

Foundation for a Sustainable Northern Future

REPORT OF THE JOINT REVIEW PANEL FOR THE MACKENZIE GAS PROJECT

VOLUME II — CHAPTERS 11 TO 19

DECEMBER 2009



Joint Review Panel
for the Mackenzie Gas Project

TABLE OF CONTENTS

ACKNOWLEDGEMENTS iv

PREFACE v

DEFINED TERMS xxx

ABBREVIATIONS AND ACRONYMS xxxii

CHAPTER 1 — PROJECT CONTEXT

1.1 THE LAND 3

1.2 THE PEOPLE 4

1.3 THE EVOLVING NORTH 6

1.4 ASPIRATIONS AND APPREHENSIONS 7

1.5 THE FUTURE AND SUSTAINABLE DEVELOPMENT 11

CHAPTER 2 — PROJECT DESCRIPTION

2.1 INTRODUCTION 15

 2.1.1 PROJECT OVERVIEW 15

 2.1.2 PROPONENTS 19

 2.1.3 CAPACITY 19

 2.1.4 PROJECT SCHEDULE 20

2.2 MAJOR PROJECT COMPONENTS 24

 2.2.1 ANCHOR FIELDS 24

 2.2.2 MACKENZIE GATHERING SYSTEM 30

 2.2.3 MACKENZIE VALLEY PIPELINE 34

 2.2.4 MACKENZIE GAS PROJECT FOOTPRINT 37

 2.2.5 NORTHWEST ALBERTA FACILITIES 37

 2.2.6 PROJECT PRODUCTS 38

2.3 PROJECT INFRASTRUCTURE 38

 2.3.1 CAMPS 42

 2.3.2 POTABLE WATER SUPPLY 42

 2.3.3 BARGE LANDING SITES 42

 2.3.4 STOCKPILE AND FUEL STORAGE SITES 42

 2.3.5 ROADS 42

 2.3.6 AIRSTRIPS AND HELIPADS 42

 2.3.7 BORROW SITES 42

2.4	LOGISTICS AND TRANSPORTATION	43
2.4.1	ESTIMATED CARGO WEIGHT	43
2.4.2	CARGO TRANSPORTATION REQUIREMENTS.....	43
2.4.3	WORKFORCE TRANSPORTATION REQUIREMENTS	43
2.5	EXPENDITURES AND WORKFORCE	45
2.5.1	EXPENDITURES.....	45
2.5.2	WORKFORCE.....	46
2.6	ENVIRONMENTAL INPUTS AND OUTPUTS	47
2.6.1	INPUTS.....	47
2.6.2	OUTPUTS	47
2.7	OPERATIONS AND MAINTENANCE	48
2.8	DECOMMISSIONING, RECLAMATION AND ABANDONMENT	49
2.8.1	INFRASTRUCTURE DECOMMISSIONING.....	49
2.8.2	FACILITIES AND EQUIPMENT DECOMMISSIONING	49
2.8.3	NORTHWEST ALBERTA FACILITIES.....	50

CHAPTER 3 — POTENTIAL FUTURE DEVELOPMENTS

3.1	THE PROJECT AS FILED WITH THE PANEL	53
3.2	EXPANSION CAPACITY SCENARIO OF THE MACKENZIE VALLEY PIPELINE	53
3.3	PROPOSERS' HYPOTHETICAL EXPANSION CAPACITY SCENARIO	54
3.3.1	GLJ REPORT	54
3.3.2	OIL AND GAS MANAGEMENT DIRECTORATE	54
3.3.3	PROPOSERS' SCENARIO.....	56
3.4	OTHER FUTURE SCENARIOS	63
3.4.1	CANADIAN ARCTIC RESOURCES COMMITTEE'S SUBMISSION	63
3.4.2	OTHER VIEWS	68
3.4.3	"BASIN-OPENING" PROJECT	68
3.5	SUMMARY	68

CHAPTER 4 — REVIEW PROCESS

4.1	INTRODUCTION	73
4.1.1	JOINT REVIEW PANEL AGREEMENT.....	73
4.1.2	DOWNSTREAM REGULATORS	74
4.2	ESTABLISHMENT OF THE JOINT REVIEW PANEL	76
4.2.1	APPOINTMENT OF THE PANEL	76
4.2.2	APPOINTMENT UNDER SECTION 15 OF THE <i>NATIONAL ENERGY BOARD ACT</i>	76
4.2.3	INDEPENDENCE OF THE JOINT REVIEW PANEL.....	76

4.3	MANDATE OF THE JOINT REVIEW PANEL	76
4.3.1	GENERAL	76
4.3.2	STEPS PRIOR TO PUBLIC HEARING PHASE	77
4.4	PUBLIC HEARINGS	78
4.4.1	PUBLIC INPUT AND ACCESSIBILITY	78
4.4.2	HEARINGS SCHEDULE AND GUIDANCE	79
4.4.3	HEARINGS STATISTICS	80
4.5	RULINGS ON MOTIONS	80
4.6	SITE VISITS	80
4.7	TIMING OF PANEL RECOMMENDATIONS	80
4.7.1	GOVERNMENT RESPONSE	80
4.7.2	DECISION TO CONSTRUCT	80
4.7.3	LEAVE TO OPEN	80
4.7.4	COMMENCEMENT OF CONSTRUCTION	80

