  
Napaimute*

*Native Village of  
Chuathbaluk*

*Native Village of Aniak*

*Knik Tribal Council*

*Akiak Native Community*

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DONLIN GOLD PROJECT  
FINAL ENVIRONMENTAL IMPACT  
STATEMENT

U.S. Army Corps of Engineers  
CEPOA-RD  
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## CONTENTS

### CHAPTER 1: PROJECT INTRODUCTION AND PURPOSE AND NEED

1.1	INTRODUCTION .....	1-1
1.2	PROJECT OVERVIEW AND LOCATION .....	1-2
1.2.1	Connected Actions .....	1-3
1.3	PROJECT PURPOSE AND NEED .....	1-4
1.3.1	Applicant's Stated Purpose and Need .....	1-4
1.3.1.1	Corps' Overall Project Purpose and Need for Action .....	1-6
1.4	SCOPE OF ANALYSIS .....	1-6
1.5	LEAD AND COOPERATING AGENCY ROLES .....	1-7
1.5.1	U.S. Army Corps of Engineers .....	1-8
1.5.1.1	Corps Authorization and Permitting .....	1-8
1.5.2	Bureau of Land Management .....	1-9
1.5.2.1	BLM Project Purpose and Need .....	1-10
1.5.3	Pipeline and Hazardous Materials Safety Administration .....	1-10
1.5.3.1	Pipeline Hazardous Materials Safety Administration Purpose and Need .....	1-11
1.5.4	U.S. Environmental Protection Agency .....	1-11
1.5.5	U.S. Fish and Wildlife Service .....	1-11
1.5.6	State of Alaska .....	1-12
1.5.7	Village of Crooked Creek .....	1-12
1.5.8	Napaimute Traditional Council .....	1-12
1.5.9	Chuathbaluk Traditional Council/Center for Science in Public Participation .....	1-13
1.5.10	Aniak Traditional Council .....	1-13
1.5.11	Knik Tribal Council .....	1-13
1.5.12	Akiak Tribe/Kuskokwim River Watershed Council .....	1-13
1.6	SCOPING AND PUBLIC OUTREACH .....	1-13
1.7	SUMMARY OF PERMITS, APPROVALS, AND CONSULTATIONS REQUIRED .....	1-14

### CHAPTER 2: ALTERNATIVES

2.1	REGULATORY SETTING FOR ALTERNATIVES ANALYSIS .....	2-1
2.2	ALTERNATIVES DEVELOPMENT PROCESS .....	2-2
2.2.1	Screening the Full Range of Alternatives .....	2-3
2.2.1.1	Screening Criteria .....	2-3
2.2.1.2	Full Range of Options Considered .....	2-4
2.3	DESCRIPTIONS OF ALTERNATIVES .....	2-6

2.3.1	Alternative 1 – No Action .....	2-6
2.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	2-6
2.3.2.1	Connected Actions.....	2-8
2.3.2.2	Alternative 2 – Mine Site .....	2-11
2.3.2.3	Alternative 2 – Transportation Corridor .....	2-46
2.3.2.4	Alternative 2 – Natural Gas Pipeline.....	2-62
2.3.2.5	Monitoring Activities .....	2-151
2.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks.....	2-165
2.3.3.1	Alternative 3A – Mine Site.....	2-166
2.3.3.2	Alternative 3A – Transportation Corridor .....	2-166
2.3.3.3	Alternative 3A – Natural Gas Pipeline .....	2-167
2.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline.....	2-167
2.3.4.1	Alternative 3B – Mine Site.....	2-170
2.3.4.2	Alternative 3B – Transportation Corridor .....	2-170
2.3.4.3	Alternative 3B – Diesel or Collocated Pipeline .....	2-173
2.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port .....	2-179
2.3.5.1	Alternative 4 – Mine Site .....	2-179
2.3.5.2	Alternative 4 – Transportation Corridor .....	2-179
2.3.5.3	Alternative 4 – Natural Gas Pipeline.....	2-185
2.3.6	Alternative 5A – Dry Stack Tailings.....	2-185
2.3.6.1	Alternative 5A – Mine Site.....	2-186
2.3.6.2	Alternative 5A – Transportation Corridor .....	2-188
2.3.6.3	Alternative 5A – Natural Gas Pipeline .....	2-188
2.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	2-188
2.3.7.1	Alternative 6A – Mine Site.....	2-189
2.3.7.2	Alternative 6A – Transportation Corridor .....	2-189
2.3.7.3	Alternative 6A – Natural Gas Pipeline .....	2-189
2.3.8	Impact Comparison – All Alternatives .....	2-189
2.4	ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS.....	2-249
2.4.1	Eliminated Mine Site Options.....	2-249
2.4.2	Eliminated Transportation Options.....	2-252
2.4.3	Eliminated Power Generation Options.....	2-254
2.4.4	Eliminated Pipeline Options.....	2-255
<b>CHAPTER 3: ENVIRONMENTAL ANALYSIS</b>		
3.0	APPROACH AND METHODOLOGY .....	3.0-1
3.0.1	Definition of Impact Types .....	3.0-1
3.0.2	EIS Analysis Area and Scope of Analysis.....	3.0-2
3.0.2.1	interrelated Nature of Environmental Resources.....	3.0-2

3.0.2.2	Issues Selected for Analysis .....	3.0-2
3.0.2.3	Issues Dismissed from Analysis .....	3.0-6
3.0.3	Incomplete and Unavailable Information .....	3.0-8
3.0.4	Methods for Determining Impacts .....	3.0-9
3.0.4.1	Direct and Indirect Effects .....	3.0-9
3.0.5	Past, Present, and Reasonably Foreseeable Future Actions .....	3.0-10
3.1	GEOLOGY AND PALEONTOLOGY .....	3.1-1
3.1.1	Regulatory Context .....	3.1-3
3.1.1.1	Materials Sites .....	3.1-3
3.1.1.2	Paleontology .....	3.1-3
3.1.2	Affected Environment .....	3.1-8
3.1.2.1	Mine Site .....	3.1-9
3.1.2.2	Transportation Corridor .....	3.1-19
3.1.2.3	Pipeline .....	3.1-27
3.1.2.4	Climate Change .....	3.1-39
3.1.3	Environmental Consequences .....	3.1-39
3.1.3.1	Alternative 1 – No Action .....	3.1-40
3.1.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.1-40
3.1.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.1-64
3.1.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.1-66
3.1.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port .....	3.1-70
3.1.3.6	Alternative 5A – Dry Stack Tailings .....	3.1-72
3.1.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.1-75
3.1.3.8	Alternatives Impact Comparison .....	3.1-77
3.2	SOILS .....	3.2-1
3.2.1	Regulatory Framework .....	3.2-4
3.2.1.1	EPA .....	3.2-4
3.2.1.2	ADEC .....	3.2-4
3.2.1.3	PHMSA .....	3.2-5
3.2.1.4	Other .....	3.2-5
3.2.2	Affected Environment .....	3.2-6
3.2.2.1	Mine Site .....	3.2-6
3.2.2.2	Transportation Corridor .....	3.2-14
3.2.2.3	Pipeline .....	3.2-21
3.2.2.4	Climate Change .....	3.2-37
3.2.3	Environmental Consequences .....	3.2-39
3.2.3.1	Alternative 1 – No Action .....	3.2-40
3.2.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.2-40

3.2.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.2-122
3.2.3.4	Alternative 3B – Reduced Diesel Barging: Diesel.....	3.2-124
3.2.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.2-128
3.2.3.6	Alternative 5A – Dry Stack Tailings .....	3.2-134
3.2.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.2-143
3.2.3.8	Alternatives Impact Comparison .....	3.2-147
3.3	GEOHAZARDS AND SEISMIC CONDITIONS.....	3.3-1
3.3.1	Regulatory Framework .....	3.3-3
3.3.1.1	Dam Safety .....	3.3-3
3.3.1.2	Pipeline Safety .....	3.3-5
3.3.1.3	Horizontal Directional Drilling .....	3.3-5
3.3.2	Affected Environment .....	3.3-6
3.3.2.1	Mine Site.....	3.3-6
3.3.2.2	Transportation Corridor.....	3.3-13
3.3.2.3	Pipeline.....	3.3-19
3.3.2.4	Climate Change .....	3.3-30
3.3.3	Environmental Consequences.....	3.3-31
3.3.3.1	Alternative 1 – No Action.....	3.3-32
3.3.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.3-32
3.3.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.3-79
3.3.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.3-81
3.3.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.3-85
3.3.3.6	Alternative 5A – Dry Stack Tailings .....	3.3-87
3.3.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.3-93
3.3.3.8	Impact Comparison – All Alternatives.....	3.3-95
3.4	CLIMATE AND METEOROLOGY .....	3.4-1
3.4.1	Affected Environment .....	3.4-2
3.4.1.1	Transportation Corridor.....	3.4-2
3.4.1.2	Mine Site.....	3.4-5
3.4.1.3	Transportation Corridor.....	3.4-10
3.4.1.4	Pipeline .....	3.4-18
3.4.2	Environmental Consequences.....	3.4-26
3.4.2.1	Alternative 1 – No Action.....	3.4-26
3.4.2.2	Alternatives 2, 3A, 3B, 4, 5A, and 6A .....	3.4-26
3.5	SURFACE WATER HYDROLOGY .....	3.5-1
3.5.1	Applicable Regulations, Water Use/Flow.....	3.5-4

3.5.2	Affected Environment .....	3.5-5
3.5.2.1	Mine Site.....	3.5-5
3.5.2.2	Transportation Corridor.....	3.5-31
3.5.2.3	Pipeline.....	3.5-49
3.5.2.4	Climate Change .....	3.5-66
3.5.3	Environmental Consequences.....	3.5-66
3.5.3.1	Alternative 1 – No Action.....	3.5-66
3.5.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.5-67
3.5.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.5-147
3.5.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.5-148
3.5.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.5-151
3.5.3.6	Alternative 5A – Dry Stack Tailings .....	3.5-153
3.5.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.5-170
3.5.3.8	Alternatives Impact Comparison .....	3.5-171
3.6	GROUNDWATER HYDROLOGY .....	3.6-1
3.6.1	Affected Environment .....	3.6-3
3.6.1.1	Applicable Regulations.....	3.6-3
3.6.1.2	Hydrogeological Setting and Data Sources.....	3.6-4
3.6.1.3	Groundwater Occurrence and Aquifer Characteristics.....	3.6-7
3.6.1.4	Mine Site Groundwater Model.....	3.6-16
3.6.1.5	Groundwater Use.....	3.6-23
3.6.1.6	Climate Change .....	3.6-25
3.6.2	Environmental Consequences.....	3.6-25
3.6.2.1	Alternative 1 - No Action .....	3.6-26
3.6.2.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.6-26
3.6.2.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks.....	3.6-59
3.6.2.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.6-59
3.6.2.5	Alternative 4 – Birch Tree Crossing Port .....	3.6-61
3.6.2.6	Alternative 5A – Dry Stack Tailings .....	3.6-61
3.6.2.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.6-64
3.6.2.8	Alternatives Impact Comparison .....	3.6-65
3.7	WATER QUALITY .....	3.7-1
3.7.1	Applicable Regulations .....	3.7-4
3.7.1.1	Regulatory Framework.....	3.7-4
3.7.1.2	Water Quality Criteria.....	3.7-6
3.7.2	Affected Environment .....	3.7-8



3.7.2.1	Surface Water Quality .....	3.7-8
3.7.2.2	Groundwater Quality .....	3.7-45
3.7.2.3	Sediment.....	3.7-57
3.7.2.4	Geochemical Characterization .....	3.7-73
3.7.2.5	Climate Change .....	3.7-106
3.7.3	Environmental Consequences.....	3.7-107
3.7.3.1	Alternative 1 – No Action.....	3.7-107
3.7.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.7-108
3.7.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.7-196
3.7.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.7-198
3.7.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.7-204
3.7.3.6	Alternative 5A – Dry Stack Tailings .....	3.7-206
3.7.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.7-218
3.7.3.8	Alternatives Impact Comparison .....	3.7-220
3.8	AIR QUALITY .....	3.8-1
3.8.1	Applicable Regulations .....	3.8-4
3.8.1.1	Regulatory Framework.....	3.8-4
3.8.1.2	Air Quality Attainment Status .....	3.8-7
3.8.1.3	Regulatory Requirements .....	3.8-10
3.8.2	Affected Environment .....	3.8-19
3.8.2.1	Mine Site.....	3.8-19
3.8.2.2	Transportation Corridor.....	3.8-29
3.8.2.3	Pipeline.....	3.8-31
3.8.2.4	Climate Change .....	3.8-34
3.8.3	Environmental Consequences.....	3.8-34
3.8.3.1	Air Quality Impacts Analysis Methodology.....	3.8-35
3.8.3.2	Alternative 1 – No Action.....	3.8-38
3.8.3.3	Alternative 2 – Donlin Gold’s Proposed Action .....	3.8-38
3.8.3.4	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.8-76
3.8.3.5	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.8-77
3.8.3.6	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.8-80
3.8.3.7	Alternative 5A – Dry Stack Tailings .....	3.8-80
3.8.3.8	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.8-82
3.8.3.9	Alternatives Impact Comparison .....	3.8-82
3.9	NOISE AND VIBRATION.....	3.9-1
3.9.1	Applicable Concepts.....	3.9-3

3.9.1.1	Acoustics Principles .....	3.9-3
3.9.1.2	Ground Vibration.....	3.9-6
3.9.2	Applicable Regulations .....	3.9-7
3.9.2.1	Regulatory framework .....	3.9-7
3.9.2.2	Guidance on Ambient Noise and Vibration Levels.....	3.9-9
3.9.3	Affected Environment .....	3.9-11
3.9.3.1	Mine Site.....	3.9-11
3.9.3.2	Transportation Corridor .....	3.9-12
3.9.3.3	Pipeline .....	3.9-15
3.9.3.4	Climate Change .....	3.9-16
3.9.4	Environmental Consequences.....	3.9-19
3.9.4.1	Noise and vibration Impacts Analysis Methodology.....	3.9-19
3.9.4.2	Alternative 1 – No Action.....	3.9-23
3.9.4.3	Alternative 2 – Donlin Gold’s Proposed Action .....	3.9-23
3.9.4.4	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.9-76
3.9.4.5	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.9-77
3.9.4.6	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.9-81
3.9.4.7	Alternative 5A – Dry Stack Tailings .....	3.9-82
3.9.4.8	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.9-83
3.9.4.9	Alternatives Impact Comparison .....	3.9-83
3.10	VEGETATION AND NONNATIVE INVASIVE SPECIES .....	3.10-1
3.10.1	Regulatory Framework .....	3.10-4
3.10.1.1	Vegetation.....	3.10-4
3.10.1.2	Rare and Sensitive Plants.....	3.10-4
3.10.1.3	Nonnative Invasive Species .....	3.10-5
3.10.2	Affected Environment .....	3.10-6
3.10.2.1	Ecoregions.....	3.10-7
3.10.2.2	Ecosystems of Conservation Concern .....	3.10-9
3.10.2.3	Vegetation Types.....	3.10-12
3.10.2.4	Transportation Corridor.....	3.10-16
3.10.2.5	Pipeline .....	3.10-18
3.10.2.6	Rare and Sensitive Plants.....	3.10-27
3.10.2.7	Nonnative Invasive Species .....	3.10-30
3.10.2.8	Climate Change .....	3.10-44
3.10.3	Environmental Consequences.....	3.10-45
3.10.3.1	Alternative 1 – No Action.....	3.10-47
3.10.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.10-47
3.10.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.10-70

3.10.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.10-70
3.10.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port .....	3.10-74
3.10.3.6	Alternative 5A – Dry Stack Tailings .....	3.10-75
3.10.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.10-76
3.10.3.8	Alternatives Impact Comparison .....	3.10-77
3.11	WETLANDS .....	3.11-1
3.11.1	Regulatory Framework .....	3.11-3
3.11.1.1	Section 404 of the Clean Water Act (CWA) .....	3.11-3
3.11.2	Analysis Methodology .....	3.11-5
3.11.2.1	Wetland Categories .....	3.11-6
3.11.2.2	Hydrogeomorphic Classes .....	3.11-7
3.11.2.3	Wetland Functions and Values .....	3.11-8
3.11.2.4	Impact Assessment Boundaries .....	3.11-12
3.11.3	Affected Environment .....	3.11-13
3.11.3.1	Mine Site Wetland Study Area .....	3.11-14
3.11.3.2	Transportation Corridor .....	3.11-21
3.11.3.3	Pipeline .....	3.11-31
3.11.3.4	Climate Change .....	3.11-44
3.11.4	Environmental Consequences .....	3.11-45
3.11.4.1	Alternative 1 – No Action .....	3.11-46
3.11.4.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.11-46
3.11.4.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.11-91
3.11.4.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.11-93
3.11.4.5	Alternative 4 – Birch Tree Crossing (BTC) Port .....	3.11-101
3.11.4.6	Alternative 5A – Dry Stack Tailings .....	3.11-106
3.11.4.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.11-110
3.11.4.8	Alternatives Impact Comparison .....	3.11-112
3.12	WILDLIFE .....	3.12-1
3.12.1	Regulatory Framework .....	3.12-4
3.12.1.1	Terrestrial Mammals .....	3.12-4
3.12.1.2	Marine Mammals .....	3.12-4
3.12.1.3	Birds .....	3.12-4
3.12.1.4	Special Status Species .....	3.12-6
3.12.1.5	Protected Species .....	3.12-6
3.12.2	Affected Environment .....	3.12-6
3.12.2.1	General Habitat Information .....	3.12-6
3.12.2.2	Terrestrial Wildlife .....	3.12-7

3.12.2.3	Marine Mammals .....	3.12-18
3.12.2.4	Birds .....	3.12-24
3.12.2.5	Environmental Contamination .....	3.12-42
3.12.2.6	Climate Change .....	3.12-50
3.12.3	Environmental Consequences.....	3.12-52
3.12.3.1	Alternative 1 – No Action.....	3.12-54
3.12.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.12-55
3.12.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.12-97
3.12.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.12-98
3.12.3.5	Alternative 4 – BTC Port .....	3.12-102
3.12.3.6	Alternative 5A – Dry Stack Tailings .....	3.12-104
3.12.3.7	Alternative 6A – Modified Natural Gas Alignment: Dalzell Gorge Route.....	3.12-105
3.12.3.8	Alternatives Impact Comparison .....	3.12-106
3.13	FISH AND AQUATIC RESOURCES.....	3.13-1
3.13.1	Regulatory Framework .....	3.13-3
3.13.1.1	Federal .....	3.13-4
3.13.1.2	State .....	3.13-4
3.13.1.3	Local.....	3.13-6
3.13.2	Affected Environment .....	3.13-6
3.13.2.1	Mine Site – Crooked Creek Drainage.....	3.13-7
3.13.2.2	Transportation Corridor.....	3.13-34
3.13.2.3	Pipeline .....	3.13-57
3.13.2.4	Climate Change .....	3.13-63
3.13.3	Environmental Consequences.....	3.13-69
3.13.3.1	Alternative 1 – No Action Alternative .....	3.13-71
3.13.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.13-72
3.13.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Rock Trucks .....	3.13-163
3.13.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.13-164
3.13.3.5	Alternative 4 – Birch Tree Crossing Port .....	3.13-166
3.13.3.6	Alternative 5A – Dry Stack Tailings .....	3.13-169
3.13.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.13-170
3.13.3.8	Alternatives Impact Comparison .....	3.13-171
3.14	THREATENED AND ENDANGERED SPECIES.....	3.14-1
3.14.1	Regulatory Framework .....	3.14-3
3.14.2	ESA-Protected, Candidate, and Delisted Bird Species .....	3.14-4
3.14.2.1	Affected Environment.....	3.14-4

3.14.2.2	Environmental Consequences .....	3.14-11
3.14.3	ESA-Protected and Candidate Marine Mammal Species .....	3.14-27
3.14.3.1	Affected Environment.....	3.14-27
3.14.3.2	Environmental Consequences .....	3.14-37
3.15	LAND OWNERSHIP, MANAGEMENT, AND USE .....	3.15-1
3.15.1	Regulatory Setting.....	3.15-3
3.15.1.1	Federal Regulations.....	3.15-3
3.15.1.2	Alaska Native Regional and Village Corporations .....	3.15-15
3.15.1.3	State Regulations.....	3.15-17
3.15.1.4	Local Regulations .....	3.15-20
3.15.1.5	Legal Access .....	3.15-23
3.15.2	Affected Environment .....	3.15-26
3.15.2.1	Land Ownership and Use.....	3.15-26
3.15.3	Environmental Consequences.....	3.15-37
3.15.3.1	Alternative 1 – No Action.....	3.15-37
3.15.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.15-39
3.15.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.15-56
3.15.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.15-56
3.15.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.15-59
3.15.3.6	Alternative 5A – Dry Stack Tailings .....	3.15-60
3.15.3.7	Alternative 6A – Modified Pipeline Alignment: Dalzell Gorge Route.....	3.15-62
3.15.3.8	Alternatives Impact Comparison .....	3.15-63
3.16	RECREATION .....	3.16-1
3.16.1	Regulatory Environment.....	3.16-3
3.16.1.1	Legal Access for Recreation .....	3.16-3
3.16.2	Affected Environment .....	3.16-4
3.16.2.1	Recreation Management.....	3.16-4
3.16.2.2	Recreation and Tourism in the EIS Analysis Area .....	3.16-8
3.16.2.3	Recreation Facilities, Setting, and Activities .....	3.16-10
3.16.2.4	Climate Change .....	3.16-12
3.16.3	Environmental Consequences.....	3.16-12
3.16.3.1	Alternative 1 – No Action.....	3.16-13
3.16.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.16-13
3.16.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.16-29
3.16.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.16-30
3.16.3.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.16-31
3.16.3.6	Alternative 5A – Dry Stack Tailings .....	3.16-32

3.16.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.16-32
3.16.3.8	Alternatives Impact Comparison .....	3.16-33
3.17	VISUAL RESOURCES .....	3.17-1
3.17.1	Regulatory Environment .....	3.17-3
3.17.1.1	Methods for Establishing Baseline Conditions.....	3.17-4
3.17.2	Affected Environment .....	3.17-5
3.17.2.1	Mine Site.....	3.17-5
3.17.2.2	Transportation Corridor.....	3.17-6
3.17.2.3	Pipeline .....	3.17-14
3.17.2.4	Climate Change .....	3.17-25
3.17.3	Environmental Consequences.....	3.17-26
3.17.3.1	Methods.....	3.17-27
3.17.3.2	Alternative 1 – No Action.....	3.17-51
3.17.3.3	Alternative 2 – Donlin Gold’s Proposed Action .....	3.17-51
3.17.3.4	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.17-77
3.17.3.5	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.17-77
3.17.3.6	Alternative 4 – Birch Tree Crossing Port .....	3.17-81
3.17.3.7	Alternative 5A – Dry Stack Tailings .....	3.17-82
3.17.3.8	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.17-82
3.17.3.9	Alternatives Impact Comparison .....	3.17-84
3.18	SOCIOECONOMICS .....	3.18-1
3.18.1	Affected Environment .....	3.18-3
3.18.1.1	Potentially Affected Communities and Community Groups.....	3.18-4
3.18.1.2	Local Public Infrastructure and Services .....	3.18-23
3.18.1.3	Climate Change .....	3.18-33
3.18.2	Environmental Consequences.....	3.18-34
3.18.2.1	Alternative 1 – No Action.....	3.18-35
3.18.2.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.18-36
3.18.2.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.18-59
3.18.2.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.18-60
3.18.2.5	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.18-63
3.18.2.6	Alternative 5A – Dry Stack Tailings .....	3.18-64
3.18.2.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.18-64
3.18.2.8	Alternatives Impact Comparison .....	3.18-65





3.20.3.9	Impact Comparison – All Alternatives.....	3.20-64
3.21	SUBSISTENCE .....	3.21-1
3.21.1	The Many Dimensions of Subsistence.....	3.21-5
3.21.2	Subsistence Values and Beliefs .....	3.21-8
3.21.3	Regulatory Environment.....	3.21-12
3.21.3.1	State Regulations.....	3.21-13
3.21.3.2	Federal Regulations.....	3.21-14
3.21.4	Traditional Ecological Knowledge.....	3.21-16
3.21.5	Affected Environment .....	3.21-18
3.21.5.1	Subsistence Harvest Patterns: Upper Kuskokwim Subregion .....	3.21-19
3.21.5.2	Subsistence Harvest Patterns: Central Kuskokwim Subregion .....	3.21-30
3.21.5.3	Subsistence Harvest Patterns: Lower-Middle Kuskokwim Subregion.....	3.21-64
3.21.5.4	Subsistence Harvest Patterns: Lower Kuskokwim Subregion .....	3.21-83
3.21.5.5	Kuskokwim River Salmon Fisheries .....	3.21-92
3.21.5.6	Western Cook Inlet and Kuskokwim River Moose and Caribou Hunting.....	3.21-96
3.21.5.7	Subsistence Harvest Patterns: Bering Sea Coast Subregion .....	3.21-104
3.21.5.8	Subsistence Harvest Patterns: Mouth of the Yukon Subregion .....	3.21-114
3.21.5.9	Subsistence Harvest Patterns: Lower Yukon Subregion .....	3.21-118
3.21.5.10	Subsistence Harvest Patterns: Middle Yukon Subregion .....	3.21-126
3.21.5.11	Subsistence Harvest Patterns: Cook Inlet Subregion .....	3.21-132
3.21.5.12	Climate Change .....	3.21-136
3.21.6	Environmental Consequences.....	3.21-138
3.21.6.1	Analyzing Impacts to Subsistence.....	3.21-138
3.21.6.2	Alternative 1 – No Action.....	3.21-155
3.21.6.3	Alternative 2 – Donlin Gold’s Proposed Action .....	3.21-156
3.21.6.4	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.21-211
3.21.6.5	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.21-213
3.21.6.6	Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.21-216
3.21.6.7	Alternative 5A – Dry Stack Tailings .....	3.21-219
3.21.6.8	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.21-223
3.21.6.9	Alternatives Impact Comparison .....	3.21-223



3.22 HUMAN HEALTH .....	3.22-1
3.22.1 Regulatory Environment, assumptions and limitations.....	3.22-5
3.22.2 Approach.....	3.22-9
3.22.3 Affected Environment .....	3.22-10
3.22.3.1 Demographic Summary of Potentially Affected Communities.....	3.22-14
3.22.3.2 Stakeholder Concerns About Health .....	3.22-16
3.22.3.3 Baseline Community Health Conditions: Health Effects Categories .....	3.22-17
3.22.3.4 Mine Site.....	3.22-17
3.22.3.5 Transportation Corridor.....	3.22-35
3.22.3.6 Pipeline .....	3.22-36
3.22.3.7 Climate Change .....	3.22-42
3.22.3.8 Summary .....	3.22-44
3.22.4 Environmental Consequences.....	3.22-44
3.22.4.1 Alternative 1 – No Action.....	3.22-48
3.22.4.2 Alternative 2 – Donlin Gold’s Proposed Action .....	3.22-49
3.22.4.3 Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.22-100
3.22.4.4 Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.22-101
3.22.4.5 Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.22-103
3.22.4.6 Alternative 5A – Dry Stack Tailings .....	3.22-105
3.22.4.7 Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.22-105
3.22.4.8 Alternatives Impact Comparison .....	3.22-105
3.23 TRANSPORTATION.....	3.23-1
3.23.1 Affected Environment: Local and Regional Transportation Systems .....	3.23-3
3.23.1.1 Surface Transportation.....	3.23-4
3.23.1.2 Air Transportation .....	3.23-6
3.23.1.3 Water Transportation .....	3.23-9
3.23.1.4 Climate Change .....	3.23-18
3.23.2 Environmental Consequences.....	3.23-19
3.23.2.1 Alternative 1 – No Action.....	3.23-20
3.23.2.2 Alternative 2 – Donlin Gold’s Proposed Action .....	3.23-20
3.23.2.3 Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.23-32
3.23.2.4 Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.23-35
3.23.2.5 Alternative 4 – Birch Tree Crossing (BTC) Port.....	3.23-38
3.23.2.6 Alternative 5A – Dry Stack Tailings .....	3.23-39

3.23.2.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.23-39
3.23.2.8	Alternatives Impact Comparison .....	3.23-40
3.24	SPILL RISK .....	3.24-1
3.24.1	Applicable Regulations and Planning Requirements .....	3.24-2
3.24.1.1	Diesel Fuel and Other Oil.....	3.24-3
3.24.1.2	Liquefied Natural Gas .....	3.24-4
3.24.1.3	Cyanide .....	3.24-5
3.24.1.4	Mercury.....	3.24-6
3.24.1.5	Tailings .....	3.24-7
3.24.2	Existing Response Capacity .....	3.24-8
3.24.2.1	Oil Spills.....	3.24-9
3.24.2.2	Liquefied Natural Gas .....	3.24-10
3.24.2.3	Cyanide .....	3.24-10
3.24.2.4	Mercury.....	3.24-10
3.24.2.5	Tailings .....	3.24-11
3.24.3	Spill Frequency and Volume.....	3.24-11
3.24.3.1	Diesel Fuel and Other Oil.....	3.24-11
3.24.3.2	Liquefied Natural Gas .....	3.24-19
3.24.3.3	Cyanide .....	3.24-21
3.24.3.4	Mercury.....	3.24-25
3.24.3.5	Tailings .....	3.24-29
3.24.4	Fate and Behavior of Spilled Materials .....	3.24-31
3.24.4.1	Diesel Fuel and Other Oil.....	3.24-31
3.24.4.2	Liquefied Natural Gas .....	3.24-34
3.24.4.3	Cyanide .....	3.24-34
3.24.4.4	Mercury.....	3.24-35
3.24.4.5	Tailings Dam Release .....	3.24-37
3.24.5	Spill Scenarios.....	3.24-38
3.24.5.1	Scenario 1: Ocean Barge Rupture at Sea .....	3.24-41
3.24.5.2	Scenario 2: River Barge Release .....	3.24-41
3.24.5.3	Scenario 3: Tank Farm Release.....	3.24-42
3.24.5.4	Scenario 4: Tanker Truck Release.....	3.24-43
3.24.5.5	Scenario 5: Diesel Pipeline Release .....	3.24-44
3.24.5.6	Scenario 6: Liquefied Natural Gas (LNG) Release .....	3.24-46
3.24.5.7	Scenario 7: Cyanide Release.....	3.24-46
3.24.5.8	Scenario 8: Mercury Release .....	3.24-48
3.24.5.9	Scenario 9: Partial Tailings Dam Failure .....	3.24-50
3.24.6	Spill Scenario Impacts .....	3.24-55
3.24.6.1	Geology .....	3.24-55
3.24.6.2	Soils.....	3.24-56

3.24.6.3	Geohazards and Seismic Conditions .....	3.24-66
3.24.6.4	Climate and Meteorology .....	3.24-66
3.24.6.5	Surface Water Hydrology .....	3.24-67
3.24.6.6	Groundwater Hydrology .....	3.24-73
3.24.6.7	Water Quality .....	3.24-78
3.24.6.8	Air Quality .....	3.24-107
3.24.6.9	Noise and Vibration.....	3.24-113
3.24.6.10	Vegetation	3.24-116
3.24.6.11	Wetlands	3.24-122
3.24.6.12	Wildlife	3.24-131
3.24.6.13	Fish and Aquatic Resources .....	3.24-146
3.24.6.14	Threatened and Endangered Species.....	3.24-160
3.24.6.15	Land Ownership, Management, and Use .....	3.24-168
3.24.6.16	Recreation	3.24-172
3.24.6.17	Visual Resources .....	3.24-178
3.24.6.18	Socioeconomics.....	3.24-182
3.24.6.19	Environmental Justice .....	3.24-186
3.24.6.20	Cultural Resources .....	3.24-191
3.24.6.21	Subsistence .....	3.24-195
3.24.6.22	Human Health.....	3.24-202
3.24.6.23	Transportation.....	3.24-208
3.24.7	Impact Reducing Measures .....	3.24-213
3.24.8	Comparison of Impacts by Scenario .....	3.24-216
3.25	PIPELINE RELIABILITY AND SAFETY .....	3.25-1
3.25.1	Safety Standards.....	3.25-4
3.25.2	Pipeline Accident Data .....	3.25-7
3.25.3	Impact on Public Safety.....	3.25-10
3.25.3.1	Alternative 1 – No Action.....	3.25-10
3.25.3.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.25-10
3.25.3.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.25-18
3.25.3.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.25-18
3.25.3.5	Alternative 4 – Birch Tree Crossing Port .....	3.25-18
3.25.3.6	Alternative 5A – Dry Stack Tailings .....	3.25-18
3.25.3.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.25-19
3.26	CLIMATE CHANGE .....	3.26-1
3.26.1	Climate Change Definition .....	3.26-4
3.26.2	Regulatory Framework .....	3.26-5
3.26.2.1	Council on Environmental Quality (CEQ) Guidance .....	3.26-5

3.26.2.2	EPA and State of Alaska Regulations .....	3.26-6
3.26.2.3	PHMSA Special Permits .....	3.26-6
3.26.3	Affected Environment .....	3.26-6
3.26.3.1	Atmosphere .....	3.26-7
3.26.3.2	Water Resources .....	3.26-8
3.26.3.3	Permafrost .....	3.26-14
3.26.3.4	Biological Resources and Subsistence .....	3.26-18
3.26.3.5	Spill Response .....	3.26-26
3.26.4	Environmental Consequences.....	3.26-26
3.26.4.1	Alternative 1 – No Action.....	3.26-26
3.26.4.2	Alternative 2 – Donlin Gold’s Proposed Action .....	3.26-26
3.26.4.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	3.26-47
3.26.4.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	3.26-49
3.26.4.5	Alternative 4 – Birch Tree Crossing Port .....	3.26-52
3.26.4.6	Alternative 5A – Dry Stack Tailings .....	3.26-54
3.26.4.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	3.26-56
3.26.4.8	Alternatives Impact Comparison .....	3.26-58
3.27	OTHER IMPACT CONSIDERATIONS.....	3.27-1
3.27.1	Unavoidable Adverse Effects.....	3.27-1
3.27.2	Relationship Between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity.....	3.27-2
3.27.3	Irreversible and Irrecoverable Commitment of Resources .....	3.27-2
<b>CHAPTER 4: CUMULATIVE EFFECTS</b>		
4.1	INTRODUCTION .....	4-1
4.2	METHODOLOGY .....	4-1
4.2.1	Temporal and Spatial Scope of Analysis .....	4-2
4.2.2	Past, Present, and Reasonably Foreseeable Future Actions .....	4-3
4.2.3	External Actions Considered but Dismissed .....	4-9
4.3	CUMULATIVE EFFECTS .....	4-10
4.3.1	Physical Environment .....	4-10
4.3.1.1	Geology .....	4-10
4.3.1.2	Soils.....	4-15
4.3.1.3	Geohazards and Seismic Conditions .....	4-23
4.3.1.4	Climate and Meteorology .....	4-23
4.3.1.5	Surface Water Hydrology .....	4-23
4.3.1.6	Groundwater Hydrology .....	4-25
4.3.1.7	Water Quality .....	4-27
4.3.1.8	Air Quality .....	4-33

4.3.1.9	Noise and Vibration.....	4-34
4.3.2	Biological Environment.....	4-36
4.3.2.1	Vegetation and Nonnative Invasive Species .....	4-36
4.3.2.2	Wetlands.....	4-37
4.3.2.3	Wildlife .....	4-38
4.3.2.4	Fish and Aquatic Resources .....	4-40
4.3.2.5	Threatened and Endangered Species.....	4-41
4.3.3	Social Environment .....	4-43
4.3.3.1	Land Ownership, Management, and Use .....	4-43
4.3.3.2	Recreation .....	4-44
4.3.3.3	Visual Resources.....	4-46
4.3.3.4	Socioeconomics.....	4-47
4.3.3.5	Environmental Justice.....	4-49
4.3.3.6	Cultural Resources .....	4-50
4.3.3.7	Subsistence .....	4-52
4.3.3.8	Human Health.....	4-53
4.3.3.9	Transportation.....	4-55
4.3.4	Cumulative Effects and Climate Change .....	4-56
4.3.4.1	Alternative 1 – No Action Alternative .....	4-57
4.3.4.2	Alternative 2 – Donlin Gold’s Proposed Action .....	4-57
4.3.4.3	Alternative 3A – Reduced Diesel Barging: LNG-Powered Haul Trucks .....	4-58
4.3.4.4	Alternative 3B – Reduced Diesel Barging: Diesel Pipeline .....	4-58
4.3.4.5	Alternative 4 – Birch Tree Crossing Port .....	4-58
4.3.4.6	Alternative 5A – Dry Stack Tailings .....	4-58
4.3.4.7	Alternative 6A – Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route .....	4-58

**CHAPTER 5: IMPACT AVOIDANCE, MINIMIZATION, AND MITIGATION**

5.1	INTRODUCTION .....	5-1
5.1.1	Overview of NEPA and Corps 404 Mitigation .....	5-1
5.1.2	Definitions and Process.....	5-2
5.1.3	NEPA Guidance .....	5-4
5.2	DESIGN FEATURES PROPOSED BY DONLIN GOLD.....	5-5
5.3	BEST MANAGEMENT PRACTICES AND PERMIT REQUIREMENTS.....	5-19
5.3.1	Permitting for Large Mine Projects in Alaska .....	5-19
5.3.2	Best Management Practices.....	5-21
5.4	STRAIN-BASED DESIGN SPECIAL PERMIT CONDITIONS .....	5-22
5.5	AGENCY-CONSIDERED MITIGATION .....	5-22
5.6	COMPENSATORY MITIGATION.....	5-41

5.6.1	Section 404 of the Clean Water Act.....	5-41
5.6.2	U.S. Department of the Interior.....	5-41
5.7	MONITORING AND ADAPTIVE MANAGEMENT .....	5-42
<b>CHAPTER 6: CONSULTATION AND COORDINATION</b>		
6.1	INTRODUCTION .....	6-1
6.2	TRIBAL COORDINATION AND GOVERNMENT-TO-GOVERNMENT CONSULTATION.....	6-2
6.3	SCOPING AND PUBLIC OUTREACH .....	6-3
6.3.1	Scoping Notice .....	6-3
6.3.2	Public Scoping Meetings .....	6-4
6.3.3	Agency Scoping Meeting.....	6-6
6.3.4	Comments Received During Scoping .....	6-8
6.3.5	Additional Public Outreach .....	6-8
6.4	THE DRAFT EIS AND PUBLIC COMMENT .....	6-10
6.4.1	Public Comment Collection .....	6-10
6.4.2	Draft EIS Comments Received.....	6-13
6.5	BIOLOGICAL ASSESSMENTS .....	6-14
6.6	ESSENTIAL FISH HABITAT ASSESSMENT .....	6-14
<b>CHAPTER 7: LIST OF PREPARERS</b>		
<b>CHAPTER 8: DISTRIBUTION</b>		
8.1	FEDERAL AGENCIES.....	8-1
8.1.1	U.S. Army Corps of Engineers (CORPS).....	8-1
8.1.2	U.S. Department of the Interior, Bureau of Land Management (BLM)...	8-1
8.1.3	U.S. Environmental Protection Agency (EPA) .....	8-1
8.1.4	U.S. Department of the Interior, Fish & Wildlife Service (USFWS).....	8-1
8.1.5	U.S. National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA/NMFS).....	8-1
8.1.6	U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration .....	8-1
8.1.7	U.S. Coast Guard, 17 <sup>th</sup> District .....	8-1
8.2	TRIBAL GOVERNMENT.....	8-2
8.2.1	Native Village of Crooked Creek.....	8-2
8.2.2	Native Village of Napaimute .....	8-2
8.2.3	Native Village of Chuathbaluk and the Center for Science in Public Participation.....	8-2
8.2.4	Aniak Traditional Council.....	8-2
8.2.5	Native Village of Lower Kalskag .....	8-2
8.2.6	Akiak Native Community and Kuskokwim River Watershed Council.....	8-2
8.2.7	Sheila Williams, Akiak Tribal Administrator Knik Tribal Council .....	8-2