CHAPTER 5 — APPROACH AND METHODS

5.1	INTRODUCTION	83
5.2	SCOPING THE PROJECT	84
5.2.1	PROJECT NEED AND PURPOSE	84
5.2.2	ALTERNATIVES	86
5.3	THE RECEIVING ENVIRONMENT	88
5.3.1	IDENTIFICATION OF VALUED COMPONENTS	88
5.3.2	TEMPORAL AND SPATIAL BOUNDARIES	88
5.3.3	BASELINE INFORMATION	89
5.3.4	TRADITIONAL KNOWLEDGE	90
5.4	IMPACT ASSESSMENT	92
5.4.1	IMPACT PREDICTION	92
5.4.2	PROponents' COMMITMENTS, MITIGATION AND ENHANCEMENT	92
5.4.3	UNCERTAINTY AND THE PRECAUTIONARY APPROACH	93
5.4.4	MONITORING AND ADAPTIVE MANAGEMENT	95
5.4.5	CUMULATIVE IMPACT ASSESSMENT	97
5.4.6	SIGNIFICANCE OF PROJECT IMPACTS	99
5.4.7	THE PANEL'S SUSTAINABILITY ASSESSMENT FRAMEWORK	103

CHAPTER 6 — PROJECT DESIGN, CONSTRUCTION AND OPERATIONS

6.1	THE PROJECT AND THE ENVIRONMENT	109
6.1.1	THE DISTINCTIVE NATURE OF THE PROJECT	110
6.1.2	PREVIOUS ARCTIC OIL AND GAS PROJECTS	110

6.1.3	TERRAIN AND PERMAFROST CONDITIONS IN THE PROJECT REVIEW AREA.....	111
6.1.4	PANEL VIEWS	113
6.2	PROponents' APPROACH TO PROJECT DESIGN, CONSTRUCTION AND OPERATIONS.....	114
6.2.1	PROponents' INFORMATION BASE.....	114
6.2.2	PROponents' DESIGN APPROACH.....	116
6.2.3	DESIGNING FOR GEOHAZARDS.....	118
6.2.4	ROUTING, SITING AND PROJECT FOOTPRINT.....	119
6.2.5	PANEL VIEWS	120
6.3	GENERAL DESIGN FOR THERMAL IMPACTS.....	122
6.3.1	RIGHT-OF-WAY AND SITE PREPARATION AND RECLAMATION METHODS.....	123
6.3.2	PIPELINE OPERATING TEMPERATURE REGIME.....	126
6.3.3	CLIMATE CHANGE.....	128
6.3.4	PANEL VIEWS	130
6.4	THAW SETTLEMENT.....	131
6.4.1	PROponents' VIEWS	131
6.4.2	PARTICIPANTS' VIEWS	134
6.4.3	PANEL VIEWS	137
6.5	SLOPE STABILITY IN PERMAFROST.....	138
6.5.1	PROponents' VIEWS	138
6.5.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	141
6.5.3	PANEL VIEWS	141
6.6	FROST HEAVE, FROST BULBS AND GROUNDWATER FLOW.....	142
6.6.1	PROponents' VIEWS	143
6.6.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	145
6.6.3	PANEL VIEWS	145
6.7	WATERCOURSE CROSSINGS.....	146
6.7.1	EXISTING CONDITIONS.....	146
6.7.2	PROponents' VIEWS	146
6.7.3	PARTICIPANTS' VIEWS	149
6.7.4	PANEL VIEWS	150
6.8	OTHER GEOHAZARDS.....	151
6.8.1	SEISMICITY.....	151
6.8.2	ACID-ROCK DRAINAGE.....	151
6.8.3	KARST TOPOGRAPHY.....	152
6.8.4	PANEL VIEWS	152
6.9	ANCHOR FIELDS.....	152
6.9.1	PERMAFROST AT DEPTH.....	152
6.9.2	SHALLOW GAS.....	154
6.9.3	SEA-LEVEL CHANGE, STORM SURGES AND SUBMERGENCE.....	155
6.9.4	EXTRACTION-INDUCED SUBSIDENCE.....	156
6.10	OVERALL PANEL VIEWS AND RECOMMENDATIONS.....	163