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8.3	STATE GOVERNMENT.....	8-2
8.3.1	Alaska Department of Natural Resources (ADNR) .....	8-2
8.4	PUBLIC OFFICIALS .....	8-2
8.4.1	Federal Congressional .....	8-2
8.4.2	State of Alaska .....	8-3
8.4.3	Local Government .....	8-3
8.4.4	Tribes and Tribal Associations.....	8-3
8.4.5	Alaska Native Claims Settlement Act (ANCSA) Corporations .....	8-5
8.5	APPLICANT.....	8-5
8.6	OTHER ENTITIES .....	8-6
8.7	LIBRARIES AND UNIVERSITIES.....	8-6

**CHAPTER 9: REFERENCES**

**GLOSSARY OF TERMS**

## TABLES

Table 2.3-1: Primary Mine Equipment Information (Estimates).....	2-17
Table 2.3-2: Mercury Control Efficiency.....	2-24
Table 2.3-3: Estimated Annual Consumption of Reagents Used at the Mine Site.....	2-27
Table 2.3-4: Estimated Processing Plant Water Use.....	2-31
Table 2.3-5: Waste Rock Characteristics and Estimated Tons.....	2-33
Table 2.3-6: Waste Rock Placement and Estimated Tons.....	2-33
Table 2.3-7: Summary of Mine Site Components Power Use.....	2-37
Table 2.3-8: Estimated Annual Ocean and River Barge Traffic Under Alternative 2.....	2-50
Table 2.3-9: Material Sites – Angyaruaq (Jungjuk) Road.....	2-52
Table 2.3-10: Angyaruaq (Jungjuk) Road Stream Crossings.....	2-57
Table 2.3-11: Estimated Mine Access Road Traffic.....	2-58
Table 2.3-12: Estimates of Annual Airport Operations at Mine Airstrip.....	2-59
Table 2.3-13: Oil Spill Response Plans.....	2-60
Table 2.3-14: Land Requirements for the Alternative 2 Natural Gas Pipeline.....	2-63
Table 2.3-15: Mainline Valve Location Summary.....	2-73
Table 2.3-16: Winter Access Routes within Susitna Valley.....	2-77
Table 2.3-17: Susitna Valley Winter Access Potential Water Extraction Sites for Ice Road Construction <sup>1</sup> .....	2-79
Table 2.3-18: Potential Water Extraction Sites for Pipeline Construction <sup>1</sup> .....	2-81
Table 2.3-19: HDD Estimated Water Use.....	2-84
Table 2.3-20: Access Road Identification <sup>1</sup> .....	2-85
Table 2.3-21: Shoofly Access Routes <sup>1</sup> .....	2-87
Table 2.3-22: Mainline Pipeline Campsite Locations.....	2-90
Table 2.3-23: HDD Camps and Campsite Locations.....	2-92
Table 2.3-24: Pipeline Construction Fuel Use Estimate.....	2-95
Table 2.3-25: Pipe Storage Yards.....	2-97
Table 2.3-26: Estimated Borrow Material Source Needs.....	2-99
Table 2.3-27: Potential Material Sites.....	2-100
Table 2.3-28: Airstrip Locations and Construction.....	2-103
Table 2.3-29: Air Operation Estimates.....	2-105
Table 2.3-30: Pipeline Construction Execution Sequence.....	2-108
Table 2.3-31: Minimum Cover Requirements.....	2-110
Table 2.3-32: Equipment Type, Usage Factor and Schedule/Period for Pipeline Construction.....	2-133
Table 2.3-33: Mainline Valve Location Summary (North Option).....	2-141
Table 2.3-34: Potential Water Extraction Sites for Pipeline Construction (North Option).....	2-143
Table 2.3-35: HDD Estimated Water Use (North Option).....	2-144
Table 2.3-36: Access Road Identification (North Option).....	2-145



Table 2.3-37: Shoofly Access Routes (North Option) .....	2-145
Table 2.3-38: Mainline Pipeline Campsite Locations (North Option).....	2-147
Table 2.3-39: HDD Camps and Campsite Locations (North Option).....	2-148
Table 2.3-40: Pipe Storage Yards (North Option).....	2-148
Table 2.3-41: Potential Material Sites (North Option) .....	2-149
Table 2.3-42: Airstrip Locations and Construction (North Option).....	2-150
Table 2.3-43: Construction, Operations, and Post-Closure Monitoring Summary .....	2-155
Table 2.3-44: Estimated Annual Ocean and River Barge Traffic Under Alternative 3A .....	2-169
Table 2.3-45: Estimated Annual Ocean and River Barge Traffic Under Alternative 3B .....	2-173
Table 2.3-46: Alternative 3B Block Valve Location Summary .....	2-176
Table 2.3-47: Airstrips for Alternative 3B.....	2-178
Table 2.3-48: Material Sites – BTC Road.....	2-182
Table 2.3-49: BTC Road Stream Crossings .....	2-183
Table 2.3-50: Dalzell Gorge Route Access Road Identification .....	2-190
Table 2.3-51: Potential Material Sites.....	2-190
Table 2.3-52: Pipeline Construction Execution Sequence .....	2-190
Table 2.3-53: Potential Water Extraction Sites for Pipeline Construction.....	2-191
Table 2.3-54: Primary Differences Between the Action Alternatives .....	2-193
Table 2.3-55: Impact Comparison by Alternative for Chapter 3 Resources .....	2-196
Table 2.4-1: Mine Site Options Eliminated from Detailed Consideration.....	2-249
Table 2.4-2: Transportation Options Eliminated from Detailed Consideration.....	2-252
Table 2.4-3: Power Options Eliminated from Detailed Consideration .....	2-254
Table 2.4-4: Pipeline Options Eliminated from Detailed Consideration.....	2-255
Table 3.0-1: Technical Working Groups to Address Data Gaps .....	3.0-9
Table 3.1-1. Fossil Sites Along Pipeline (within one mile) .....	3.1-36
Table 3.1-2: Impact Methodology for Geological Resources .....	3.1-39
Table 3.1-3: Summary Impacts <sup>1</sup> of Alternative 2 on Geological Resources by Project Component .....	3.1-61
Table 3.1-4: Comparison of Impacts by Alternative* for Geology and Paleontology .....	3.1-78
Table 3.2-1: Concentrations of Inorganics in Baseline Soils, Mine Site and Vicinity .....	3.2-12
Table 3.2-2: Stream Crossings in Permafrost Terrain – Screening for Erosion Vulnerability .....	3.2-31
Table 3.2-3: Impact Methodology for Effects on Soils and Permafrost .....	3.2-39
Table 3.2-4: Permafrost Degradation, Mine Site.....	3.2-54
Table 3.2-5: Permafrost Degradation, Transportation Corridor.....	3.2-61
Table 3.2-6: Selected Metals Concentrations in Fugitive Dust Sources.....	3.2-96
Table 3.2-7: Estimated Metals Concentrations in Mine Site Soil due to Fugitive Dust, based on Site-Wide Baseline Values .....	3.2-98

Table 3.2-8: Estimated Arsenic Concentrations in Soil along Mine Access Road due to Fugitive Dust.....	3.2-108
Table 3.2-9: Summary Impacts of Alternative 2 on Soils by Project Component .....	3.2-114
Table 3.2-10: Soil Disturbance Comparisons for Pipeline Alternatives .....	3.2-126
Table 3.2-11: Permafrost Comparisons for Pipeline Alternatives.....	3.2-144
Table 3.2-12: Soil Erosion Comparison for Pipeline Alternatives in Alaska Range .....	3.2-146
Table 3.2-13: Comparison by Alternative* for Soils .....	3.2-149
Table 3.3-1: Impact Methodology for Geohazard Effects.....	3.3-31
Table 3.3-2: Build-out Dimensions for Proposed Water Dams and TSF Dam.....	3.3-43
Table 3.3-3: Earthquake Magnitude-Distance Criteria for Dam Incident Reporting.....	3.3-46
Table 3.3-4: Summary of Impacts <sup>1</sup> of Alternative 2 for Geohazards by Project Component .....	3.3-75
Table 3.3-5: Comparison of Impacts by Alternative* for Geohazards .....	3.3-96
Table 3.4-1: Average Monthly Climate Data Characteristic of the Mine Site.....	3.4-6
Table 3.4-2: Description of Meteorological Monitoring Stations at Mine Site .....	3.4-9
Table 3.4-3: Average Monthly Climate Data Characteristic of Transportation Corridor.....	3.4-12
Table 3.4-4: Average Monthly Climate Data Characteristic of Pipeline.....	3.4-20
Table 3.5-1: Federal and State Surface Water Use Regulations .....	3.5-4
Table 3.5-2: Drainage Basin Characteristics, Crooked Creek and Tributaries .....	3.5-6
Table 3.5-3: Streamflow Gauging Stations, Crooked Creek Drainage .....	3.5-10
Table 3.5-4: Snow Gulch Minimum and Maximum Measured Discharge at Station SNOW.....	3.5-13
Table 3.5-5: American Creek Average Monthly Discharge at Station AMER .....	3.5-16
Table 3.5-6: Anaconda Creek Average Monthly Discharge at Station ANDA .....	3.5-17
Table 3.5-7: Crevice Creek Average Monthly Discharge at Station CRDN.....	3.5-20
Table 3.5-8: Average Monthly Discharge in Crooked Creek at Station CCAC .....	3.5-22
Table 3.5-9: Summary of Average Monthly Discharge on Crooked Creek (USGS) .....	3.5-23
Table 3.5-10: Summary of Peak Discharge on Lower Crooked Creek (USGS) .....	3.5-23
Table 3.5-11: Crooked Creek (USGS) versus American Creek Runoff Depth (2007 – 2009) .....	3.5-25
Table 3.5-12: Meteorological Data Inputs for Water Balance Models .....	3.5-25
Table 3.5-13: Water Balance Calibration Results for the Open-Water Season.....	3.5-30
Table 3.5-14: Flood Magnitude and Frequency for Mine Site Watersheds .....	3.5-31
Table 3.5-15: Watersheds Traversed by the Angyaruaq (Jungjuk) Road Corridor.....	3.5-32
Table 3.5-16: Eagle Creek Minimum and Maximum Measured Discharge .....	3.5-35
Table 3.5-17: Getmuna Creek 2013 Discharge .....	3.5-36
Table 3.5-18: Flood Magnitude and Frequency for Watersheds Traversed by Angyaruaq (Jungjuk) Road .....	3.5-37

Table 3.5-19: Watersheds Traversed by the BTC Road Alignment between the BTC Port and the Angyaruaq (Jungjuk) Road Corridor.....	3.5-39
Table 3.5-20: Summary of Hydraulic Variables for Sites on the Lower Kuskokwim River ....	3.5-44
Table 3.5-21: Kuskokwim River Widths and Depths at Critical Sections.....	3.5-45
Table 3.5-22: Kuskokwim River Flood Magnitude and Frequency at USGS Gauging Station <sup>1</sup> .....	3.5-49
Table 3.5-24: Impact Criteria for Surface Water Resources .....	3.5-67
Table 3.5-25: Storage Requirements and Dam Crests .....	3.5-73
Table 3.5-26: Summary of Percent Reduction in Average Monthly Stream Flow for Various Scenarios during Mining.....	3.5-93
Table 3.5-27: Summary of Bankfull Channel Dimension Computations for Crooked Creek above Crevice Creek .....	3.5-95
Table 3.5-28: Summary of Percent Change in Average Monthly Streamflow for Two Scenarios After Pit Lake is at Capacity.....	3.5-109
Table 3.5-29: Kuskokwim River Barge Guidelines.....	3.5-117
Table 3.5-30: Maximum Wave Heights for Upriver Loaded Trip .....	3.5-118
Table 3.5-31: Maximum Wave Heights for Empty Return Voyage.....	3.5-119
Table 3.5-32: Maximum Estimated Velocity and Shear Stress on Kuskokwim Riverbed from Propeller Wash .....	3.5-120
Table 3.5-33: HDD Water Use Estimates .....	3.5-136
Table 3.5-34: Summary of Surface Water Impacts for Alternative 2 .....	3.5-145
Table 3.5-34: Summary of Surface Water Impacts for Alternative 2 .....	3.5-146
Table 3.5-35: Comparison of Impacts by Alternative* for Surface Water Hydrology .....	3.5-172
Table 3.6-1: Federal and State Regulations Affecting Groundwater Quantity .....	3.6-4
Table 3.6-2: Summary of Hydraulic Conductivity Estimates from Hydraulic Tests Not Influenced by Permafrost .....	3.6-15
Table 3.6-3: Impact Methodology for Groundwater Resources.....	3.6-26
Table 3.6-4: Summary of Impacts <sup>1</sup> to Groundwater Hydrology for Alternative 2 .....	3.6-53
Table 3.6-5: Comparison of Impacts by Alternative* for Groundwater .....	3.6-66
Table 3.7-1: Description of Surface Water Sampling Locations in Mine Area, Donlin Gold Baseline Water Quality Monitoring Program .....	3.7-12
Table 3.7-2: Surface Water Quality Summary for Category 1 Locations – Background Sites Outside of Mineralized Areas .....	3.7-14
Table 3.7-3: Surface Water Quality Summary for Category 2 Locations - Background Sites in Mineralized Areas.....	3.7-17
Table 3.7-4: Surface Water Quality Summary for Category 3 Locations – Baseline Sites Draining Proposed Mine and Placer Mining Areas .....	3.7-20
Table 3.7-5: Summary of USGS Surface Water Quality Data from Proposed Mine Area....	3.7-26
Table 3.7-6: Methylmercury Concentrations in Mine Area Surface Water Samples, Crooked Creek Watershed.....	3.7-31
Table 3.7-7: Historical Water Quality Data from Kuskokwim River at Crooked Creek.....	3.7-40

Table 3.7-8: Summary of Surface Water Quality Field Measurements along Proposed Pipeline Route .....	3.7-43
Table 3.7-9: Groundwater Quality Monitoring Well Locations .....	3.7-47
Table 3.7-10: Groundwater Quality Summary for Alluvial Mine Site Wells.....	3.7-49
Table 3.7-11: Groundwater Quality Summary for Bedrock Mine Site Wells .....	3.7-51
Table 3.7-12: Summary of Total Metals Results for Proposed Mine Area Stream Sediment Samples, 2008.....	3.7-60
Table 3.7-13: Summary of Total Metals Results <sup>1</sup> in Kuskokwim River Sediment, 2007 Sampling Event.....	3.7-68
Table 3.7-14: Summary of Total Metals Results <sup>1</sup> in Kuskokwim River Sediment, 2010 Sampling Event.....	3.7-70
Table 3.7-15: Summary of Non-Metal Analytes in Sediments on the Main Channel of the Kuskokwim River from Helmick Point to Georgetown.....	3.7-72
Table 3.7-16: Preliminary and Revised Waste Rock Management Categories for Proposed Donlin Gold Project.....	3.7-80
Table 3.7-17: Characteristics of Rock Samples in Humidity Cell Tests.....	3.7-83
Table 3.7-18: Characteristics of Samples Used in On-Site Barrel Tests.....	3.7-87
Table 3.7-19: Distribution Statistics for Selected Elements in Waste Rock.....	3.7-91
Table 3.7-20: Waste Rock Leachate Concentrations in the Final Step of Sequential Meteoric Water Mobility Procedure.....	3.7-94
Table 3.7-21: Grouping of Major and Trace Element Leaching Trends with Time for Barrel Tests (2006-2014) .....	3.7-96
Table 3.7-22: Grouping of Major and Trace Element Leaching Trends Along the Flow Path for Barrel Tests (2006-2014) .....	3.7-97
Table 3.7-23: Acid-Base Accounting Data for Pit-Area Overburden and Distribution Statistics for Other Miscellaneous Mine-Site Overburden.....	3.7-99
Table 3.7-24: Selected Meteoric Water Mobility Procedure Results for Overburden Samples.....	3.7-100
Table 3.7-25: Mineralogy and Acid-Base Accounting on Tailings Samples .....	3.7-101
Table 3.7-26: Acid-Base Accounting for Tailings Samples Submitted for Humidity Cell Testing.....	3.7-102
Table 3.7-27: Meteoric Water Mobility Procedure Results for Tailings Samples .....	3.7-102
Table 3.7-28: Meteoric Water Mobility Procedure and Subsequent Rinsing of Tailings, General Water Quality Parameters .....	3.7-104
Table 3.7-29: Meteoric Water Mobility Procedure and Subsequent Rinsing of Tailings, Metals Results .....	3.7-105
Table 3.7-30: Impact Methodology for Effects on Surface Water Quality, Groundwater Quality, and Sediment Quality .....	3.7-107
Table 3.7-31: Predicted Lower CWD Pond Concentrations .....	3.7-110
Table 3.7-32: Predicted Upper CWD Pond Concentrations .....	3.7-114
Table 3.7-33: Tailings Pond Water and Pore-Water Quality in Buried Tailings .....	3.7-117
Table 3.7-34: Predicted TSF Seepage Recovery System Water Quality .....	3.7-119

Table 3.7-35: Surface Water Quality Estimates for Pit Lake at Closure Year 99— Sensitivity Analysis (assuming Exhausted PAG Pit-Wall Runoff and No-Discharge Water Management).....	3.7-124
Table 3.7-36: Comparison of Surface Water Quality Estimates for Pit Lake-- at Closure Year 100 for Exhausted-PAG (Base Case) and Peak-PAG Pit-Wall Runoff (Decreased Salinity Case), and for Closure Years 100 and 200 for the AWT Model.....	3.7-125
Table 3.7-37: Water Quality of Major Inflows to Pit at Closure, Comparison of AWT and Base Case Inputs.....	3.7-127
Table 3.7-38: Estimated Operations WTP Influent Source Water Quality, to Year 10 of Discharge.....	3.7-134
Table 3.7-39: Average and Maximum Flows to WTP over Summer Treatment Season ...	3.7-136
Table 3.7-40: Predicted Treated Water Quality from Operations WTP .....	3.7-142
Table 3.7-41: Waste Streams from Operations WTP.....	3.7-143
Table 3.7-42: Baseline and Predicted Total Mercury Concentrations in Surface Water for Watersheds Closest to Mine Site.....	3.7-152
Table 3.7-43: Predicted Pit Lake and Treated WTP Effluent Water Quality .....	3.7-164
Table 3.7-44: Potential SRS Water Quality .....	3.7-166
Table 3.7-45: Estimated Changes in Sediment Concentrations as a Result of Changes in Mercury Deposition Rates.....	3.7-179
Table 3.7-46: Summary of Impacts <sup>1</sup> to Water Quality for Alternative 2 .....	3.7-189
Table 3.7-47: Ore (Tailings) Metals Concentrations .....	3.7-211
Table 3.7-48: Comparison of Impacts by Alternative* for Water Quality .....	3.7-221
Table 3.8-1: Summary of Selected Emissions by Phase and Component <sup>1</sup> .....	3.8-3
Table 3.8-2: National and Alaska Ambient Air Quality Standards .....	3.8-6
Table 3.8-3: Air Quality Attainment Status Terminology .....	3.8-7
Table 3.8-4: Maximum Allowable Increments for Class II Areas.....	3.8-8
Table 3.8-5: Global Warming Potentials.....	3.8-11
Table 3.8-6: New Air Station and Camp Station Measurement Methods.....	3.8-22
Table 3.8-7: Baseline Ambient Air Quality Data Collected at New Air Station and Camp Monitoring Stations.....	3.8-24
Table 3.8-8: Measured Baseline Ambient Air Mercury Concentrations.....	3.8-27
Table 3.8-9: Measured Mercury Deposition.....	3.8-28
Table 3.8-10: Annual Hg Wet Deposition at AK00.....	3.8-30
Table 3.8-11: Measured Mercury Deposition.....	3.8-30
Table 3.8-12: Historical Visibility Conditions at SIME1 .....	3.8-31
Table 3.8-13: Big Lake 24-hour PM <sub>2.5</sub> Baseline Ambient Air Quality Data .....	3.8-32
Table 3.8-14: Historical Visibility Conditions at TRCR1 and TUXE1 .....	3.8-33
Table 3.8-15: Impact Methodology for Effects on Air Quality.....	3.8-36
Table 3.8-16: Air Quality Thresholds.....	3.8-37
Table 3.8-17: Mine Site Construction Phase Emissions <sup>d</sup> .....	3.8-39