CHAPTER 7 — ACCIDENTS, MALFUNCTIONS AND EMERGENCY RESPONSE

7.1	INTRODUCTION.....	171
7.2	EXISTING CONDITIONS.....	172
7.2.1	NATIONAL ENERGY BOARD	172
7.2.2	GOVERNMENT OF THE NORTHWEST TERRITORIES.....	172
7.2.3	ENVIRONMENT CANADA.....	173
7.2.4	INDIAN AND NORTHERN AFFAIRS CANADA	173
7.2.5	TRANSPORT CANADA.....	173
7.2.6	LAND AND WATER BOARDS	173
7.2.7	THE NORTHWEST TERRITORIES/NUNAVUT SPILLS WORKING AGREEMENT	173
7.2.8	AQUATIC SPILLS.....	174
7.2.9	TRANSPORTATION OF DANGEROUS GOODS	176
7.3	PROONENTS' VIEWS	176
7.3.1	KEY PLANNING DOCUMENTS	176
7.3.2	ACCIDENT AND MALFUNCTION SCENARIOS	178
7.3.3	PROONENTS' MITIGATION MEASURES AND COMMITMENTS	181
7.4	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	184
7.4.1	ANCHOR FIELDS AND PIPELINES	184
7.4.2	TRANSPORTATION	185
7.4.3	HAZARDOUS MATERIALS MANAGEMENT	188
7.4.4	GENERAL CONCERNS.....	188
7.5	PANEL VIEWS AND RECOMMENDATIONS.....	190
7.5.1	SPILL REPORTING	191
7.5.2	SPILL CONTINGENCY PLANNING.....	191
7.5.3	TRANSPORT AND STORAGE OF DANGEROUS GOODS	192
7.5.4	HAZARDOUS MATERIALS AND DANGEROUS GOODS MANAGEMENT PLANNING	192
7.5.5	ENVIRONMENTAL EMERGENCY PLANS.....	192
7.5.6	RESPONSE AND DESIGN FOR EARTHQUAKES.....	193
7.5.7	EMERGENCY PREPAREDNESS AND RESPONSE PLAN	193
7.5.8	LOCAL SPILL RESPONSE CAPACITY	194
7.5.9	GOVERNMENT PREPAREDNESS.....	194

CHAPTER 8 — AIR AND WATER QUALITY

8.1	INTRODUCTION.....	197
8.2	AIR QUALITY	197
8.2.1	EXISTING CONDITIONS.....	197
8.2.2	PROONENTS' VIEWS	198
8.2.3	PARTICIPANTS' VIEWS	201
8.2.4	PANEL VIEWS AND RECOMMENDATIONS.....	202

8.3	WASTE INCINERATION	204
8.3.1	PROPOSANTS' VIEWS	204
8.3.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	205
8.3.3	PANEL VIEWS AND RECOMMENDATION	205
8.4	GREENHOUSE GAS EMISSIONS	207
8.4.1	PROPOSANTS' VIEWS	207
8.4.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	209
8.4.3	PANEL VIEWS AND RECOMMENDATIONS	214
8.5	WATER QUALITY AND DRINKING WATER	219
8.5.1	PROPOSANTS' VIEWS	219
8.5.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	221
8.5.3	PANEL VIEWS	222

CHAPTER 9 — FISH AND MARINE MAMMALS

9.1	INTRODUCTION.....	225
9.2	PROPOSANTS' APPROACH TO IMPACT ASSESSMENT	226
9.2.1	INTRODUCTION.....	226
9.2.2	BASELINE CONDITIONS.....	226
9.2.3	PANEL VIEWS	228
9.3	WATERCOURSE CROSSINGS	228
9.3.1	EXISTING CONDITIONS.....	228
9.3.2	PROPOSANTS' VIEWS	229
9.3.3	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	231
9.3.4	PANEL VIEWS AND RECOMMENDATIONS.....	234
9.4	FROST BULBS AND AUFELS.....	235
9.4.1	PROPOSANTS' VIEWS	235
9.4.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	236
9.4.3	PANEL VIEWS AND RECOMMENDATION	237
9.5	HABITAT COMPENSATION	238
9.5.1	PROPOSANTS' VIEWS	238
9.5.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	238
9.5.3	PANEL VIEWS AND RECOMMENDATIONS.....	239
9.6	BARGE TRAFFIC AND LANDING SITE CONSTRUCTION	240
9.6.1	PROPOSANTS' VIEWS	240
9.6.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	242
9.6.3	PANEL VIEWS AND RECOMMENDATION	244
9.7	MARINE AND RIVER DREDGING, AND DISPOSAL AT SEA.....	245
9.7.1	PROPOSANTS' VIEWS	245
9.7.2	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	248
9.7.3	PANEL VIEWS AND RECOMMENDATIONS.....	250