Table 3.8-18: Mine Site Stationary Fuel Combustion Emission Units during Operations Phase .....	3.8-41
Table 3.8-19: Annual Mine Site Operations Phase Emissions.....	3.8-43
Table 3.8-20: Annual Mine Site Stationary Operations Phase Emissions for Permit Applicability.....	3.8-44
Table 3.8-21: Annual Mine Site Operations Phase Modeled Emissions .....	3.8-47
Table 3.8-22: PSD Increment Dispersion Modeling Results .....	3.8-47
Table 3.8-23: AAAQS Dispersion Modeling Results.....	3.8-49
Table 3.8-24: Mercury Ambient Modeling Results Estimated Using CALPUFF .....	3.8-53
Table 3.8-25: Annual Maximum Mercury Deposition Modeling Results estimated using CALPUFF .....	3.8-54
Table 3.8-26: Maximum Annual Mine Site Closure Phase Emissions.....	3.8-59
Table 3.8-27: Land and Air Transportation Construction Phase Emissions <sup>e</sup> .....	3.8-62
Table 3.8-28: Annual Land and Air Transportation Operations Phase Emissions.....	3.8-64
Table 3.8-29: Annual River Traffic Construction Phase Emissions.....	3.8-66
Table 3.8-30: Annual Ocean Traffic Construction Phase Indirect Emissions .....	3.8-66
Table 3.8-31: Annual River Traffic Operations Phase Emissions .....	3.8-67
Table 3.8-32: Annual Ocean Traffic Operations Phase Indirect Emissions.....	3.8-68
Table 3.8-33: Annual Pipeline Construction Phase Emissions .....	3.8-69
Table 3.8-34: Annual Pipeline Operations Phase Emissions .....	3.8-70
Table 3.8-35: Summary of Impacts <sup>1</sup> of Alternative 2 on Air Quality by Project Component .....	3.8-74
Table 3.8-36: Comparison by Alternative* for Air Quality.....	3.8-83
Table 3.9-1: Noise Levels from Common Indoor Sources .....	3.9-4
Table 3.9-2: Examples of Outdoor Noise Levels .....	3.9-5
Table 3.9-3: Typical Levels of Ground-Borne Vibration .....	3.9-7
Table 3.9-4: Yearly Values that Protect Public Health and Welfare with a Margin of Safety.....	3.9-9
Table 3.9-5: Acceptable Ground-Borne Vibration Levels with Respect to Human Annoyance .....	3.9-10
Table 3.9-6: Acceptable Ground-Borne Vibration Levels with Respect to Building Damage.....	3.9-10
Table 3.9-7: Baseline Ambient Sound Level of Mine Site Infrastructure and Processes .....	3.9-11
Table 3.9-8: Baseline Ambient Sound Data for Transportation Corridor .....	3.9-13
Table 3.9-9: Baseline Sound Data for the Pipeline .....	3.9-16
Table 3.9-10: Noise and Vibration Impact Assessment Criteria for Rural and Urban Residential Receptors .....	3.9-19
Table 3.9-11: Noise- and Vibration-Sensitive Receptors within 15 Miles of Mine Site Noise and Vibration Sources, by Subcomponent .....	3.9-23
Table 3.9-12: Noise- and Vibration-Sensitive Receptors within 15 Miles of Transportation Corridor Noise and Vibration Sources, by Subcomponent.....	3.9-25

Table 3.9-13: Noise- and Vibration-Sensitive Receptors within 15 Miles of Natural Gas Pipeline Noise and Vibration Sources, by Subcomponent.....	3.9-26
Table 3.9-14: Major Noise Sources and Noise Levels for Construction of Mine Site Pits.....	3.9-30
Table 3.9-15: Major Noise Sources and Noise Levels for Construction of Mine Site Support Facilities .....	3.9-31
Table 3.9-16: Vibration Source Levels for Mine Site Construction Equipment (VdB) .....	3.9-32
Table 3.9-17: Major Noise Sources and Estimated Maximum Noise Levels for Operations Activities at the Mine Site.....	3.9-33
Table 3.9-18: Major Noise Sources and Estimated Maximum Noise Levels for Closure and Reclamation of Mine Site .....	3.9-36
Table 3.9-19: Summary of Noise Impacts at Nearest Sensitive Receptor for the Mine Site.....	3.9-36
Table 3.9-20: Major Noise Sources and Estimated Maximum Noise Levels for the Operations Phase of Mine Access Road.....	3.9-38
Table 3.9-21: Major Noise Sources and Estimated Maximum Noise Levels for General Reclamation Activities Associated with the Mine Access Road Material Sites .....	3.9-39
Table 3.9-22: Major Noise Sources and Estimated Maximum Noise Levels for the Operations Phase of Angyaruaq (Jungjuk) Port Site .....	3.9-44
Table 3.9-23: Summary of Construction Noise and Vibration Levels at Various Distances: Bethel Port Site <sup>1, 2</sup> .....	3.9-46
Table 3.9-24: Major Noise Sources and Estimated Maximum Noise Levels for the Operations Phase of the Bethel Port Site.....	3.9-47
Table 3.9-25: Summary of Noise Levels during Operations at Various Distances to the Bethel Port Site.....	3.9-48
Table 3.9-26: Kuskokwim River Traffic Noise Impacts During Mine Site Construction and Operations Phases.....	3.9-50
Table 3.9-27: Summary of Noise Impacts at Nearest Sensitive Receptor for the Transportation Corridor.....	3.9-52
Table 3.9-28: Major Noise Sources and Noise Levels for Construction of Pipeline.....	3.9-54
Table 3.9-29: Commercial Lodges within Five Miles of Proposed Pipeline Corridor .....	3.9-58
Table 3.9-30: Major Noise Sources and Noise Levels for Maintenance of Pipeline ROW....	3.9-63
Table 3.9-31: Major Noise Sources for the Compressor Station and Noise Levels During Operations.....	3.9-67
Table 3.9-32: Summary of Noise Impacts at Nearest Sensitive Receptor for the Natural Gas Pipeline - Mainline.....	3.9-70
Table 3.9-33: Summary of Noise Levels at Nearest Sensitive Receptor for the Above-Ground Pipeline Facilities .....	3.9-71
Table 3.9-34: Predicted Noise Levels at Crooked Creek <sup>1</sup> due to Project-related Activities that may Occur Simultaneously.....	3.9-72
Table 3.9-35: Summary of Impacts <sup>1</sup> of Alternative 2 to Noise by Project Component.....	3.9-75
Table 3.9-36: Summary of Noise Impacts at Nearest Sensitive Receptor for Alternative 4..	3.9-82
Table 3.9-37: Comparison of Impacts by Alternative* for Noise and Vibration.....	3.9-84

Table 3.10-1: Study Area Mine Site Vegetation Types .....	3.10-15
Table 3.10-2: Study Area Transportation Corridor Vegetation Types .....	3.10-17
Table 3.10-3: Study Area Pipeline Component Vegetation Types .....	3.10-19
Table 3.10-4: Rare and Sensitive Plants Recorded in the Project Area .....	3.10-29
Table 3.10-5: Nonnative Invasive Species within the Project Area .....	3.10-34
Table 3.10-6: Nonnative Invasive Species Occurrence by Component .....	3.10-38
Table 3.10-7: Potential High Risk NNIS - Aquatic Animals .....	3.10-41
Table 3.10-8: Potential High Risk NNIS - Aquatic Plants .....	3.10-44
Table 3.10-9: Impact Methodology for Effects on Vegetation .....	3.10-48
Table 3.10-10: Alternative 2 Mine Site Vegetation Removal Impacts .....	3.10-51
Table 3.10-11: Alternative 2 Transportation Corridor Vegetation Removal Impacts.....	3.10-52
Table 3.10-12: Alternative 2 Pipeline Component Vegetation Removal Impacts .....	3.10-53
Table 3.10-13: Summary Impacts <sup>1</sup> of Alternative 2 on Vegetation by Project Component .....	3.10-68
Table 3.10-14: Alternative 3B and Options Vegetation Removal Impacts.....	3.10-75
Table 3.10-15: Alternative 4 Transportation Corridor Vegetation Removal Impacts.....	3.10-77
Table 3.10-16: Alternative 5A Mine Site Vegetation Removal Impacts .....	3.10-78
Table 3.10-17: Alternative 6A Pipeline Component Vegetation Removal Impacts .....	3.10-79
Table 3.10-18: Vegetation Removal Acres Summary (Acres).....	3.10-80
Table 3.10-19: Comparison by Alternative* for Vegetation .....	3.10-81
Table 3.11-1: Wetland Categories for Mine Site, Mine Transportation, Kuskokwim River, Bethel, Pipeline, and North Option Wetland Study Areas .....	3.11-7
Table 3.11-2: Hydrogeomorphic (HGM) Class Descriptions for Donlin Gold Mine Project Wetlands.....	3.11-9
Table 3.11-3: Typical Wetland Functions by HGM Class for Donlin Gold Project Wetlands.....	3.11-12
Table 3.11-4: Physical Subdivisions, Ecoregion, and Study Area Wetland Comparisons.....	3.11-13
Table 3.11-5: Mine Site Wetland Study Area Preliminary Calculation of Wetland Categories by HGM Classes .....	3.11-15
Table 3.11-6: Mine Transportation Wetland Study Area Wetland Categories by HGM Classes.....	3.11-22
Table 3.11-7: Kuskokwim River Wetland Study Area Wetland Categories .....	3.11-25
Table 3.11-8: Kuskokwim River Segment Wetland Deposition and Erosion Rates (acres/mile) between 1988 and 2006 .....	3.11-27
Table 3.11-9: Pipeline Wetland Study Area Wetland Categories by Ecoregion .....	3.11-32
Table 3.11-10: North Option Wetland Study Area Wetland Categories by Ecoregion.....	3.11-45
Table 3.11-11: Impact Methodology for Effects on Wetlands.....	3.11-46
Table 3.11-12: Alternative 2 Mine Site Wetland Direct Impacts from Construction and Operations .....	3.11-49
Table 3.11-13: Alternative 2 Mine Site Wetland Potential Indirect Impacts from Fugitive Dust.....	3.11-52



Table 3.11-14: Alternative 2 Mine Site Potential Dewatering Wetland Indirect Impacts ....	3.11-54
Table 3.11-15: Alternative 2 Mine Site Wetland Direct Impacts for Cut or Fill and Vegetation Clearing Areas .....	3.11-59
Table 3.11-16: Alternative 2 Mine Site Wetland Vegetation Clearing Impact Areas Located on Permafrost.....	3.11-60
Table 3.11-17: Alternative 2 Mine Site Summary of Wetland Direct and Indirect Impacts .....	3.11-62
Table 3.11-18: Alternative 2 Transportation Corridor Wetland Direct Impacts from Construction and Operations .....	3.11-63
Table 3.11-19: Alternative 2 Mine Access Road and Airstrip Wetland Potential Indirect Impacts from Fugitive Dust.....	3.11-64
Table 3.11-20: Wetland Erosion Rates from the 1988 to 2006 by River Segment with Alternative 2 Projected Barge-Related Increases.....	3.11-67
Table 3.11-21: Alternative 2 Transportation Corridor Summary of Wetland Direct and Indirect Impacts.....	3.11-70
Table 3.11-22: Alternative 2 Pipeline Construction Wetland Direct Impacts by Ecoregion .....	3.11-74
Table 3.11-23: Alternative 2 Pipeline Construction Calculation of Wetland Direct Impacts Located on Permafrost .....	3.11-77
Table 3.11-24: Alternative 2 Winter Access Corridor Wetland Impacts from Winter Access Route Vegetation Clearing .....	3.11-78
Table 3.11-25: Alternative 2 and North Option Impacts Comparison .....	3.11-80
Table 3.11-26: Alternative 2 Pipeline Operations Wetland Direct Impacts by Ecoregion ..	3.11-82
Table 3.11-27: Alternative 2 Pipeline Operations Wetland Direct Impacts by HGM Class .....	3.11-84
Table 3.11-28: Summary of Impacts to Wetlands for Alternative 2 by Project Component .....	3.11-86
Table 3.11-29: Alternative 3A Projected Barge-Related Wetland Erosion Rates .....	3.11-92
Table 3.11-30: Alternative 3B Projected Barge-Related Wetland Erosion Rates .....	3.11-95
Table 3.11-31: Alternative 3B and Options Comparison of Wetland Direct Impacts from Construction.....	3.11-97
Table 3.11-32: Alternative 3B and Options Comparison of Wetland Direct Impacts from Operations .....	3.11-98
Table 3.11-33: Alternative 4 Birch Tree Crossing Transportation Corridor Wetland Direct Impacts during Construction and Operations Phases....	3.11-102
Table 3.11-34: Alternative 4 Birch Tree Crossing Road Calculation of Wetland Potential Fugitive Dust Indirect Impacts .....	3.11-104
Table 3.11-35: Alternative 4 Wetland Direct Impacts from Crooked Creek Winter Trail Construction.....	3.11-105
Table 3.11-36: Alternative 4 Birch Tree Crossing Summary of Wetland Direct and Indirect Impacts in the Transportation Corridor .....	3.11-106
Table 3.11-37: Alternative 5A Tailings Storage Facility/Operating Pond Comparison of Calculation of Wetland Direct Impacts.....	3.11-109
Table 3.11-38: Alternative 5A Projected Barge-Related Wetland Erosion Rates .....	3.11-110

Table 3.11-39: Alternative 6A – Dalzell Gorge Route Pipeline Calculation of Wetland Direct Impacts from Construction .....	3.11-111
Table 3.11-40: Comparison by Alternative* for Wetlands .....	3.11-114
Table 3.12-1: Small Mammal Status .....	3.12-17
Table 3.12-2: Marine Mammals (Non-ESA Listed) in or near EIS Analysis Area .....	3.12-19
Table 3.12-3: Lower- and Upper-Bound Hazard Quotients (HQs) for ERA Scenarios by Receptor and COPC .....	3.12-45
Table 3.12-4: Comparison of Pit Lake Surface Water Quality Estimates at Closure Year 55, 56, and 99 to Water Quality Standards for Ecological Receptors .....	3.12-48
Table 3.12-5: Potential Risk from Metals (Baseline and Year 35).....	3.12-49
Table 3.12-6: Soil Metal Concentrations <sup>1</sup> in Baseline versus Year 35 Soils Compared to BLM Wildlife Risk Management Criteria <sup>2</sup> .....	3.12-51
Table 3.12-7: Impact Methodology for Effects on Wildlife .....	3.12-52
Table 3.12-8: Summary Impacts <sup>1</sup> of Alternative 2 on Terrestrial Mammals by Project Component .....	3.12-69
Table 3.12-9: Summary Impacts <sup>1</sup> of Alternative 2 on Marine Mammals by Project Component .....	3.12-80
Table 3.12-10: Summary Impacts <sup>1</sup> of Alternative 2 on Terrestrial Birds by Project Component .....	3.12-91
Table 3.12-11: Comparison by Alternative for Terrestrial Mammals* .....	3.12-107
Table 3.12-12: Comparison by Alternative for Marine Mammals* .....	3.12-110
Table 3.12-13: Comparison by Alternative for Birds* .....	3.12-111
Table 3.13-1: Crooked Creek Watershed Stream Characteristics .....	3.13-12
Table 3.13-2: Summary of Habitat Type and Attribute Data for Crooked Creek (2009) ....	3.13-14
Table 3.13-3: Juvenile Salmon Habitat Suitability for Baseflow Conditions Crooked Creek (2009) .....	3.13-15
Table 3.13-4: Fish Species Identified within the Crooked Creek Drainage (2004–2013) ..	3.13-19
Table 3.13-5: Summary of Electrofishing Results within the Crooked Creek Drainage (2004–2014) .....	3.13-20
Table 3.13-5: Summary of Electrofishing Results within the Crooked Creek Drainage (2004–2014) .....	3.13-21
Table 3.13-6: Averaged Adult Salmon Aerial Counts for the Crooked Creek Drainage (2004–2014) .....	3.13-22
Table 3.13-7: Crooked Creek Weir Salmon Escapement Summary, 2008 to 2012.....	3.13-26
Table 3.13-8: Macroinvertebrate Bioassessment Summary Statistics within the Crooked Creek Drainage (2004 to 2014) .....	3.13-31
Table 3.13-9: Average Metal Concentrations in Slimy Sculpin <55mm Long within the Crooked Creek Drainage (2004 to 2014) .....	3.13-32
Table 3.13-10: Summary of Kuskokwim River Salmon Run Timing Based on Test Fishery at Bethel, AK 1984-2003 .....	3.13-36
Table 3.13-11: Fish Species Occurring in the Kuskokwim River Drainage .....	3.13-37

Table 3.13-12: Marine, Anadromous, and Resident Fish Species Occurring in the Kuskokwim Management Area.....	3.13-44
Table 3.13-13: Chinook Salmon Utilization, Kuskokwim River, Kuskokwim Area, 1990-2014.....	3.13-48
Table 3.13-14: Chum Salmon Utilization, Kuskokwim River, Kuskokwim Area, 1990-2014.....	3.13-49
Table 3.13-15: Sockeye Salmon Utilization, Kuskokwim River, Kuskokwim Area, 1990-2014.....	3.13-50
Table 3.13-16: Coho Salmon Utilization, Kuskokwim River, Kuskokwim Area, 1990-2014.....	3.13-51
Table 3.13-17: Escapement Counts for Salmon from Kuskokwim River Area Weirs in 2014.....	3.13-52
Table 3.13-18: Stream Characteristics and Water Quality Data by Drainage for the Pipeline Route (2010) .....	3.13-59
Table 3.13-18: Stream Characteristics and Water Quality Data by Drainage for the Pipeline Route (2010) .....	3.13-60
Table 3.13-19: Summary of Pipeline Route Stream Crossings (2010–2014).....	3.13-64
Table 3.13-20: Summary of Fish Species Composition per Drainage for the Pipeline Route (2010 to 2013).....	3.13-65
Table 3.13-21: Summary of Fish Species Composition along the Pipeline Route (2010 to 2013) .....	3.13-67
Table 3.13-22: Impact Methodology for Effects on Aquatic Resources.....	3.13-70
Table 3.13-23: Direct Aquatic Habitat Loss and Corresponding Predicted Fish Loss for Streams within the Facilities Study Area .....	3.13-77
Table 3.13-24: Estimated Reductions in Aquatic Habitat Surface Area for Summer and Winter Average and Low Flow Conditions during Year 20 of Mine Operations* .....	3.13-91
Table 3.13-25: Off-channel Habitat Connectivity and Estimated Surface Area for Various Flow Conditions for Mainstream Crooked Creek (2009).....	3.13-93
Table 3.13-26: Alternative 2 Impacts by Project Component.....	3.13-152
Table 3.13-27: Comparison by Alternative for Fish and Aquatic Resources* .....	3.13-172
Table 3.14-1: Impact Methodology for Effects on ESA-Listed Birds.....	3.14-12
Table 3.14-2: Temporal Overlap of Ocean Barge Traffic and Spectacled and Steller’s Eider Presence in Kuskokwim Bay .....	3.14-16
Table 3.14-3: Estimated Annual Ocean and River Barge Traffic under Alternative 2.....	3.14-17
Table 3.14-4: Summary Impacts <sup>1</sup> of Alternative 2 on ESA-Listed Birds by Project Component .....	3.14-20
Table 3.14-5: Estimated Annual Ocean and River Barge Traffic Under Alternative 3A.....	3.14-21
Table 3.14-6: Estimated Annual Ocean and River Barge Traffic Under Alternative 3B.....	3.14-23
Table 3.14-7: Comparison by Alternative for ESA-Listed Birds* .....	3.14-25
Table 3.14-8: ESA-Protected and Candidate Marine Mammal Species or Stocks in the Project Area .....	3.14-27
Table 3.14-9: Impact Methodology for Effects on ESA-Listed Marine Mammals.....	3.14-38

Table 3.14-10: Summary Impacts <sup>1</sup> of Alternative 2 on ESA-Listed Marine Mammals by Project Component .....	3.14-48
Table 3.14-11: Comparison by Alternative for ESA-Listed Marine Mammals* .....	3.14-56
Table 3.15-1: Revised Statute 2477 Rights-of-way in Project Area .....	3.15-23
Table 3.15-2: Section 17(b) Easements in Project Area .....	3.15-25
Table 3.15-3: State Public Access Easements in Project Area .....	3.15-25
Table 3.15-4: Land Status of the Locations of the Transportation Corridor .....	3.15-29
Table 3.15-5: Land Status along the Transportation Corridor .....	3.15-31
Table 3.15-6: Land Status in the Pipeline Construction ROW .....	3.15-33
Table 3.15-7: Land Status within the Pipeline Operations ROW .....	3.15-35
Table 3.15-8: Land Status of Ancillary Facilities for Construction ROW .....	3.15-36
Table 3.15-9: Impact Methodology for Land Ownership, Management, and Use .....	3.15-38
Table 3.15-10: Miles of Iditarod National Historic Trail Impacted under Alternative 2 .....	3.15-49
Table 3.15-11: Summary of Impacts <sup>1</sup> of Alternative 2 on Land Ownership, Management, and Use by Project Component .....	3.15-53
Table 3.15-12: Miles of Iditarod National Historic Trail Impacted, Alt. 3B .....	3.15-58
Table 3.15-13: Miles of Iditarod National Historic Trail Impacted, Alt. 6A .....	3.15-62
Table 3.15-14: Comparison of Impacts by Alternative for Lands* .....	3.15-64
Table 3.16-1: Number of Sport Harvest Anglers in Kuskokwim River/ Kuskokwim Bay Drainages, 2006-2015 .....	3.16-9
Table 3.16-2: Impact Criteria for Recreation .....	3.16-13
Table 3.16-3: Miles of Winter Routes Impacting the Iditarod National Historic Trail .....	3.16-21
Table 3.16-4: Miles of Shoofly Roads Impacting the Iditarod National Historic Trail .....	3.16-22
Table 3.16-5: Miles of Pipeline Impacting the Iditarod National Historic Trail .....	3.16-23
Table 3.16-6: Summary Impacts <sup>1</sup> of Alternative 2 on Recreation by Project Component .....	3.16-26
Table 3.16-7: Miles of Iditarod National Historic Trail Impacted, Alt. 6A .....	3.16-32
Table 3.16-8: Comparison of Impacts by Alternative* for Recreation .....	3.16-34
Table 3.17-1: Impact Methodology for Visual Resources .....	3.17-27
Table 3.17-2: Summary of Key Observation Points used to Assess Visual Resources along the Pipeline ROW .....	3.17-28
Table 3.17-3: Summary Impacts of Alternative 2 on Visual Resources by Project Component .....	3.17-72
Table 3.17-4: Comparison of Impacts by Alternative* for Visual Resources .....	3.17-85
Table 3.18-1: Communities and Community Groups Potentially Affected by Project Component .....	3.18-5
Table 3.18-2: Population and Age Characteristics, 2000 and 2010 .....	3.18-5
Table 3.18-3: Educational Characteristics, 2007-2015 .....	3.18-8

Table 3.18-4: Major Economic Sectors, 2015.....	3.18-8
Table 3.18-5: Income and Unemployment Characteristics, 2011-2015 and 2016.....	3.18-9
Table 3.18-6: Sources of Government Revenue, 2016.....	3.18-10
Table 3.18-7: Impact Methodology for Socioeconomic Resources .....	3.18-34
Table 3.18-8: Summary Impacts <sup>1</sup> of Alternative 2 on Socioeconomics .....	3.18-55
Table 3.18-9: Comparison of Impacts by Alternative for Socioeconomics .....	3.18-66
Table 3.19-1: Ethnicity Characteristics of the EIS Analysis Area 2015 .....	3.19-6
Table 3.19-2: Ethnicity and Poverty Level of the EIS Analysis Area, by Community.....	3.19-8
Table 3.19-3: Minority and Low-Income Evaluations for Determining Communities with Environmental Justice Concerns .....	3.19-11
Table 3.19-4: Environmental Justice Impact Methodology for Socioeconomics and Subsistence .....	3.19-14
Table 3.19-5: Environmental Justice Impact Dimensions for Human Health.....	3.19-15
Table 3.19-6: Environmental Justice Impact Likelihood Rating and Overall Impact Rating for Human Health.....	3.19-16
Table 3.19-7: Alternative 2 Impacts Summary Table <sup>1, 2</sup> .....	3.19-23
Table 3.19-8: Comparison of Impacts by Alternative* for Environmental Justice .....	3.19-33
Table 3.20-1: Summary of Documented Cultural Resources and Historic Properties within the APE for the Donlin Gold Project .....	3.20-25
Table 3.20-2: Summary of Scenic Quality and Character-Defining Features of the Iditarod National Historic Trail by Scenic Quality Rating Unit .....	3.20-34
Table 3.20-3: Impact Methodology for Cultural Resources under NEPA .....	3.20-38
Table 3.20-4: Determination of Effect under NHPA .....	3.20-39
Table 3.20-5: Analysis of Effects – Iditarod National Historic Trail.....	3.20-41
Table 3.20-6: Cultural Resources within the Alternative 2 Mine Site APE.....	3.20-44
Table 3.20-7: Cultural Resources within Alternative 2 Transportation Corridor.....	3.20-45
Table 3.20-8: Cultural Resources within or adjacent to the Alternative 2 Pipeline Corridor .....	3.20-46
Table 3.20-9: Interaction of Proposed Pipeline ROW with INHT - Susitna Lowlands.....	3.20-50
Table 3.20-10: Interaction of Proposed Pipeline ROW with INHT - Alaska Range.....	3.20-51
Table 3.20-11: Summary Impacts of Alternative 2 on Cultural Resources by Project Component .....	3.20-57
Table 3.20-12: Cultural Resources within the Alternative 6A Pipeline Corridor.....	3.20-60
Table 3.20-13: Additional Interaction of Proposed Pipeline with INHT under Alternative 6A .....	3.20-63
Table 3.20-14: Comparison of Impacts by Alternative* .....	3.20-65
Table 3.20-15: Comparison of Impacts by Alternative* .....	3.20-66
Table 3.21-1: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Four Upper Kuskokwim Subregion Communities .....	3.21-22



Table 3.21-2: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Nikolai, 2011.....	3.21-26
Table 3.21-3: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Eight Central Kuskokwim Subregion Communities, 2009.....	3.21-32
Table 3.21-4: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Stony River, 2009.....	3.21-34
Table 3.21-5: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Sleetmute, 2009.....	3.21-41
Table 3.21-6: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Crooked Creek, 2009.....	3.21-49
Table 3.21-7: Estimated Use, Harvest, Giving and Sharing of Subsistence Resources by Category and Selected Species, Aniak, 2009.....	3.21-56
Table 3.21-8: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Chuathbaluk, 2009.....	3.21-61
Table 3.21-9: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Nine Lower-Middle Kuskokwim Subregion Communities.....	3.21-67
Table 3.21-10: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Bethel, 2012.....	3.21-69
Table 3.21-11: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Kwethluk, 2010.....	3.21-77
Table 3.21-12: Per Capita Subsistence Harvests in Edible Weight (lbs.) for Three Lower Kuskokwim Subregion Communities, 2013.....	3.21-83
Table 3.21-13: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Quinhagak, 2013.....	3.21-85
Table 3.21-14: Historical Subsistence Salmon Harvests, Kuskokwim Area <sup>1</sup> , 1989-2014...3.21-95	
Table 3.21-15: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Resource Categories and Selected Species, Scammon Bay, 2013.....	3.21-107
Table 3.21-16: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Scammon Bay, 2013.....	3.21-110
Table 3.21-17: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Four Mouth of the Yukon Subregion Communities.....	3.21-114
Table 3.21-18: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Emmonak, 2008.....	3.21-116
Table 3.21-19: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Four Lower Yukon Subregion Communities.....	3.21-120
Table 3.21-20: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Russian Mission, 2011.....	3.21-121
Table 3.21-21: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Four Middle Yukon Subregion Communities.....	3.21-126
Table 3.21-22: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Grayling, 2011.....	3.21-127
Table 3.21-23: Estimated Per Capita Subsistence Harvests in Edible Weight (lbs.) for Three Cook Inlet Subregion Communities.....	3.21-132
Table 3.21-24: Estimated Use, Harvest, and Sharing of Subsistence Resources by Category and Selected Species, Tyonek, 2013.....	3.21-134

Table 3.21-25: Impact Criteria for Effects on Subsistence .....	3.21-153
Table 3.21-26: Annual River Barge Traffic: Alternative 2 .....	3.21-174
Table 3.21-27: Summary of Impacts of Alternative 2 by Project Component .....	3.21-204
Table 3.21-28: Annual River Barge Traffic During Operations: Alternatives 2 and 3A .....	3.21-212
Table 3.21-29: Annual River Barge Traffic During Operations: Alternatives 2 and 3B .....	3.21-214
Table 3.21-30: Annual Transportation Distances: Alternatives 2 and 4 .....	3.21-217
Table 3.21-31: Comparison of Subsistence Harvests.....	3.21-224
Table 3.22-1: Health Effects Categories (HECs) and Health Impact Issues .....	3.22-8
Table 3.22-2: Demographic Summary.....	3.22-15
Table 3.22-3: Dutch Harbor Demographics .....	3.22-16
Table 3.22-4: Social Determinants of Health .....	3.22-20
Table 3.22-5: Accidents and Injuries .....	3.22-24
Table 3.22-6: Summary of Data Collected by Gender, Donlin Gold, 2012 .....	3.22-26
Table 3.22-7: Observed Levels of Mercury and Lead in Alaska and National Populations, 2012 .....	3.22-27
Table 3.22-8: Food Security and Costs, 2009 .....	3.22-29
Table 3.22-9: Infectious Diseases .....	3.22-30
Table 3.22-10: Non-Communicable and Chronic Diseases .....	3.22-33
Table 3.22-11: Social Determinants of Health .....	3.22-37
Table 3.22-12: Accidents and Injuries .....	3.22-39
Table 3.22-13: Infectious Diseases .....	3.22-40
Table 3.22-14: Non-Communicable and Chronic Diseases .....	3.22-43
Table 3.22-15: Impact Dimensions.....	3.22-46
Table 3.22-16: Likelihood Rating and Overall Impact Rating .....	3.22-47
Table 3.22-17: Summary of HEC 1 Impacts: Social Determinants of Health .....	3.22-56
Table 3.22-18: Summary of HEC 2 Impacts: Accidents and Injuries.....	3.22-62
Table 3.22-19: Summary of HEC 3 Impacts: Exposure to Potentially Hazardous Materials .....	3.22-79
Table 3.22-20: Summary of HEC 4 Impacts: Food, Nutrition, and Subsistence Activity .....	3.22-83
Table 3.22-21: Summary of HEC 5 Impacts: Infectious Diseases .....	3.22-88
Table 3.22-22: Summary of HEC 6 Impacts: Water and Sanitation .....	3.22-88
Table 3.22-23: Summary of HEC 7 Impacts: Non-communicable and Chronic Diseases .....	3.22-91
Table 3.22-24: Summary of HEC 8 Impacts: Health Services Infrastructure and Capacity.....	3.22-91
Table 3.22-25: Alternative 2 Impact Levels by HEC .....	3.22-95
Table 3.22-26: Summary of Health Impact Reducing Design Features, Permit Conditions, and Best Management Practices.....	3.22-96
Table 3.22-27: Comparison of Impacts by Alternative* for Human Health .....	3.22-106
Table 3.23-1: Summary of Airports Located in the Pipeline Corridor .....	3.23-8

Table 3.23-2: Incident Investigation Reports for Kuskokwim River and Kuskokwim Bay ...	3.23-12
Table 3.23-3: Bethel Harbor, Commercial Vessel Trips, 2007-2014.....	3.23-14
Table 3.23-4: Kuskokwim River Commercial Vessel Trips, 2014.....	3.23-14
Table 3.23-5: Kuskokwim River Commercial Vessel Traffic, CY2007-2014.....	3.23-14
Table 3.23-6: Summary of Boats on the Kuskokwim River from Georgetown to Eek Island during 10 Fishing Activity Surveys Conducted in Summer and Fall 2009.....	3.23-16
Table 3.23-7: Count of Boats on the Lower Kuskokwim River in ADFG Kuskokwim District Statistical Area 335-12 Summarized by Month from May 20, 2009 through September 29, 2009 between Bethel and Fowler Island.....	3.23-16
Table 3.23-8: Number of Boats on the Lower Kuskokwim River between Helmick Point and Tuntutuliak Summarized by Month from June 3, 2009 through September 24, 2009.....	3.23-17
Table 3.23-9: Transportation Impact Methodology.....	3.23-19
Table 3.23-10: Estimates of Annual Operations <sup>1</sup> at Mine Airstrip.....	3.23-22
Table 3.23-11: Estimated Number of River Barge Round Trips per Season.....	3.23-24
Table 3.23-12: Alternative 2 Impacts by Project Component.....	3.23-33
Table 3.23-13: Annual Barge Traffic Comparisons, Alternatives 2 and 3A.....	3.23-35
Table 3.23-14: Annual Barge Traffic Comparisons, Alternatives 2 and 3B.....	3.23-37
Table 3.23-15: Annual Transportation Distances Comparisons, Alternatives 2 and 4.....	3.23-39
Table 3.23-16: Comparison of Impacts by Alternative* for Transportation.....	3.23-41
Table 3.23-17: Comparison of Impacts by Alternative* for Transportation.....	3.23-42
Table 3.24-1: Expected Relative Rate of Occurrence for Diesel Fuel Spills from Main Project Sources.....	3.24-12
Table 3.24-2: 10-Year Average for Releases from Diesel Pipelines.....	3.24-16
Table 3.24-3: Fuel Spill Incidents from Trucks in Alaska (2010-2015).....	3.24-18
Table 3.24-4: Expected Relative Rate of Occurrence for LNG Spills from Main Project Sources.....	3.24-20
Table 3.24-5: Expected Relative Rate of Occurrence for Cyanide Spills from Main Project Sources.....	3.24-22
Table 3.24-6: Expected Relative Rate of Occurrence for Mercury Spills from Main Project Sources.....	3.24-26
Table 3.24-7: Likelihood Definitions Used in Early Stage FMEA for Assessing Tailings Dam Failure Risk.....	3.24-29
Table 3.24-8: Spill Scenarios and Alternatives.....	3.24-39
Table 3.24-9: Spill Scenarios and Project Components.....	3.24-40
Table 3.24-10: Summary of Modelling Results for Partial Tailings Dam Breach due to Piping Failure.....	3.24-50
Table 3.24-11: Media and Analytes of Concern for Soil Impacts from TSF Release Scenarios.....	3.24-60
Table 3.24-12: Tailings Pond Water and Pore-Water Quality in Buried Tailings for Regulated Analytes of Concern.....	3.24-84



Table 3.24-13: 2007 Phase 2 Pilot Plant Transitional Tailings Solids MWMP Species Results.....	3.24-85
Table 3.24-14: 2007 Phase 2 Pilot Plant Transitional Tailings Solids MWMP Dissolved Metals Results .....	3.24-87
Table 3.24-15: USGS Mean Monthly Discharge Comparison (Crooked Creek and Kuskokwim River) .....	3.24-91
Table 3.24-16: Potential Kuskokwim River Analyte Exceedances .....	3.24-92
Table 3.24-17: Acres of Vegetation Affected in the Tailings and Water Scenario .....	3.24-120
Table 3.24-18: Acres of Vegetation Affected in the Water Only Scenario .....	3.24-120
Table 3.24-19: Piping Failure – Tailings and Water: Preliminary Calculation of Wetland Categories by Maximum Flow Depth.....	3.24-127
Table 3.24-20: Piping Failure – Water Only: Preliminary Calculation of Wetland Categories by Maximum Flow Depth.....	3.24-128
Table 3.24-21: Piping Failure – Tailings and Water: Preliminary Calculation of Wetland Categories by Burial Depth .....	3.24-129
Table 3.24-22: Piping Failure – Tailings and Water Slurry: Preliminary Calculation of Aquatic Habitat Categories by Maximum Flow Depth.....	3.24-156
Table 3.24-23: Piping Failure – Water Only: Preliminary Calculation of Aquatic Habitat Categories by Maximum Flow Depth .....	3.24-156
Table 3.24-24: Piping Failure – Tailings and Water: Preliminary Calculation of Aquatic Habitat Categories by Burial Depth .....	3.24-157
Table 3.24-25: Flow Inundation Extent and Travel Distance.....	3.24-157
Table 3.24-26: Summary of Spill Scenario Impacts.....	3.24-217
Table 3.25-1: Natural Gas Transmission Pipeline Significant Incidents by Cause 1997-2016.....	3.25-8
Table 3.25-2: Outside Force, Excavation, and Natural Force Incidents by Cause, 1997-2016.....	3.25-9
Table 3.25-3: Annual Average Fatalities – Natural Gas Transmission Pipelines.....	3.25-10
Table 3.25-4: Nationwide Accidental Deaths (2007).....	3.25-11
Table 3.26-1: Estimated Annual GHG Emissions (CO <sub>2</sub> -e) <sup>1</sup> .....	3.26-8
Table 3.26-2: Annual Reported GHG Emissions by Sector in Alaska <sup>1</sup> .....	3.26-8
Table 3.26-3: Predicted Precipitation Changes in Mine Area from Climate Change .....	3.26-10
Table 3.26-4: Predicted Precipitation Changes along Kuskokwim River from Climate Change .....	3.26-15
Table 3.26-5: Predicted Precipitation Changes near Pipeline Route in Cook Inlet Basin from Climate Change .....	3.26-16
Table 3.26-6: Permafrost Zone Correlation to Air Temperature in Alaska.....	3.26-17
Table 3.26-7: Projected Air Temperature Increases in Alaska for Two Climate Scenarios.....	3.26-17
Table 3.26-8: Annual Mine Site GHG Emissions <sup>a</sup> .....	3.26-29
Table 3.26-9: Annual Transportation Corridor Component GHG Emissions <sup>a</sup> .....	3.26-30
Table 3.26-10: Annual Pipeline Component GHG Emissions .....	3.26-31

---

Table 3.26-11: Average Monthly Precipitation Change Applied to Kuskokwim River Discharge Record .....	3.26-36
Table 3.26-12: Available Barge Days on Kuskokwim River under Base Case and Climate Change Scenarios .....	3.26-37
Table 3.26-13: Comparison by Alternative* for Climate Change.....	3.26-59
Table 4.2-1: Past, Present, and Reasonably Foreseeable Future Actions Considered in the Cumulative Effects Analysis .....	4-5
Table 4.2-2: External Actions Considered but not included in the Cumulative Effects Analysis .....	4-9
Table 5.1-1: Common Mitigation Terms .....	5-1
Table 5.2-1: Design Features.....	5-7
Table 5.5-1A: Mitigation Measures Being Considered.....	5-26
Table 5.5-1B Mitigation Measures Assessed as Not Likely to be Required .....	5-33
Table 5.7-1A: Monitoring and Adaptive Management being Considered .....	5-45
Table 5.7-1B: Monitoring Measures Assessed as Not Likely to be Required.....	5-51
Table 6.1-1: Lead and Cooperating Agencies .....	6-1
Table 6.3-1: Scoping Meetings, Dates and Locations .....	6-5
Table 6.3-2: Donlin Gold Project EIS Scoping Meeting Attendance.....	6-6
Table 6.3-3: Supplemental Outreach Efforts .....	6-9
Table 6.4-1: Draft EIS Meetings, Dates and Locations .....	6-12
Table 6.4-2: Donlin Gold Project EIS Draft EIS Public Meeting Attendance .....	6-13