9.8 MARINE MAMMALS 250

9.8.1 EXISTING CONDITIONS 250

9.8.2 PROPONENTS' VIEWS 251

9.8.3 PARTICIPANTS' VIEWS AND RECOMMENDATIONS 253

9.8.4 PANEL VIEWS AND RECOMMENDATIONS 256

9.9 BALLAST WATER DISPOSAL 258

9.9.1 PROPONENTS' VIEWS 258

9.9.2 PARTICIPANTS' VIEWS AND RECOMMENDATIONS 258

9.9.3 PANEL VIEWS AND RECOMMENDATIONS 259

9.10 WATER WITHDRAWAL AND DISCHARGE 260

9.10.1 PROPONENTS' VIEWS 260

9.10.2 PARTICIPANTS' VIEWS AND RECOMMENDATIONS 262

9.10.3 PANEL VIEWS 262

9.11 FISHERIES MANAGEMENT 262

9.11.1 PROPONENTS' VIEWS 262

9.11.2 PARTICIPANTS' VIEWS AND RECOMMENDATIONS 262

9.11.3 PANEL VIEWS AND RECOMMENDATION 264

CHAPTER 10 — WILDLIFE

10.1 INTRODUCTION 269

10.2 IMPACT ASSESSMENT METHODOLOGY 270

10.2.1 PROPONENTS' ASSESSMENT METHODS 270

10.2.2 PANEL VIEWS AND RECOMMENDATION 272

10.3 SPECIES AT RISK 274

10.3.1 ASSESSMENT REQUIREMENTS 274

10.3.2 SELECTION OF SPECIES FOR ASSESSMENT 276

10.3.3 ASSESSMENT METHODS 277

10.3.4 IMPACT ASSESSMENT 278

10.3.5 CUMULATIVE IMPACT ASSESSMENT 278

10.3.6 PARTICIPANTS' VIEWS AND RECOMMENDATIONS 279

10.3.7 PANEL VIEWS AND RECOMMENDATIONS 279

10.4 WOODLAND (BOREAL) CARIBOU 282

10.4.1 EXISTING CONDITIONS 282

10.4.2 PROPONENTS' VIEWS 286

10.4.3 PARTICIPANTS' VIEWS AND RECOMMENDATIONS 287

10.4.4 PANEL VIEWS AND RECOMMENDATION 292

10.5 BARREN GROUND CARIBOU 295

10.5.1 EXISTING CONDITIONS 295

10.5.2 PROPONENTS' VIEWS 296

10.5.3	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	297
10.5.4	PANEL VIEWS AND RECOMMENDATIONS.....	299
10.6	GRIZZLY BEAR	301
10.6.1	EXISTING CONDITIONS.....	301
10.6.2	PROPOSERS' VIEWS	302
10.6.3	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	303
10.6.4	PANEL VIEWS AND RECOMMENDATIONS.....	304
10.7	POLAR BEAR.....	304
10.7.1	EXISTING CONDITIONS.....	304
10.7.2	PROPOSERS' VIEWS	305
10.7.3	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	305
10.7.4	PANEL VIEWS AND RECOMMENDATIONS.....	306
10.8	MOOSE.....	306
10.8.1	EXISTING CONDITIONS.....	306
10.8.2	PROPOSERS' VIEWS	307
10.8.3	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	308
10.8.4	PANEL VIEWS	308
10.9	OTHER WILDLIFE	308
10.9.1	WOLVERINE.....	308
10.9.2	OTHER SPECIES AT RISK.....	310
10.10	BIRDS: MACKENZIE VALLEY.....	313
10.10.1	PEREGRINE FALCON.....	313
10.10.2	PROTECTED AREAS FOR BIRDS IN THE MACKENZIE VALLEY.....	316
10.11	BIRDS: MACKENZIE DELTA.....	317
10.11.1	EXISTING CONDITIONS.....	317
10.11.2	PROPOSERS' VIEWS	318
10.11.3	PARTICIPANTS' VIEWS AND RECOMMENDATIONS.....	318
10.11.4	PANEL VIEWS AND RECOMMENDATIONS.....	323

CHAPTER 11 — CONSERVATION MANAGEMENT AND PROTECTED AREAS

11.1	<u>INTRODUCTION</u>.....	331
11.2	<u>APPROACHES AND METHODS</u>	332
11.2.1	<u>PROPOSERS' APPROACH</u>	332
11.2.2	<u>PARTICIPANTS' VIEWS</u>	333
11.2.3	<u>PANEL VIEWS</u>	334
11.3	<u>IMPACTS ON PROTECTED AREAS AND AREAS OF HIGH CONSERVATION VALUE</u>	335
11.3.1	<u>EXISTING CONDITIONS</u>	335
11.3.2	<u>PROPOSERS' VIEWS</u>	338
11.3.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	338

11.4	<u>IMPACTS ON LAND USE PLANS AND OCEAN MANAGEMENT</u>	341
11.4.1	<u>EXISTING CONDITIONS</u>	341
11.4.2	<u>PROPOSANTS' VIEWS</u>	342
11.4.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	342
11.5	<u>IMPACT ASSESSMENT: INUVIALUIT SETTLEMENT REGION</u>	345
11.5.1	<u>EXISTING CONDITIONS</u>	345
11.5.2	<u>PROPOSANTS' VIEWS</u>	346
11.5.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	348
11.6	<u>IMPACT ASSESSMENT: GWICH'IN SETTLEMENT AREA</u>	349
11.6.1	<u>EXISTING CONDITIONS</u>	349
11.6.2	<u>PROPOSANTS' VIEWS</u>	349
11.6.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	350
11.7	<u>IMPACT ASSESSMENT: SAHTU SETTLEMENT AREA</u>	350
11.7.1	<u>EXISTING CONDITIONS</u>	350
11.7.2	<u>PROPOSANTS' VIEWS</u>	350
11.7.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	351
11.8	<u>IMPACT ASSESSMENT: DEHCHO REGION</u>	352
11.8.1	<u>EXISTING CONDITIONS</u>	352
11.8.2	<u>PROPOSANTS' VIEWS</u>	352
11.8.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	352
11.9	<u>IMPACT ASSESSMENT: NORTHWEST ALBERTA</u>	353
11.9.1	<u>EXISTING CONDITIONS</u>	353
11.9.2	<u>PROPOSANTS' VIEWS</u>	353
11.9.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	353
11.10	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	353
11.10.1	<u>PROTECTED AREAS</u>	356
11.10.2	<u>REGIONAL LAND USE PLANS AND COMMUNITY CONSERVATION PLANS</u>	358

CHAPTER 12 — HARVESTING

12.1	<u>INTRODUCTION</u>	365
12.2	<u>IMPACTS ON HARVESTER ACCESS</u>	366
12.2.1	<u>PROPOSANTS' VIEWS</u>	366
12.2.2	<u>PARTICIPANTS' VIEWS</u>	367
12.2.3	<u>PANEL VIEWS</u>	367
12.3	<u>HARVESTER COMPENSATION (NORTHWEST TERRITORIES)</u>	368
12.3.1	<u>EXISTING CONDITIONS</u>	368
12.3.2	<u>PROPOSANTS' VIEWS</u>	368
12.3.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	371
12.3.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	373

12.4	<u>HARVESTER COMPENSATION (ALBERTA)</u>	374
12.4.1	<u>EXISTING CONDITIONS</u>	374
12.4.2	<u>PROPOSANTS' AND NOVA GAS TRANSMISSION LTD.'S VIEWS</u>	375
12.4.3	<u>PARTICIPANTS' VIEWS</u>	375
12.4.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	375
12.5	<u>WORST-CASE SCENARIOS IN THE INUVIALUIT SETTLEMENT REGION: MITIGATION AND POTENTIAL LIABILITY OF THE PROPOSANTS</u>	376
12.5.1	<u>PROPOSANTS' MITIGATIONS</u>	376
12.5.2	<u>ESTIMATE OF POTENTIAL LIABILITY</u>	377
12.5.3	<u>PANEL VIEWS AND RECOMMENDATION</u>	377

CHAPTER 13 — LAND USE AND HERITAGE RESOURCES

13.1	<u>INTRODUCTION</u>	381
13.2	<u>LAND OWNERSHIP AND ACCESS</u>	381
13.2.1	<u>EXISTING CONDITIONS</u>	381
13.2.2	<u>PROPOSANTS' VIEWS</u>	383
13.2.3	<u>PARTICIPANTS' VIEWS</u>	385
13.2.4	<u>PANEL VIEWS</u>	386
13.3	<u>GRANULAR RESOURCES</u>	386
13.3.1	<u>EXISTING CONDITIONS</u>	386
13.3.2	<u>PROPOSANTS' VIEWS</u>	386
13.3.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	388
13.3.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	389
13.4	<u>TIMBER RESOURCES</u>	391
13.4.1	<u>EXISTING CONDITIONS</u>	391
13.4.2	<u>PROPOSANTS' VIEWS</u>	392
13.4.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	393
13.4.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	394
13.5	<u>TOURISM AND OUTDOOR RECREATION</u>	395
13.5.1	<u>EXISTING CONDITIONS</u>	395
13.5.2	<u>PROPOSANTS' VIEWS</u>	395
13.5.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	396
13.5.4	<u>PANEL VIEWS</u>	397
13.6	<u>HERITAGE AND HISTORICAL RESOURCES</u>	397
13.6.1	<u>EXISTING CONDITIONS</u>	397
13.6.2	<u>PROPOSANTS' VIEWS</u>	398
13.6.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	399
13.6.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	400