## FIGURES

Figure 1.3-1: Project Location Map .....	1-5
Figure 2.3-1: Bethel Cargo Terminal, Fuel Terminal, and Tank Farm.....	2-10
Figure 2.3-2: Alternative 2 General Project Layout.....	2-13
Figure 2.3-3: Alternative 2 Mine Site: ACMA and Lewis Pit Design .....	2-15
Figure 2.3-4: Alternative 2 Overview of Open Pit Benches .....	2-16
Figure 2.3-5: Alternative 2 Ore Crushing and Grinding.....	2-19
Figure 2.3-6: Alternative 2 Ore Processing.....	2-20
Figure 2.3-7: Alternative 2 Mine Site and Waste Rock Facility .....	2-35
Figure 2.3-8: Alternative 2 Tailings Storage Facility .....	2-36
Figure 2.3-9: Alternative 2 Transportation Facilities Overview .....	2-53
Figure 2.3-10: Alternative 2 Typical River Tug and Barge Configuration .....	2-54
Figure 2.3-11: Alternative 2 Angyaruaq (Jungjuk) Port Site .....	2-55
Figure 2.3-12: Alternative 2 Angyaruaq (Jungjuk) Port Mine Access Road.....	2-56
Figure 2.3-13: Alternative 2 Airstrips .....	2-61
Figure 2.3-14: Alternative 2 Pipeline Location .....	2-64
Figure 2.3-15: Alternative 2 Natural Gas Pipeline Right-of-Way Evolution.....	2-65
Figure 2.3-16: Alternative 2 Compressor and Metering Station Location .....	2-66
Figure 2.3-17: Alternative 2 Compressor Station Site Plan.....	2-69
Figure 2.3-18: Alternative 2 Access to Farewell Pig Launching Station .....	2-70
Figure 2.3-19: Alternative 2 Typical Pig Launcher .....	2-71
Figure 2.3-20: Alternative 2 Typical Metering Station .....	2-72
Figure 2.3-21: Alternative 2 Typical Main Line Block Valve .....	2-74
Figure 2.3-22: Alternative 2 Typical Side Slope Section .....	2-76
Figure 2.3-23: Alternative 2 Winter Access Route Options within the Susitna Valley.....	2-78
Figure 2.3-24: Alternative 2 Camp Movement Plan Diagram.....	2-91
Figure 2.3-25: Alternative 2 General Construction Camp Configuration .....	2-94
Figure 2.3-26: Alternative 2 Natural Gas Pipeline Alignment Pipe and Equipment Yards .....	2-96
Figure 2.3-27: Alternative 2 Proposed Airstrip Locations.....	2-104
Figure 2.3-28: Typical Pipeline Construction Sequence .....	2-109
Figure 2.3-29: Alternative 2 Typical Trench Barrier .....	2-111
Figure 2.3-30: Typical Non-Flowing Open Cut Water Body Crossing .....	2-114
Figure 2.3-31: Typical HDD Crossing.....	2-118
Figure 2.3-32: Typical HDD Entry Site Equipment Layout .....	2-119
Figure 2.3-33: Alternative 2 Natural Gas Pipeline Fault Crossings .....	2-123
Figure 2.3-34: Natural Gas Pipeline Alignment Permafrost Distribution.....	2-126
Figure 2.3-35: Alternative 2 Typical Silt Fence Sediment Barrier.....	2-129
Figure 2.3-36: Alternative 2 Erosion Control Matting Stream Banks .....	2-130
Figure 2.3-37: Alternative 2 Temporary Soil Containment Berm.....	2-131

---

Figure 2.3-38: Alternative 2 Pipeline Location (North Option).....	2-142
Figure 2.3-39: Alternative 2 Mine Site Monitoring Locations in Construction, Operations, and Closure .....	2-154
Figure 2.3-40: Alternative 3A LNG Plant and Storage Tanks Locations .....	2-168
Figure 2.3-41: Alternative 3B Diesel Pipeline Tyonek Dock.....	2-172
Figure 2.3-42: Alternative 3B Diesel Pipeline Tyonek Dock to MP 0.....	2-177
Figure 2.3-43: Alternative 4 Birch Tree Crossing Port Site .....	2-180
Figure 2.3-44: Alternative 4 Birch Tree Crossing Mine Access Road .....	2-181
Figure 2.3-45: Alternative 5A Dry Stack Tailings .....	2-187
Figure 2.3-46: Alternative 6A: Dalzell Gorge Route.....	2-192
Figure 3.1-1: Physiographic Divisions and Topography.....	3.1-10
Figure 3.1-2: Regional Geology and Mine Setting .....	3.1-12
Figure 3.1-3: Local Faulting in Mine Site Vicinity .....	3.1-14
Figure 3.1-4: Bedrock Geology of Mine Site .....	3.1-15
Figure 3.1-5: Thickness of Surficial Deposits at Mine Site.....	3.1-17
Figure 3.1-6: Potential Fossil Yield Classification System .....	3.1-20
Figure 3.2-1: Soil Types at Mine Site and Mine Access Roads .....	3.2-8
Figure 3.2-2: Distribution of Permafrost at Mine Site .....	3.2-9
Figure 3.2-3: Baseline Soil and Rock Rubble Sample Locations, Mine Site and Vicinity .....	3.2-13
Figure 3.2-4: Contaminated Sites along Kuskokwim River Corridor .....	3.2-22
Figure 3.2-5: Contaminated Sites at Dutch Harbor.....	3.2-23
Figure 3.2-6: Soil Types Along Eastern Pipeline Segment .....	3.2-24
Figure 3.2-7: Soil Types Along Central Pipeline Segment.....	3.2-26
Figure 3.2-8: Soil Types Along Western Pipeline Segment .....	3.2-27
Figure 3.2-9: Contaminated Sites along Pipeline Corridor.....	3.2-38
Figure 3.2-10: Estimated Fugitive Dust Deposition from Mine Sources .....	3.2-99
Figure 3.2-11: Estimated Fugitive Dust Deposition along Mine Access Road.....	3.2-100
Figure 3.2-12: Estimated Concentrations of Mercury in Soil from Dust and Stack Sources.....	3.2-101
Figure 3.2-13: Estimated Concentrations of Arsenic in Soil from Fugitive Dust .....	3.2-104
Figure 3.2-14: Estimated Concentrations of Arsenic and Antimony in Soil from Fugitive Dust, for Watersheds of Maximum Impact, Mine Site and Access Road.....	3.2-105
Figure 3.3-1: Regional Earthquakes and Active Faults.....	3.3-9
Figure 3.3-2: Seismic Hazard Map, Southwest Alaska.....	3.3-10
Figure 3.3-3: Active Volcanoes in Project Region.....	3.3-18
Figure 3.3-4: Slope Stability Map, Alaska Range Segment of Pipeline Corridor .....	3.3-25
Figure 3.3-5: Seismic Deformation of Tailings Dam .....	3.3-39
Figure 3.3-6: Tailings Storage Facility Features .....	3.3-40

Figure 3.3-7: Schematic Cross-section of Tailings Dam .....	3.3-41
Figure 3.3-8: Seismic Stability of Ultimate Waste Rock Facility .....	3.3-44
Figure 3.3-9: Seismic Stability of Pit Wall in Post-Closure Period.....	3.3-51
Figure 3.3-10: Post-Closure Configuration of Crooked Creek Floodplain near Pit Crest.....	3.3-60
Figure 3.4-1: Project Location and Climatic Zones .....	3.4-4
Figure 3.4-2: Meteorological Monitoring Stations near Mine Site.....	3.4-8
Figure 3.4-3: Meteorological Monitoring Stations near Transportation Corridor .....	3.4-11
Figure 3.4-4: Meteorological Monitoring Stations Near Pipeline .....	3.4-19
Figure 3.5-1: Crooked Creek Drainages in Mine Area .....	3.5-7
Figure 3.5-2: Streamflow Monitoring Sites in Mine Area.....	3.5-14
Figure 3.5-3: American Creek Average Daily Discharge at Station AMER .....	3.5-18
Figure 3.5-4: Anaconda Creek Average Daily Discharge at Station ANDA.....	3.5-19
Figure 3.5-5: Crevice Creek Average Daily Discharge at Station CRDN .....	3.5-21
Figure 3.5-6: Crooked Creek Average Daily Discharge at Station CCAC .....	3.5-24
Figure 3.5-7: Precipitation Stations in Mine Area Considered for Water Balance Model.....	3.5-28
Figure 3.5-8: Drainages Along Angyaruaq (Jungjuk) Road Corridor – Alternative 2 .....	3.5-33
Figure 3.5-9: Drainages Along Birch Tree Crossing Road Corridor – Alternative 4.....	3.5-38
Figure 3.5-10: Kuskokwim River Corridor and Width.....	3.5-42
Figure 3.5-11: Glacial Coverage in Kuskokwim River Watershed.....	3.5-43
Figure 3.5-12: Kuskokwim River Discharge at Crooked Creek During Open-Water Season .....	3.5-47
Figure 3.5-13: Number of Days Average Daily Discharge <45,000 cfs at Crooked Creek ...	3.5-48
Figure 3.5-14: Erosion and Deposition in the Lower Kuskokwim River, 1988-2006 .....	3.5-51
Figure 3.5-15a: Erosion and Deposition in Kuskokwim River Upstream of Bethel, 1988-2006 (Kwethluk to Kalskag) .....	3.5-52
Figure 3.5-15b: Erosion and Deposition in Kuskokwim River Upstream of Bethel, 1988-2006 (Aniak to Crooked Creek).....	3.5-53
Figure 3.5-16: Bethel Yard Dock in Relation to Upriver and Downriver Sites.....	3.5-54
Figure 3.5-17: Watersheds Along Pipeline Corridor .....	3.5-55
Figure 3.5-18: Watersheds Along Diesel Pipeline Corridor.....	3.5-62
Figure 3.5-169: Water Management Plan during Construction .....	3.5-69
Figure 3.5-20: Schematic Water Balance during Construction .....	3.5-72
Figure 3.5-21: Water Management Plan during Operations .....	3.5-81
Figure 3.5-22: Schematic Water Balance during Operations .....	3.5-83
Figure 3.5-23: Schematic Water Balance: Above Average Precipitation during Operations .....	3.5-89
Figure 3.5-24: Schematic Water Balance: Below Average Precipitations during Operations .....	3.5-90
Figure 3.5-25: Water Management Plan during Closure.....	3.5-100
Figure 3.5-26: Schematic Water Balance during Closure: Year 1 to 5.....	3.5-102

Figure 3.5-27: Schematic Water Balance during Closure: Year 6 to 10 .....	3.5-103
Figure 3.5-28: Schematic Water Balance during Closure: Year 11 to 51 .....	3.5-104
Figure 3.5-29: Schematic Water Balance during Closure: Year 52 on .....	3.5-105
Figure 3.5-30: Bethel Yard Dock Expansion and Navigation Plan .....	3.5-114
Figure 3.5-31: Survey Locations and Critical Sections of the Kuskokwim River.....	3.5-116
Figure 3.5-32: Estimated Propeller-Induced Water Velocity at Streambed, Kuskokwim River .....	3.5-122
Figure 3.5-33: Estimated Depth of Erosion for Various Grain Sizes and Water Depths, Kuskokwim River .....	3.5-123
Figure 3.5-34: Alternative 5A Dry Stack Tailings Facility: Water Management Features ...	3.5-156
Figure 3.5-35: Alternative 5A Dry Schematic Water Balance During Operations: Average Precipitation Conditions .....	3.5-158
Figure 3.5-36: Alternative 5A-Unlined Option Schematic Water Balance during Closure: Year 1 to 5 .....	3.5-162
Figure 3.5-37: Alternative 5A-Unlined Option Schematic Water Balance during Closure: Year 6 to 10 .....	3.5-163
Figure 3.5-38: Alternative 5A Unlined Option Schematic Water Balance during Closure: Year 11 to 42 .....	3.5-164
Figure 3.5-39: Alternative 5A-Unlined Option Schematic Water Balance during Closure: Year 43 On .....	3.5-165
Figure 3.5-40: Alternative 5A-Lined Option Schematic Water Balance during Closure: Year 1 to 5 .....	3.5-166
Figure 3.5-41 Alternative 5A-Lined Option Schematic Water Balance during Closure: Year 6 to 10 .....	3.5-167
Figure 3.5-42: Alternative 5A-Lined Option Schematic Water Balance during Closure: Year 11 to 46 .....	3.5-168
Figure 3.5-43: Alternative 5A-Lined Option Schematic Water Balance during Closure: Year 47 On .....	3.5-169
Figure 3.6-1: Shallow Groundwater Distribution Along Pipeline Alignment.....	3.6-12
Figure 3.6-2: Potentiometric Groundwater Surface Map.....	3.6-13
Figure 3.6-3: Conceptual Hydrogeologic Model.....	3.6-18
Figure 3.6-4: Simulated Water Table from Groundwater Flow Model .....	3.6-21
Figure 3.6-5: Results of Model Calibration: Simulated vs. Observed Mean Annual Hydraulic Head .....	3.6-22
Figure 3.6-6: Crooked Creek Community Well Drinking Water Protection Area.....	3.6-24
Figure 3.6-7: Open Pit Dewatering System .....	3.6-28
Figure 3.6-8: Simulated Drawdown in Bedrock at the End of Mining .....	3.6-32
Figure 3.6-9: Cross-Section Showing Proposed Cone of Depression around Pit.....	3.6-33
Figure 3.6-10: Simulated Water Table at the End of Mining .....	3.6-34
Figure 3.6-11: Groundwater System at Pit Lake in Closure Period.....	3.6-44
Figure 3.6-12: Predicted Groundwater Flows to and from Pit Lake.....	3.6-45



Figure 3.7-1: Surface Water Quality Monitoring Sites in Mine Area .....	3.7-11
Figure 3.7-2: The Aquatic Cycle of Mercury .....	3.7-28
Figure 3.7-3: Eh-pH Diagram of Aqueous Arsenic Species in Oxygenated Water .....	3.7-34
Figure 3.7-4: Mineralized Areas and USGS Water Quality Sampling Sites in the Kuskokwim River Drainage Basin .....	3.7-38
Figure 3.7-5: Turbidity Data at Pipeline Stream Crossings .....	3.7-44
Figure 3.7-6: Groundwater Quality Monitoring Wells and Drinking Water Wells in Mine Area .....	3.7-46
Figure 3.7-7: Groundwater/Surface Water Interactions due to Bank Storage Effects Along Kuskokwim River .....	3.7-56
Figure 3.7-8: Stream Sediment Sample Locations and Mercury Distribution, Crooked Creek Watershed.....	3.7-59
Figure 3.7-9: Arsenic Concentrations in Stream Sediment, Crooked Creek Watershed .....	3.7-62
Figure 3.7-10: Mercury Concentrations in Stream Sediment, Crooked Creek Watershed ..	3.7-63
Figure 3.7-11: Methylmercury Concentrations in Stream Sediment, Crooked Creek Watershed .....	3.7-65
Figure 3.7-12: Sediment Sampling Stations on Kuskokwim River .....	3.7-66
Figure 3.7-13: Drillholes Sampled for Acid-Base Accounting.....	3.7-76
Figure 3.7-14: Acid-Neutralization Potential vs. Acid-Generation Potential by Rock Type..	3.7-78
Figure 3.7-15: Tonnage-Weighted Annual Average NP/AP for Waste Rock Categories.....	3.7-79
Figure 3.7-16: Phase 1 Humidity Cell Test Results for pH and Sulfate.....	3.7-82
Figure 3.7-17: Phase 2 Humidity Cell Test Results for pH and Sulfate.....	3.7-85
Figure 3.7-18: Barrel Test Leachate pH: 2006 Barrel Tests and 2008 Flow Path Experiment.....	3.7-88
Figure 3.7-19: Temporal Variation of Molar Ratio of (Ca + Mg)/SO <sub>4</sub> in NAG 4 (ARD-4), PAG 5 (ARD-3) and PAG 6 (WRMC-6) Barrel Tests .....	3.7-89
Figure 3.7-20: Arsenic Correlations with Mercury and Antimony in Waste Rock.....	3.7-93
Figure 3.7-21: Humidity Cell Test Arsenic Loading Results: Phase 1 and Phase 2 .....	3.7-95
Figure 3.7-22: Variation of Pycnocline Depth with Age of Pit Lake (55 to 99 Years) – Base Case and AWT Water Management Plan Case .....	3.7-129
Figure 3.7-23: Comparison of Pycnocline Depth and Strength for the Base Case, Peak-PAG, Decreased Salinity Case, and AWT Case (Year 99).....	3.7-130
Figure 3.7-24: Flow Diagram of Operations Water Treatment Plant .....	3.7-138
Figure 3.8-1: Alaska Class I Areas and SO <sub>2</sub> Special Protection Areas .....	3.8-9
Figure 3.8-2: Air Quality Monitoring Locations.....	3.8-21
Figure 3.8-3: Location of Highest PSD Increment Impacts .....	3.8-48
Figure 3.8-4: Location of Highest Total Ambient Impacts .....	3.8-50
Figure 3.8-5: Estimated Annual Average Concentrations of Elemental Mercury due to Donlin Stack and Fugitive Sources .....	3.8-55
Figure 3.8-6: Estimated Peak One-Hour Concentrations of Elemental Mercury due to Donlin Stack and Fugitive Sources .....	3.8-56



---

Figure 3.8-7: Estimated Annual Average Deposition Flux due to Donlin Stack and Fugitive Sources .....	3.8-58
Figure 3.9-1: Kuskokwim River Noise Survey Locations .....	3.9-17
Figure 3.9-2: Noise Monitoring Station near the Proposed Compressor Station .....	3.9-18
Figure 3.9-3: Noise Sources and Receptors within Project Area .....	3.9-24
Figure 3.10-1: Vegetation Affected Area .....	3.10-10
Figure 3.10-2: Ecoregions in the EIS Analysis Area .....	3.10-11
Figure 3.10-3: Mine Site Vegetation Types .....	3.10-15
Figure 3.10-4: Transportation Corridor Vegetation Types.....	3.10-17
Figure 3.10-5A: Pipeline Vegetation Study Area (Map 1 of 8) .....	3.10-19
Figure 3.10-5B: Pipeline Vegetation Study Area (Map 2 of 8) .....	3.10-20
Figure 3.10-5C: Pipeline Vegetation Study Area (Map 3 of 8) .....	3.10-21
Figure 3.10-5D: Pipeline Vegetation Study Area (Map 4 of 8) .....	3.10-22
Figure 3.10-5E: Pipeline Vegetation Study Area (including North Option)(Map 5 of 8) .....	3.10-23
Figure 3.10-5F: Pipeline Vegetation Study Area (Map 6 of 8).....	3.10-24
Figure 3.10-5G: Pipeline Vegetation Study Area (Map 7 of 8) .....	3.10-25
Figure 3.10-5H: Pipeline Vegetation Study Area (Map 8 of 8) .....	3.10-26
Figure 3.10-6: Incidental Observations of Rare Plants in the Project Area .....	3.10-29
Figure 3.10-7: Nonnative Invasive Plant Locations at the Mine Site .....	3.10-34
Figure 3.10-8: Nonnative Invasive Plant Locations in the Transportation Corridor.....	3.10-35
Figure 3.10-9: Nonnative Invasive Plants Locations in the Pipeline Component.....	3.10-36
Figure 3.11-1: Mine Site Wetland Study Area .....	3.11-16
Figure 3.11-2: Common Wetland Types in the Mine Site Wetland Study Area .....	3.11-17
Figure 3.11-3: Mine Site Wetland Study Area Disturbed Sites.....	3.11-18
Figure 3.11-4: Wetland and Upland Disturbance Types in the Mine Site Wetland Study Area .....	3.11-19
Figure 3.11-5: Mine Site Wetland Study Area Wetland Composition – Disturbed and All Wetlands.....	3.11-20
Figure 3.11-6: Common Wetland Types in the Mine Transportation Wetland Study Area .....	3.11-23
Figure 3.11-7: Mine Transportation Wetland Study Area.....	3.11-24
Figure 3.11-8: Kuskokwim River Wetland Study Area .....	3.11-26
Figure 3.11-9A: Kuskokwim River Wetland Erosion 1988 to 2006 – Map 1 of 2 .....	3.11-28
Figure 3.11-9B: Kuskokwim River Wetland Erosion 1988 to 2006 – Map 2 of 2 .....	3.11-29
Figure 3.11-10: Kuskokwim River Wetland Deposition and Erosion Rates by River Segment 1988 to 2006 .....	3.11-30
Figure 3.11-11: Common Wetland Types in the Pipeline Wetland Study Area .....	3.11-33
Figure 3.11-12A: Pipeline Wetland Study Area – Map 1 of 8.....	3.11-34
Figure 3.11-12B: Pipeline Wetland Study Area – Map 2 of 8.....	3.11-35