CHAPTER 14 — PHYSICAL INFRASTRUCTURE AND HOUSING

14.1 INTRODUCTION..... 405

14.2 TRANSPORTATION..... 406

 14.2.1 RAIL TRANSPORTATION 406

 14.2.2 ROAD TRANSPORTATION 409

 14.2.3 BARGE TRANSPORTATION 415

 14.2.4 AIR TRANSPORTATION 420

14.3 LOCAL INFRASTRUCTURE 423

 14.3.1 EXISTING CONDITIONS..... 423

 14.3.2 PROPOSERS' VIEWS 424

 14.3.3 PARTICIPANTS' VIEWS AND RECOMMENDATIONS..... 425

 14.3.4 PANEL VIEWS AND RECOMMENDATIONS 427

14.4 GAS SUPPLY TO COMMUNITIES AND OTHER SMALL-MARKET CONSUMERS 427

 14.4.1 EXISTING CONDITIONS..... 427

 14.4.2 PROPOSERS' VIEWS 428

 14.4.3 PARTICIPANTS' VIEWS AND RECOMMENDATIONS..... 428

 14.4.4 PANEL VIEWS 429

14.5 HOUSING 429

 14.5.1 EXISTING CONDITIONS..... 430

 14.5.2 PROPOSERS' VIEWS 431

 14.5.3 PARTICIPANTS' VIEWS AND RECOMMENDATIONS..... 433

 14.5.4 PANEL VIEWS 435

CHAPTER 15 — ECONOMIC IMPACTS

15.1 INTRODUCTION..... 439

15.2 METHODS AND APPROACH 439

 15.2.1 SOURCES AND METHODS 439

 15.2.2 PANEL APPROACH 441

15.3 PROJECT EXPENDITURES AND GDP IMPACTS..... 442

 15.3.1 PROPOSERS' VIEWS 442

 15.3.2 PARTICIPANTS' VIEWS 445

 15.3.3 PANEL VIEWS 445

15.4 PROCUREMENT AND BUSINESS OPPORTUNITIES..... 447

 15.4.1 PROPOSERS' VIEWS 447

 15.4.2 PARTICIPANTS' VIEWS AND RECOMMENDATIONS..... 450

 15.4.3 PANEL VIEWS AND RECOMMENDATIONS..... 452

15.5	<u>LABOUR FORCE DEVELOPMENT</u>	453
15.5.1	<u>INTRODUCTION</u>	453
15.5.2	<u>EXISTING CONDITIONS</u>	454
15.5.3	<u>PROPOSERS' VIEWS</u>	458
15.5.4	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	460
15.5.5	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	461
15.6	<u>EMPLOYMENT AND LABOUR INCOME</u>	463
15.6.1	<u>PROPOSERS' VIEWS</u>	463
15.6.2	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	469
15.6.3	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	471
15.7	<u>REVENUES TO GOVERNMENTS</u>	473
15.7.1	<u>PROPOSERS' VIEWS</u>	473
15.7.2	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	475
15.7.3	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	477
15.8	<u>OVERALL PANEL FINDINGS ON ECONOMIC IMPACTS</u>	480
15.8.1	<u>CONSTRUCTION PHASE</u>	480
15.8.2	<u>OPERATIONS PHASE</u>	481
15.8.3	<u>PROJECT LEGACY</u>	482
15.8.4	<u>EXPANSION CAPACITY SCENARIO</u>	484

CHAPTER 16 — SOCIAL AND CULTURAL IMPACTS

16.1	<u>INTRODUCTION</u>	487
16.2	<u>APPROACH AND METHODS</u>	488
16.2.1	<u>PROPOSERS' VIEWS</u>	488
16.2.2	<u>PARTICIPANTS' VIEWS</u>	489
16.2.3	<u>PANEL VIEWS</u>	490
16.3	<u>EXISTING CONDITIONS</u>	491
16.3.1	<u>HEALTH, SOCIAL WELL-BEING AND COMMUNITY CONDITIONS</u>	491
16.3.2	<u>HEALTH CARE, SOCIAL SERVICE AND PROTECTION FACILITIES AND SERVICES</u>	493
16.4	<u>DIRECT PROJECT IMPACTS</u>	495
16.4.1	<u>SOUTHERN WORKERS AND POTENTIAL INTERACTIONS WITH COMMUNITIES IN THE PROJECT REVIEW AREA</u>	495
16.4.2	<u>PROJECT-INDUCED MIGRATION TO REGIONAL CENTRES</u>	498
16.4.3	<u>HEALTH IMPACTS</u>	499
16.5	<u>IMPACTS ON COMMUNITIES AND GOVERNMENT SERVICES</u>	501
16.5.1	<u>ALCOHOL, DRUGS AND GAMBLING</u>	502
16.5.2	<u>WELL-BEING CONDITIONS AND SOCIAL SERVICE DELIVERY</u>	507
16.5.3	<u>POLICING AND SAFETY</u>	513
16.5.4	<u>CHILD CARE</u>	517

16.5.5	<u>HOMELESSNESS</u>	518
16.5.6	<u>WOMEN'S SHELTERS</u>	519
16.5.7	<u>ELDER CARE</u>	521
16.5.8	<u>SUICIDE</u>	522
16.5.9	<u>TRADITIONAL LANGUAGE AND CULTURE</u>	523
16.6	<u>SHARED RESPONSIBILITY MODEL</u>	529
16.6.1	<u>PROPOSERS' VIEWS</u>	529
16.6.2	<u>PARTICIPANTS' VIEWS</u>	530
16.6.3	<u>PANEL VIEWS AND RECOMMENDATION</u>	531
16.7	<u>SOCIO-ECONOMIC MANAGEMENT SYSTEM</u>	532
16.7.1	<u>PROPOSERS' VIEWS</u>	532
16.7.2	<u>PARTICIPANTS' VIEWS</u>	533
16.7.3	<u>PANEL VIEWS</u>	533
16.8	<u>SOCIO-ECONOMIC AGREEMENT</u>	534
16.8.1	<u>PROPOSERS' VIEWS</u>	534
16.8.2	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	534
16.8.3	<u>PANEL VIEWS</u>	535
16.9	<u>MACKENZIE GAS PROJECT IMPACTS FUND</u>	535
16.9.1	<u>PURPOSE, OBJECTIVES AND SCOPE</u>	535
16.9.2	<u>KEY FEATURES AND PRINCIPLES</u>	536
16.9.3	<u>STRUCTURES AND INSTITUTIONAL FRAMEWORK</u>	536
16.9.4	<u>IMPLEMENTATION</u>	537
16.9.5	<u>PARTICIPANTS' VIEWS</u>	537
16.9.6	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	540
16.10	<u>OVERALL VIEWS</u>	541
16.10.1	<u>PROPOSERS' VIEWS</u>	541
16.10.2	<u>PARTICIPANTS' VIEWS</u>	541
16.10.3	<u>PANEL VIEWS</u>	542