Figure 3.11-12C: Pipeline Wetland Study Area – Map 3 of 8.....	3.11-36
Figure 3.11-12D: Pipeline Wetland Study Area – Map 4 of 8.....	3.11-37
Figure 3.11-12E: Pipeline and North Option Wetland Study Area – Map 5 of 8.....	3.11-38
Figure 3.11-12F: Pipeline Wetland Study Area – Map 6 of 8.....	3.11-39
Figure 3.11-12G: Pipeline Wetland Study Area – Map 7 of 8.....	3.11-40
Figure 3.11-12H: Pipeline Wetland Study Area – Map 8 of 8.....	3.11-41
Figure 3.11-13: Pipeline Wetland Study Area and Wetland Proportions by Ecoregion .....	3.11-42
Figure 3.11-14: Pipeline Wetland Study Area Hydrogeomorphic Classes by Ecoregion...	3.11-43
Figure 3.11-15: Alternative 2 Mine Site Wetland Direct Impacts.....	3.11-50
Figure 3.11-16: Alternative 2 Mine Site Potential Dewatering Indirect Impact Area .....	3.11-55
Figure 3.11-17: Alternative 2 Mine Site Estimated Groundwater Surface .....	3.11-56
Figure 3.11-18: Alternative 2 Mine Site Vegetation Clearing, Fill, and Excavation Wetland Impact Areas on Permafrost.....	3.11-61
Figure 3.11-19: Alternative 2 Transportation Corridor Facilities Wetland Impacts.....	3.11-65
Figure 3.11-20: Alternative 2 Bethel Fuel and Cargo Storage Facility Wetland Impacts ...	3.11-69
Figure 3.11-21: Alternative 2 Pipeline Construction Wetland Impacts for Hydrogeomorphic Classes by Ecoregion .....	3.11-75
Figure 3.11-22: Alternative 2 Pipeline Construction Wetland Impacts by Disturbance Type.....	3.11-76
Figure 3.11-23: Alternative 2 Winter Access Routes Potential Wetland Impacts .....	3.11-79
Figure 3.11-24: Alternative 3B Transportation Facilities and Diesel Pipeline from Tyonek Dock to MP 0 in the Pipeline Component .....	3.11-96
Figure 3.11-25: Alternative 3B Diesel Pipeline from Port MacKenzie to MP 28 in the Pipeline Component.....	3.11-100
Figure 3.11-26: Alternative 4 Birch Tree Crossing Wetland Impacts.....	3.11-103
Figure 3.11-27: Alternative 5A Dry Stack Tailings Storage Facility and Operating Pond Wetlands .....	3.11-108
Figure 3.11-28: Alternative 6A Dalzell Gorge Route Wetland Comparison .....	3.11-113
Figure 3.12-1: Farewell Mineral Lick and Bison Ranges.....	3.12-12
Figure 3.12-2: Project Vicinity Game Management Units and Caribou Herd Ranges .....	3.12-16
Figure 3.12-3: 2012 Mine Site and Transportation Corridor Raptor Nest Locations.....	3.12-29
Figure 3.12-4: 2012 Aerial Raptor Nest Survey of the Pipeline Corridor – Milepost 0 – 150 .....	3.12-30
Figure 3.12-5: 2012 Aerial Raptor Nest Survey of the Pipeline Corridor – Milepost 150 – 310.....	3.12-31
Figure 3.12-6: Audubon Alaska’s Important Bird Areas.....	3.12-35
Figure 3.12-7: Waterbird Survey of Crooked Creek, Getmuna Creek, and Jungjuk Creek.....	3.12-36
Figure 3.12-8: Waterbird Survey of Crooked Creek to Bethel.....	3.12-37
Figure 3.12-9: Waterway Transportation Corridor Observation Areas .....	3.12-38
Figure 3.12-10: USFWS Aerial Waterbird Survey Locations.....	3.12-39
Figure 3.12-11: Bird Density at East End of Pipeline Corridor .....	3.12-40

Figure 3.12-12: Swan Nests and Observations in the Project Vicinity ..... 3.12-41

Figure 3.13-1: Resident Species Occurrence and Estimated Adult Salmon Density  
and Distribution..... 3.13-9

Figure 3.13-2: Transportation Corridor Overview ..... 3.13-10

Figure 3.13-3 Resident Species Occurrence and Estimated Adult Salmon Density  
and Distribution Relative to Predicted Groundwater Drawdown  
Near the Mine Site .....3.13-100

Figure 3.13-4: Estimated Scour Depth by Grain Size and Water Depth for a  
600 hp Tug.....3.13-126

Figure 3.13-5: Estimated Scour Depth by Grain Size and Water Depth for a  
450 hp Tug.....3.13-127

Figure 3.13-6: Estimated Scour Depth by Grain Size and Water Depth for a  
300 hp Tug.....3.13-128

Figure 3.13-7: Estimated Scour Depth by Grain Size and Water Depth for a  
150 hp Tug.....3.13-129

Figure 3.13-8: Estimated Propeller-Induced Water Velocity at Streambed .....3.13-130

Figure 3.14-1: Short-tailed Albatross Opportunistic Sights near the Barge  
Transportation Corridor..... 3.14-5

Figure 3.14-2: Spectacled and Steller’s Eider Critical Habitat Nearest the Project Area ..... 3.14-6

Figure 3.14-3: Spectacled and Steller’s Eider Concentrations and Critical Habitat in  
the Vicinity of Kuskokwim Bay..... 3.14-7

Figure 3.14-4: Cook Inlet Beluga Whale Critical Habitat..... 3.14-34

Figure 3.14-5: North Pacific Right Whale Critical Habitat ..... 3.14-36

Figure 3.15-1A: Generalized Land Status – Map 1 of 5.....3.15-5

Figure 3.15-1B: Generalized Land Status – Map 2 of 5.....3.15-6

Figure 3.15-1C: Generalized Land Status – Map 3 of 5.....3.15-7

Figure 3.15-1D: Generalized Land Status – Map 4 of 5.....3.15-8

Figure 3.15-1E: Generalized Land Status – Map 5 of 5.....3.15-9

Figure 3.15-2: Pipeline Route Proximity to the Iditarod National Historic Trail .....3.15-13

Figure 3.15-3: Existing Easements Associated with Mine Site and Mine Access Road .....3.15-27

Figure 3.15-4: Generalized Land Status for Alternative 4 .....3.15-61

Figure 3.17-1: Landscape Character of the Kuskokwim Mountains  
Physiographic Province.....3.17-7

Figure 3.17-2: Existing Infrastructure of the Donlin Mine Camp.....3.17-8

Figure 3.17-3: Owhat Cliffs on the Kuskokwim River.....3.17-10

Figure 3.17-4: Barge Unloading at the Village of Chuathbaluk .....3.17-11

Figure 3.17-5: Typical Landforms of the Upriver Portion of the Yukon-Kuskokwim  
Coastal Lowlands.....3.17-12

Figure 3.17-6: Characteristically Flat Topography of the Lower Yukon-Kuskokwim Coastal Lowlands.....	3.17-13
Figure 3.17-7: The George River Basin.....	3.17-15
Figure 3.17-8: The Kuskokwim River ¼-Mile Downriver of Devil's Elbow .....	3.17-16
Figure 3.17-9: Tanana Kuskokwim Lowland Physiographic Province.....	3.17-17
Figure 3.17-10: Big River at the Location of the Proposed ROW.....	3.17-18
Figure 3.17-11: South Fork Kuskokwim River .....	3.17-20
Figure 3.17-12: Happy River Valley.....	3.17-21
Figure 3.17-13: Spruce Forest East of Happy River .....	3.17-22
Figure 3.17-14: Wetland Meadows of Upper Matanuska Valley .....	3.17-23
Figure 3.17-15: Estimated Extent of View: Angyaruaq (Jungjuk) Port, Airstrip, and Access Roads.....	3.17-30
Figure 3.17-16A: Pipeline ROW Viewshed Overview, Map 1 of 5 .....	3.17-31
Figure 3.17-16B: Pipeline ROW Viewshed Overview, Map 2 of 5 .....	3.17-32
Figure 3.17-16C: Pipeline ROW Viewshed Overview, Map 3 of 5 .....	3.17-33
Figure 3.17-16D: Pipeline ROW Viewshed Overview, Map 4 of 5 .....	3.17-34
Figure 3.17-16E: Pipeline ROW Viewshed Overview, Map 5 of 5 .....	3.17-35
Figure 3.17-17A: Estimated Extent of View: Lower Kalskag (Map 1 of 5).....	3.17-36
Figure 3.17-17B: Estimated Extent of View: Upper Kalskag (Map 2 of 5).....	3.17-37
Figure 3.17-17C: Estimated Extent of View: Aniak (Map 3 of 5).....	3.17-38
Figure 3.17-17D: Estimated Extent of View: Chuathbaluk (Map 4 of 5).....	3.17-39
Figure 3.17-17E: Estimated Extent of View: Napaimute (Map 5 of 5).....	3.17-40
Figure 3.17-18: Simulation of the Angyaruaq (Jungjuk) Proposed Port Site .....	3.17-42
Figure 3.17-19: Simulation of the Proposed Operational ROW Where It Crosses the George River Valley.....	3.17-43
Figure 3.17-20: Simulation of the Proposed Operational ROW Where It Crosses the Kuskokwim River (Near Devil's Elbow) .....	3.17-44
Figure 3.17-21: Simulation of the Proposed Operational ROW Where It Crosses the Nushagak-Big River Hills Physiographic Province (Big River).....	3.17-45
Figure 3.17-22: Simulation of the Proposed Operational ROW Where It Crosses the Tanana-Kuskokwim Lowlands Physiographic Province (Farewell Airstrip).....	3.17-46
Figure 3.17-23A: Simulation of the Proposed Operational ROW Where It Crosses the Alaska Range Physiographic Province (Happy Valley – elevated vantage point).....	3.17-47
Figure 3.17-23B: Simulation of the Proposed Operational ROW Where It Crosses the Alaska Range Physiographic Province (Happy Valley – at grade vantage point) .....	3.17-48
Figure 3.17-24: Simulation of the Proposed Operational ROW Where It Crosses the Alaska Range Physiographic Province via Dalzell Gorge.....	3.17-49
Figure 3.17-25: Simulation of the Proposed Operational ROW Where It Crosses the Upper Matanuska Valley Physiographic Province (Mount Susitna) .....	3.17-50
Figure 3.18-1: Y-K Region .....	3.18-6

---

Figure 3.18-2: Kuskokwim River Communities .....	3.18-7
Figure 3.19-1: Low-Income and Minority Communities.....	3.19-7
Figure 3.20-1: Cultural Resources Area of Potential Effect .....	3.20-37
Figure 3.21-1: Subsistence Subregions .....	3.21-21
Figure 3.21-2: Nikolai Seasonal Round of Subsistence Harvests.....	3.21-24
Figure 3.21-3: Composition of Nikolai Subsistence Harvest by Estimated Edible Weight, 2011.....	3.21-27
Figure 3.21-4: Subsistence Search and Harvest Areas, Nikolai, 2011.....	3.21-28
Figure 3.21-5: Wild Food Harvesting and Processing Network, Nikolai, 2011 .....	3.21-29
Figure 3.21-6: Composition of Stony River Subsistence Harvest by Estimated Edible Weight, 2009.....	3.21-34
Figure 3.21-7: Subsistence Search and Harvest Areas, Stony River, 2009.....	3.21-36
Figure 3.21-8: Subsistence Search and Harvest Areas, Salmon, Stony River, 2009 .....	3.21-37
Figure 3.21-9: Sleetmute and Chuathbaluk Seasonal Round of Subsistence Harvests, 1982-83 .....	3.21-39
Figure 3.21-10: Composition of Sleetmute Subsistence Harvest by Estimated Edible Weight, 2009.....	3.21-42
Figure 3.21-11: Subsistence Search and Harvest Areas, Sleetmute, 2009 .....	3.21-44
Figure 3.21-12: Subsistence Search and Harvest Areas, Salmon, Sleetmute, 2009 .....	3.21-45
Figure 3.21-13: Wild Food Harvesting and Processing Network, Sleetmute, 2009 .....	3.21-46
Figure 3.21-14: Crooked Creek Seasonal Round of Subsistence Harvests, 1964-1986 ....	3.21-48
Figure 3.21-15: Composition of Crooked Creek Subsistence Harvest by Estimated Edible Weight, 2009.....	3.21-50
Figure 3.21-16: Subsistence Search and Harvest Areas, Crooked Creek, 2009.....	3.21-53
Figure 3.21-17: Subsistence Search and Harvest Areas, Salmon, Crooked Creek, 2009.....	3.21-54
Figure 3.21-18: Wild Food Harvesting and Processing Network, Crooked Creek, 2009.....	3.21-55
Figure 3.21-19: Composition of Aniak Subsistence Harvest by Estimated Edible Weight, 2009.....	3.21-57
Figure 3.21-20: Subsistence Search and Harvest Areas, Aniak, 2009 .....	3.21-58
Figure 3.21-21: Wild Food Harvesting and Processing Network, Aniak, 2009 .....	3.21-60
Figure 3.21-22: Composition of Chuathbaluk Subsistence Harvest by Estimated Edible Weight, 2009.....	3.21-62
Figure 3.21-23: Subsistence Search and Harvest Areas, Chuathbaluk, 2009 .....	3.21-65
Figure 3.21-24: Wild Food Harvesting and Processing Network, Chuathbaluk, 2009 .....	3.21-66
Figure 3.21-25: Composition of Bethel Subsistence Harvest by Estimated Edible Weight, 2012.....	3.21-71
Figure 3.21-26: Subsistence Search and Harvest Areas, Large Land Mammals, Bethel, 2012.....	3.21-73

Figure 3.21-27: Subsistence Search and Harvest Areas, Salmon and Whitefish, Bethel, 2012.....	3.21-74
Figure 3.21-28: Subsistence Search and Harvest Areas, Marine Mammals, Bethel, 2012.....	3.21-75
Figure 3.21-29: Wild Food Harvesting and Processing Network, Bethel, 2012.....	3.21-76
Figure 3.21-30: Composition of Kwethluk Subsistence Harvest by Estimated Edible Weight, 2010.....	3.21-77
Figure 3.21-31: Subsistence Search and Harvest Areas, Kwethluk, 2010.....	3.21-80
Figure 3.21-32: Subsistence Search and Harvest Areas, Salmon, Kwethluk, 2010.....	3.21-81
Figure 3.21-33: Wild Food Harvesting and Processing Network, Kwethluk, 2010.....	3.21-82
Figure 3.21-34: Composition of Quinhagak Subsistence Harvest by Estimated Edible Weight, 2013.....	3.21-85
Figure 3.21-35: Quinhagak Seasonal Round of Subsistence Harvests 1983.....	3.21-88
Figure 3.21-36: Subsistence Search and Harvest Areas, Quinhagak, 2013.....	3.21-90
Figure 3.21-37: Wild Food Harvesting and Processing Network, Quinhagak, 2013.....	3.21-91
Figure 3.21-38: Estimated Moose Harvests, GMU 16B, 1999-2009.....	3.21-97
Figure 3.21-39: Historical Subsistence Moose Harvest, GMU 19A Communities, 1992-2013.....	3.21-99
Figure 3.21-40: Historical Subsistence Moose Harvest, GMU 18 Communities, 1992-2013.....	3.21-100
Figure 3.21-41: Distribution and Density of Local Moose Hunters, GMUs 16B, 18, and 19, 2002-2014.....	3.21-101
Figure 3.21-42: Successful Caribou Hunters from Communities within the Mulchatna Caribou Herd Range, 1991-2010.....	3.21-102
Figure 3.21-43: Distribution and Density of Local Caribou Hunters, GMUs 16B, 18, and 19, 2002-2014.....	3.21-103
Figure 3.21-44: Hooper Bay Seasonal Round of Subsistence Harvests 1984.....	3.21-105
Figure 3.21-45: Composition of Scammon Bay Subsistence Harvest by Estimated Edible Weight, 2013.....	3.21-109
Figure 3.21-46: Subsistence Search and Harvest Areas, Scammon Bay, 2013.....	3.21-112
Figure 3.21-47: Wild Food Harvesting and Processing Network, Scammon Bay, 2013.....	3.21-113
Figure 3.21-48: Composition of Emmonak Subsistence Harvest by Estimated Edible Weight, 2008.....	3.21-117
Figure 3.21-49: Subsistence Search and Harvest Areas, Emmonak, 2008.....	3.21-119
Figure 3.21-50: Composition of Russian Mission Subsistence Harvest by Estimated Edible Weight, 2011.....	3.21-123
Figure 3.21-51: Subsistence Search and Harvest Areas, Russian Mission, 2011.....	3.21-124
Figure 3.21-52: Wild Food Harvesting and Processing Network, Russian Mission, 2011.....	3.21-125
Figure 3.21-53: Composition of Grayling Subsistence Harvests by Estimated Edible Weight, 2011.....	3.21-129
Figure 3.21-54: Subsistence Search and Harvest Areas, Grayling, 2011.....	3.21-130
Figure 3.21-55: Wild Food Harvesting and Processing Network, Grayling, 2011.....	3.21-131



Figure 3.21-56: Composition of Tyonek Subsistence Harvest by Estimated Edible Weight, 2013.....	3.21-134
Figure 3.21-57: Harvest Locations and Search Areas, Tyonek, 2013.....	3.21-137
Figure 3.21-58: Population of Upper, Central Kuskokwim, Upper Kuskokwim, Lower-Middle and Lower Kuskokwim Subregions (excluding Bethel) from 1950 to 2010.....	3.21-147
Figure 3.21-59: Population of Bethel, AK from 1950 to 2010.....	3.21-147
Figure 3.21-60: Black Bear and Moose Harvest Areas for Central Kuskokwim Subregion Communities, 2009-2010.....	3.21-162
Figure 3.21-61: Black Bear and Moose Harvest Areas for Lower-Middle Kuskokwim Subregion Communities, 2010-2012.....	3.21-163
Figure 3.21-62: Migratory and Upland Birds Harvest Areas for Central Kuskokwim Subregion Communities, 2009-2010.....	3.21-165
Figure 3.21-63: Berry and Plant Harvest Areas for Central Kuskokwim Subregion Communities, 2009-2010.....	3.21-166
Figure 3.21-64: Seal and Walrus Harvest Areas for Lower Kuskokwim Subregion Communities.....	3.21-177
Figure 3.21-65: Netting and Fishing Activities for Crooked Creek, Alaska; 2009.....	3.21-182
Figure 3.21-66A: Netting and Fishing Activities for Central Kuskokwim Subregion Communities, Map 1 of 3.....	3.21-183
Figure 3.21-67: Salmon Harvest Locations for Central Kuskokwim Subregion Communities, 2009-2010.....	3.21-186
Figure 3.21-68: Salmon Harvest Locations for Lower-Middle Kuskokwim Subregion Communities, 2010-2012.....	3.21-187
Figure 3.21-69: Black Bear, Brown Bear, Caribou, and Moose Harvest Locations for McGrath and Nikolai, 2011.....	3.21-191
Figure 3.21-70: Small Mammal Harvest Locations for McGrath and Nikolai, 2011.....	3.21-192
Figure 3.21-71: Berry, Plant, and Bird Harvest Locations for McGrath and Nikolai, 2011.....	3.21-193
Figure 3.21-72: Black Bear, Caribou, and Moose Harvest Locations for Skwentna and Tyonek, 2012-2013.....	3.21-194
Figure 3.21-73: Salmon Harvest Locations for Skwentna and Tyonek, 2012-2013.....	3.21-195
Figure 3.21-74: Migratory and Upland Birds Harvest Locations for Skwentna and Tyonek, 2012-2013.....	3.21-196
Figure 3.21-75: Berry and Plant Harvest Locations for Skwentna and Tyonek, 2012-2013.....	3.21-197
Figure 3.21-76: Alternative 4 Birch Tree Crossing Mine Access Road and Moose Harvest Areas for Aniak and Chuathbaluk, 2009.....	3.21-220
Figure 3.21-77: Alternative 4 Birch Tree Crossing Mine Access Road and Vegetation Harvest Areas for Aniak and Chuathbaluk, 2009.....	3.21-221
Figure 3.21-78: Alternative 4 Birch Tree Crossing Mine Access Road and Ducks and Geese Harvest Areas for Aniak and Chuathbaluk, 2009.....	3.21-222
Figure 3.22-1: Bethel Census Area.....	3.22-11
Figure 3.22-2: Yukon-Kuskokwim Health Corporation Facilities Map.....	3.22-12