CHAPTER 17 — DECOMMISSIONING AND ABANDONMENT

17.1	<u>INTRODUCTION</u>	545
17.2	<u>PROPOSERS' VIEWS</u>	545
17.3	<u>PARTICIPANTS' VIEWS AND RECOMMENDATIONS</u>	546
17.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	546

CHAPTER 18 — MONITORING, FOLLOW-UP AND MANAGEMENT PLANS

18.1	<u>INTRODUCTION</u>	551
18.1.1	<u>PURPOSE AND IMPORTANCE OF MONITORING AND FOLLOW-UP</u>	551
18.1.2	<u>TYPES OF MONITORING</u>	552
18.2	<u>PROJECT MONITORING AND FOLLOW-UP</u>	553
18.2.1	<u>BIOPHYSICAL MONITORING</u>	553
18.2.2	<u>SOCIO-ECONOMIC MONITORING</u>	558
18.2.3	<u>GOVERNMENT AND OTHER INSTITUTIONAL ROLES</u>	562
18.2.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	565
18.3	<u>CUMULATIVE IMPACTS MONITORING AND MANAGEMENT</u>	571
18.3.1	<u>EXISTING CONDITIONS</u>	571
18.3.2	<u>CUMULATIVE IMPACTS MANAGEMENT</u>	572
18.3.3	<u>CUMULATIVE IMPACTS OF FUTURE DEVELOPMENTS</u>	574
18.3.4	<u>PANEL VIEWS AND RECOMMENDATIONS</u>	576
18.3.5	<u>FOLLOW-UP PROGRAM FOR CUMULATIVE IMPACTS MANAGEMENT AND MONITORING</u>	578

CHAPTER 19 — SUSTAINABILITY AND NET CONTRIBUTION

19.1	<u>INTRODUCTION</u>	585
19.2	<u>APPROACH</u>	586
19.3	<u>THE CORE QUESTION</u>	586
19.4	<u>THE SCOPE OF DEVELOPMENTS TO BE ASSESSED</u>	586
19.5	<u>KEY SUSTAINABILITY ISSUES</u>	589
19.6	<u>SUMMARY OF PANEL ANALYSIS OF THE FIVE KEY SUSTAINABILITY ISSUES CATEGORIES</u>	590
19.6.1	<u>CUMULATIVE IMPACTS ON THE BIOPHYSICAL ENVIRONMENT</u>	591
19.6.2	<u>CUMULATIVE IMPACTS ON THE HUMAN ENVIRONMENT</u>	595
19.6.3	<u>EQUITY IMPACTS</u>	599
19.6.4	<u>LEGACY AND BRIDGING IMPACTS</u>	602
19.6.5	<u>CUMULATIVE IMPACTS MANAGEMENT AND PREPAREDNESS</u>	604
19.6.6	<u>INTERACTION OF PROJECT IMPACTS</u>	606
19.7	<u>EVALUATION OF THE PROJECT'S CONTRIBUTION TO SUSTAINABILITY</u>	608
19.7.1	<u>THE PROJECT AS FILED WITH A THROUGHPUT OF 0.83 BCF/D</u>	608
19.7.2	<u>THE PROJECT AS FILED WITH EXPANDED THROUGHPUT IN THE RANGE OF 0.83 TO 1.2 BCF/D</u>	609
19.7.3	<u>THE PROJECT AS FILED EXPANDED IN THE RANGE FROM 1.2 BCF/D TO ITS DESIGN CAPACITY OF 1.8 BCF/D</u>	610
19.7.4	<u>THE PROJECT AS FILED AND OTHER FUTURE SCENARIOS</u>	611
19.7.5	<u>THE NULL ALTERNATIVE</u>	612