Figure 3.22-3: Health Professional Shortage Areas by Discipline in Alaska .....3.22-35

Figure 3.24-1: Typical Elemental Mercury Containers .....3.24-28

Figure 3.24-2: Inundation Area, Tailings and Water Release .....3.24-51

Figure 3.24-3: Deposition Depth, Tailings and Water Release .....3.24-52

Figure 3.24-4: Inundation Area, Water Only Release .....3.24-53

Figure 3.26-1: Projected Air Temperature Trends in Alaska for Two Climate Scenarios... 3.26-11

Figure 3.26-2: Communities with SNAP Climate Change Data ..... 3.26-12

Figure 3.26-3: Projected Ground Temperature Trends in Alaska for Two Climate  
Scenarios..... 3.26-19

Figure 4.2-1: Overall Area Considered for Cumulative Effects ..... 4-4

Figure 6.3-1: Donlin Gold EIS Scoping Meeting Locations ..... 6-7

Figure 6.4-1: Donlin Gold Draft EIS Meeting Locations ..... 6-11

## APPENDICES

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Appendix A	Financial Assurance
Appendix B	Scoping Report and Public Involvement Plan
Appendix C	Alternatives Development Process
Appendix D	Pipeline Engineering Strip Maps
Appendix E	PHMSA Enclosure B
Appendix F	Supplemental Soil Information
Appendix G Tables	Stream Crossing, Water Extraction, and Flow Reduction Data
Appendix H	Analysis of Mine Site Geochemistry
Appendix I	Air Quality
Appendix J	USACE Section 10 Rivers and Harbors Act / Section 404 Clean Water Act Permit Application
Appendix K	Supplemental Wetlands Table for Wetlands Section 3.11
Appendix L	Wetlands Pipeline Strip Maps
Appendix M	Compensatory Mitigation Plan
Appendix N	ANILCA Section 810 Preliminary Analysis
Appendix O	Biological Assessments
Appendix P	Corps' Initiation of the Government-to-Government Relationship with Federally Recognized Tribes
Appendix Q	Essential Fish Habitat Assessment
Appendix R	Oil Discharge Prevention and Contingency Plans
Appendix S	Pit Lake Ecological Risk Assessment
Appendix T	Visual Pipeline Engineering Strip Maps
Appendix U	Donlin Gold Invasive Species Plan
Appendix V	Supplemental Bird Data Tables for Wildlife Section 3.12
Appendix W	Barge Plans
Appendix X	CAR
Appendix Y	Programmatic Agreement
Appendix Z	Public Easement Plan
Appendix AA	Additional Regulatory Framework Information
Appendix AB	Focused Risk Analysis

## ACRONYMS AND ABBREVIATIONS

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°F	degrees Fahrenheit
µm	micrometer
µN/m <sup>2</sup>	microNewtons per square seter
µg	microgram
µg/m <sup>2</sup>	micrograms per square meter
µg/m <sup>2</sup> /y	micrograms per square meter per year
µS	micro Siemens
µPa	microPascals
3PPI	Three Parameters Plus, Inc.
AAQS	Alaska Ambient Air Quality Standards
AAC	Alaska Administrative Code
AAOF	Army Airfield Operations Facility
AASHTO	American Association of State Highway and Transportation Officials
ABA	acid-base accounting
ABC	Alcoholic Beverage Control Board
ACMA	American Creek magnetic anomaly
ACS	American Community Survey
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADHSS	Alaska Department of Health and Social Services
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation & Public Facilities
ADOL	Alaska Department of Labor and Workforce Development
ADPS	Alaska Department of Public Safety
AEIC	Alaska Earthquake Information Center
AGRA	AGRA Earth & Environmental, Inc.
AHRS	Alaska Heritage Resource Survey
AKARNG	Alaska Army National Guard
AKEPIC	Alaska Exotic Plant Information Clearinghouse
AKNHP	Alaska Natural Heritage Program
ALFRESCO	Alaska Frame-Based Ecosystem Code Model
AMEC	AMEC Americas Limited
AMS	American Meteorological Society
AN	Alaska Native
ANCSA	Alaska Native Claims Settlement Act

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ANILCA	Alaska National Interest Lands Conservation Act
ANTHC	Alaska Native Tribal Health Consortium
AP	acid-generation potential
APD&T	Alaska Petroleum Distributors and Transporters
APDES	Alaska Pollutant Discharge Elimination System
APE	area of potential effects
APNCU	adequacy of prenatal care utilization index
AQRV	air quality related value
AQS	air quality system
ARD	acid rock drainage
ASHSC	Alaska Seismic Hazards Safety Commission
AST	aboveground storage tank
ATR	Alaska Trauma Registry
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AVCP	Association of Village Council Presidents
AVCS	Alaska Vegetation Classification System
AVEC	Alaska Village Electric Cooperative
AVO	Alaska Volcano Observatory
AWQC	applicable/ambient water quality criteria
AWS	aircraft warning station
BACT	best available control technology
BAFs	bioaccumulation factors
BART	best available retrofit technology
BGC	BGC Engineering, Inc.
BIA	Bureau of Indian Affairs
BLEVE	boiling liquid expanding vapor explosion
BLM	Bureau of Land Management
BMC	Bethel Municipal Code
BMP	best management practice
BNC	Bethel Native Corporation
BOG	Alaska Board of Game
BPL	Beluga Natural Gas Pipeline
BRFSS	Behavioral Risk Factor Surveillance System
BSCF	billion standard cubic feet
BSWI	Bering Sea Western Interior
BTC	Birch Tree Crossing
BVS	Bureau of Vital Statistics
BW	body weight

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ca.	circa (meaning "around, about," "approximately")
CAA	Clean Air Act
Calista	Calista Corporation (An ANCSA Regional Corporation)
CALTRAN	California Department of Transportation
CAM	compliance assurance monitoring
CASTNET	clean air status and trends network
CCBO	Crooked Creek below Omega
CCME	Canadian Council of Ministers of the Environment
CDC	Center for Disease Control
CDQ	Community Development Quota
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGMIX	Coast Guard Maritime Information Exchange
CH <sub>4</sub>	methane
Chadux	Alaska Chadux Corporation
CI ICE	compression ignition internal combustion engines
CIL	Carbon-in-Leach
CIMMC	Cook Inlet Marine Mammal Council
CISPRI	Cook Inlet Spill Prevention & Response, Inc.
CIRI	Cook Inlet Region, Inc. (an ANCSA Regional Corporation)
CISWI	commercial and industrial solid waste incineration
CKMP	Central Kuskokwim Moose Plan
CLE	contingency-level event
CLRD	chronic lower respiratory diseases
cm	centimeter
CMAQ	EPA Community Modeling Air Quality system
CMP	Compensatory Mitigation Plan (wetlands), Comprehensive Management Plan (cultural resources)
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> -e	equivalence to CO <sub>2</sub> , CO <sub>2</sub> equivalent
Code	International Cyanide Management Code
COPCs	chemicals of potential concern
COPD	chronic obstructive pulmonary disease

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Corps	U.S. Army Corps of Engineers
CPUE	catch per unit effort
CRMP	Cultural Resources Management Plan
CSM	conceptual site model
CVAFS	cold vapor atomic fluorescence spectrometry
CVRF	Coastal Villages Region Fund
CWA	Clean Water Act
CWD	contact water dam
CY	cubic yards
dB	decibels
dBA	A-weighted decibel
DCCED	Alaska Department of Commerce, Community and Economic Development
DEM	digital elevation model
DGGS	Division of Geological and Geophysical Survey
DI	Deionized Water
DMA	Duane Miller Associates
DMLW	Division of Mining, Land and Water
DO	dissolved oxygen
Donlin Gold	Donlin Gold, LLC
DOC	Department of Corrections
DOI	Department of the Interior
DPS	distinct population segment
DRO	diesel range organics
DST	dry stack tailings
dvs	deciviews
EAP	Emergency Action Plan
EDR	effective detection radius
EDRR	Early Detection and Rapid Response
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	environmental impact statement
EPA	Environmental Protection Agency
EPA CCC	EPA Criterion Continuous Concentration
EPCRA	Emergency Planning and Community Right to Know Act
ERA	ecological risk assessment
ESA	Endangered Species Act
ESCP	erosion and sediment control plan
FAA	Federal Aviation Administration

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FCI	functional capacity index
FNWA RCNM	Federal Highway Administration Roadway Construction Noise Model
FLPMA	Federal Land Policy and Management Act
FMEA	failure mode effects analysis
FOS	factor of safety
FPPA	Farmland Protection Policy Act
FRP	facility response plan
FSA	Federal Scout Armory
ft/d	feet per day
FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
FWD	fresh water dam
FWDD	fresh water diversion dam
GCMs	global climate models
GED	general educational development
GHG	greenhouse gas
GIS	geographical information system
GMU	game management unit
gpd	gallons per day
gpm	gallons per minute
GRO	gasoline range organics
GUA	guided use area
GWP	global warming potential
HAP	hazardous air pollutant
HACCP	Hazard Analysis and Critical Control Point
HCA	high consequence area
HCTs	Humidity cell tests
HDD	horizontal directional drilling
HEC	Health Effects Criteria/Categories
HFCs	hydrofluorocarbons
Hg	mercury
Hg <sup>0</sup>	elemental mercury vapor
Hg <sup>II</sup>	gaseous divalent mercury
Hg <sub>p</sub>	particulate-bound mercury
HgS	cinnabar
HGM	hydrogeomorphic
HIA	Health Impact Assessment
HMH	HMH Consulting, LLC



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HPSA	Health Professional Shortage Area
HQs	hazard quotients
HQ <sub>NOAEL</sub> :	hazard quotient no observable adverse effect level
HQ <sub>loael</sub> :	hazard quotients low adverse effect level
HRC	high rate clarifier
HRSA	Health Resource and Services Administration
HUC	hydrologic unit code
ICMM	International Council on Mining and Metals
IDF	inflow design flood
IFC	International Finance Corporation
IHS	Indian Health Services
IIR	incident investigation report
ILI	in-line inspection
IMDG Code	International Maritime Dangerous Goods Code
IMP	integrity management program
IMPLAN	impact analysis for planning
IMPROVE	interagency monitoring of protected visual environments
INHT	Iditarod National Historic Trail
IPCC	Intergovernmental Panel on Climate Change
ISMP	Invasive Species Management Plan
ISO	International Standards Organization
ISQG	interim sediment quality guidelines
IWC	International Whaling Commission
IWMP	Integrated Waste Management Permit
JDWET	jurisdictional wetland classification
K	hydraulic conductivity
KFL	known fossil localities
kg	kilogram
km	kilometer
kPa	kilopascal
KAP	Kuskokwim Area Plan
KOPs	key observation points
KPB	Kenai Peninsula Borough
KRSMWG	Kuskokwim River Salmon Management Working Group
KTC	Knik Tribal Council
kV	kilovolt
LDR	land disposal restriction
LEDPA	least environmentally damaging practicable alternative

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LEO Network	Local Environmental Observer Network
LEQ	equivalent sound level
LDN	day-night sound level
LLC	limited liability corporation
LLDPE	linear low-density polyethylene
L <sub>max</sub>	maximum L <sub>EQ</sub>
LNG	liquefied natural gas
LOEC	lowest observed effect concentrations
LOD	limit of detection
LSA	Little South America
LUSTs	leaking underground storage tanks
L <sub>v</sub>	vibration level
LWC	lands with wilderness characteristics
m	meter
m <sup>2</sup>	square meter
m <sup>3</sup>	cubic meter
MAAT	mean annual air temperature
MACT	maximum achievable control technology
MAG	mitigation advisory group
Magnuson- Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MAOP	maximum allowable operating pressure
Mat-Su	Matanuska-Susitna
MBTA	Migratory Bird Treaty Act
MCE	maximum credible earthquake
MCL	maximum containment levels
MDAG	mine drainage assessment group
MDE	maximum design earthquake
MDL	method detection limit
MDN	mercury deposition network
MET	meteorology
MeHg	methyl mercury
MFP	management framework plan
mg/kg	milligrams per kilogram
Mgal	million gallons
mi	miles
mi <sup>2</sup>	square mile
MISLE	Marine Information for Safety and Law Enforcement
ML	metal leaching

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MLA	Mineral Leasing Act
MLLW	mean lower low water
MLV	mainline block valve
mm	millimeter
MMA	McVehil-Monnett Associates, Inc.
MMBtu/hr	million British thermal units per hour
MMPA	Marine Mammals Protection Act
MMT	million metric tons (1,000,000 tonnes)
MP	milepost
mph	miles per hour
MS	material sites
MSB	Matanuska-Susitna Borough
MSBC	Matanuska-Susitna Borough Code
MSDS	Material Data Safety Sheet
MSES	Management and Solutions in Environmental Science
MSGP	multi-sector general permit
MSHA	Mine Safety and Health Administration
MSL	mean sea level
Mt	million tons (short tons)
MT	metric tonne (a unit of weight equal to 1,000 kilograms or 2,204.6 pounds)
MUA	Medically Underserved Area
MUA	Medically Underserved Population
MW	megawatt
MWMP	meteoric water mobility procedure
N <sub>2</sub> O	nitrous oxide
na	not available
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NAG	non-acid generating
NANA	Northwest Alaska Native Association (an ANCSA Regional Corporation)
NAS	New Air Station
NBD	non-directional beacon
NCES	National Center for Education Statistics
ND	not detected
NDSA	Naval Defensive Sea Area
NEPA	National Environmental Policy Act

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NES	Northern Ecological Services
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
ng/g	nanograms per gram
ng/L	nanograms per liter
ng/m <sup>3</sup>	nanograms per cubic meter
ng/scm	nanograms per standard cubic meter
NH <sub>3</sub>	ammonia
NHD	National Hydrography Database
NHPA	National Historic Preservation Act
NISC	National Invasive Species Council
NLCD	National Land Cover Database
NLUR	Northern Land Use Research
NMFS	National Marine Fisheries Service
NNIS	nonnative invasive species
NNSR	nonattainment NSR
NRMS	normalized root mean square
NO	nitric oxide
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	oxides of nitrogen
NOAA	National Oceanic and Atmospheric Administration
NOB	north overburden stockpile
NOI	Notice of Intent
NP	acid-neutralization potential
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	new source review
NTN	National Trends Network
NTSA	National Trails System Act
NTSB	National Transportation Safety Board
NTU	Nephelometric Turbidity Units
NWAB	Northwest Arctic Borough
NWI	National Wetlands Inventory
NWIS	National Water Information System
NWR	National Wildlife Refuge
NWS	National Weather Service
NWS COOP	NWS Cooperative

---

O <sub>3</sub>	ozone
O&M	operations and maintenance
OBE	operating basis earthquake
OCS	Alaska Office of Children’s Services
ODPCP	Oil Discharge and Prevention Contingency Plan
OHMP	Office of Habitat Management and Permitting
OHV	off-highway vehicle /off-road vehicle
OLE	operating-level earthquake
OMS	organizational maintenance shop
OPA	Oil Pollution Act
ORV	off-road vehicle/off-highway vehicle
OSHA	Occupational Safety & Health Administration
OSRO	oil spill removal organization
PA	Programmatic Agreement
PAG	potentially acid generating
PAHs	polyaromatic hydrocarbons
Pb	lead
PCR	project control room
PELs	probable effects levels
PFCs	perfluorocarbons
PFL	potential fossil localities
PFYC	Potential Fossil Yield Classification
PG&E	Pacific Gas and Electric
pg/m <sup>3</sup>	picograms per cubic meter
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PJD	Preliminary Jurisdictional Delineation
PM	particulate matter
PM <sub>-10</sub>	PM with an aerodynamic diameter less than or equal to 10 µm
PM <sub>-2.5</sub>	PM with an aerodynamic diameter less than or equal to 2.5 µm
PMF	probable maximum flood
PMP	probable maximum precipitation
POD	Plan of Development
POA	Port of Anchorage
POX	pressure oxidation
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRISM	parameter elevation regressions on independent slope models

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PSD	Prevention of Significant Deterioration
psi	pounds per square inch
PSI	periodic safety inspections
PSIO	Petroleum Systems Integrity Office
PSR	Pipeline Safety Regulations
PSY	Pipe and Equipment Storage Yards
PTE	potential to emit
QAPP	Quality Assurance Project Plan
RAC	Regional Advisory Council
RCRA	Resource Conservation and Recovery Act
RFFA	Reasonably Foreseeable Future Actions
RECON	Rowland Engineering Consultants
RFAI	request for additional information
RFS	renewable fuel standards
RHA	Rivers and Harbors Act
RICE	reciprocating internal combustion engines
RMP	Risk Management Plan, Resource Management Plan
RMS	root mean square
RO	reverse osmosis
ROD	Record of Decision
ROW(s)	right(s)-of-way
RPT	rapid phase transition
RRO	residual range organics
SAG	semi-autonomous grinding
SBD	strain-based design
SBRA	simultaneous broadcast range adcock antenna
SCA	secondary containment area
SDH	Social Determinants of Health
SDWA	Safe Drinking Water Act
sf	square feet
SF <sub>6</sub>	sulfur hexafluoride
SHPO	State Historical Preservation Officer
SI ICE	spark ignition internal combustion engines
SIP	state implementation plan
SMAP	Susitna Matanuska Area Plan
SNAP	scenarios network for Alaska planning
SO <sub>2</sub>	sulfur dioxide
SODAR	sonic detection and ranging
SOB	south overburden stockpile

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SPCC	Spill Prevention Control and Countermeasure
SPCO	State Pipeline Coordinator's Office
SPL	sound pressure level
SpUD	special use district
SQGs	Sediment Quality Guidelines
SQRU	scenic quality rating unit
SREB	snow removal equipment building
SRK	SRK Consulting (US), Inc.
SRR	Stabilization, Rehabilitation, and Reclamation Plan
SRS	seepage recovery system
SSA	sole source aquifer
SSAP	Southeast Susitna Area Plan
SME	State Medical Examiner
SSI	sewage sludge incineration
STATSGO	State Soil Geographic Database
STI	sexually transmitted infection
STPs	sewage treatment plants
SWE	snow water equivalent
SWPPP	Stormwater Pollution Prevention Plan
t	ton, short ton (a unit of weight equal to 2,000 pounds)
TAPS	Trans-Alaska Pipeline System
TCLP	toxicity characteristic leaching procedure
TCP	Traditional Cultural Properties
TDML	total maximum daily load
TDS	totally dissolved solids
TEK	traditional ecological knowledge
TELs	threshold effects levels
TES	threatened or endangered species
TKC	The Kuskokwim Corporation
TMDL	Total Maximum Daily Load
TOC	total organic carbon
tpd	tons per day
tpy	tons per year
Tribe	federally recognized tribal government
TSCA	Toxic Substances Control Act
TSF	tailings storage facility
TUP	Temporary Use Permit
TWUP	temporary water use permit
UAA	University of Alaska, Anchorage



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UCO	Unalaska Code of Ordinances
UCL	upper confidence limit
ULSD	ultra-low sulfur diesel
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USC	United States Code
USCG	U. S. Coast Guard
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USDA SCS	USDA Soils Conservation Service
USDOI	U.S. Department of Interior
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
USPS	U.S. Postal Service
USTs	underground storage tanks
UTM	Universal Transverse Mercator
VdB	vibration decibels
VOC	volatile organic compound
VPSO	Village Public Safety Officer
VRI	visual resources inventory
VRM	Visual Resource Management
WAD	weak acid dissociable
WBM	water balance model
WDAP	Wastewater Discharge Authorization Program
WEG	wind erodibility group
WELTS	well log tracking system
WHO	World Health Organization
WMO	World Meteorological Organization
WMRP	Water Resource Management Plan
WPR	world population review
WQS	water quality standards
WRF	waste rock facility
WRMCs	waste rock management categories
WT	wall thickness
WTP	water treatment plant
WT/TSF	waste treatment/ tailings storage facility
YK, Y-K	Yukon-Kuskokwim
YKHC	Yukon-Kuskokwim Health Center/Corporation