19.8 **TRADE-OFFS** 612

19.9 **CONCERNS REGARDING THE IMPLEMENTATION OF THE PANEL'S RECOMMENDATIONS BY GOVERNMENT** 612

19.10 **CONCLUSIONS** 614

APPENDICES

APPENDIX 1: AGREEMENT ESTABLISHING THE JOINT REVIEW PANEL FOR THE MACKENZIE GAS PROJECT 620

APPENDIX 2: BIOGRAPHIES OF JOINT REVIEW PANEL MEMBERS 630

APPENDIX 3: DIRECTION ON PROCEDURES 632

APPENDIX 4: LIST OF PARTIES 640

APPENDIX 5: LIST OF PUBLIC INFORMATION SESSIONS 641

APPENDIX 6: LIST OF HEARINGS, DATES AND LOCATIONS 642

APPENDIX 7: DETERMINATION ON SUFFICIENCY 645

APPENDIX 8: CRITERIA FOR CONFIDENTIALITY ORDERS FOR TRADITIONAL KNOWLEDGE STUDY REPORTS 647

APPENDIX 9: SELECTED RULINGS ON MOTIONS 649

APPENDIX 10: SUMMARY REPORTS OF COMMUNITY HEARINGS 650

AKLAVIK COMMUNITY HEARING, JUNE 19, 2007 650

COLVILLE LAKE COMMUNITY HEARING, APRIL 10, 2006 651

DÉLINE COMMUNITY HEARING, APRIL 3, 2006 651

FORT GOOD HOPE COMMUNITY HEARING NO. 1, APRIL 11, 2006 652

FORT GOOD HOPE COMMUNITY HEARING NO. 2, APRIL 12, 2006 653

FORT LIARD COMMUNITY HEARING, MAY 12, 2006 654

FORT MCPHERSON COMMUNITY HEARING, FEBRUARY 17, 2006 655

FORT PROVIDENCE COMMUNITY HEARING NO. 1, JUNE 14, 2006 655

FORT PROVIDENCE COMMUNITY HEARING NO. 2, JUNE 15, 2006 656

FORT SIMPSON COMMUNITY HEARING NO. 1, MAY 8, 2006 657

FORT SIMPSON COMMUNITY HEARING NO. 2, MAY 9, 2006 657

HAY RIVER COMMUNITY HEARING, JUNE 9, 2006 658

HAY RIVER RESERVE COMMUNITY HEARING, JUNE 8, 2006 658

HIGH LEVEL COMMUNITY HEARING NO. 1, JULY 5, 2006 659

HIGH LEVEL COMMUNITY HEARING NO. 2, JULY 6, 2006 660

INUVIK COMMUNITY HEARING NO. 1, JANUARY 8, 2007 660

<u>INUVIK COMMUNITY HEARING NO. 2, JANUARY 9, 2007</u>	661
<u>JEAN MARIE RIVER COMMUNITY HEARING, MAY 15, 2006</u>	661
<u>KAKISA COMMUNITY HEARING, JUNE 13, 2006</u>	662
<u>NORMAN WELLS COMMUNITY HEARING, APRIL 6, 2006</u>	663
<u>PAULATUK COMMUNITY HEARING, SEPTEMBER 7, 2006</u>	663
<u>SACHS HARBOUR COMMUNITY HEARING, SEPTEMBER 9, 2006</u>	664
<u>TROUT LAKE COMMUNITY HEARING, MAY 16, 2006</u>	665
<u>TSIIGEHTCHIC COMMUNITY HEARING, FEBRUARY 20, 2006</u>	666
<u>TUKTOYAKTUK COMMUNITY HEARING NO. 1, SEPTEMBER 11, 2006</u>	666
<u>TUKTOYAKTUK COMMUNITY HEARING NO. 2, SEPTEMBER 15, 2006</u>	667
<u>TUKTOYAKTUK COMMUNITY HEARING NO. 3, JUNE 20, 2007</u>	668
<u>TULITA COMMUNITY HEARING NO. 1, APRIL 4, 2006</u>	668
<u>TULITA COMMUNITY HEARING NO. 2, APRIL 5, 2006</u>	669
<u>ULUKHAKTOK COMMUNITY HEARING, SEPTEMBER 8, 2006</u>	669
<u>WRIGLEY COMMUNITY HEARING, MAY 11, 2006</u>	670
<u>APPENDIX 11: GLOSSARY</u>	672

that initial predictions of development intensity and impacts were an underestimate of what actually occurred. The Alaskan case demonstrated the failures of regulators to protect valued wildlife resources when a project-specific (case-by-case) regulatory approach with a focus on the immediate project footprint (similar to the approach taken by the MGP Proponents) was taken.

The WWF pointed to adverse impacts on wildlife in Alberta (e.g. woodland caribou, grizzly bear, other species at risk) as an example of the consequence of an improper cumulative impact assessment or planning for sustainability of VCs.

In the WWF's view, a moratorium on development should be recommended while land use plans were developed. This approach would encourage governments to give attention and priority to these matters. Alternatively, WWF proposed that project approval could be given, conditional upon the completion of work to address future cumulative effects, such as scenario development and cumulative effects analysis.

Participant Ms. Tasha Stephenson commented on the failures of the Proponents' cumulative impacts assessment. She expressed the view that the Proponents had avoided discussion of the impacts of Project-induced developments except when they could be presented as a benefit of the Project. As a basin opening activity, the MGP was presented in the context of economic development and revenues generation. However, Ms. Stephenson suggested that in the context of adverse cumulative effects, the Proponents indicated that the prediction of induced development was difficult and unlikely to occur. She expressed concern that, in the absence of planning, the scale and pace of unbridled pipeline development would be devastating to the area. Additionally, she agreed with a number of other parties that scenario assessments must be performed to evaluate the full cumulative impacts of the MGP.

Sierra Legal Defence Fund on behalf of the Sierra Club of Canada and the World Wildlife Fund filed a motion requesting the Panel to:

- commission an independent scenario-based cumulative effects assessment (CEA) in accordance with the Greig and Duinker report; and
- ensure that the scenario-based CEA report was distributed in advance of the Panel's hearing on cumulative effects.

Many participants filed positions in favour of and against the motion. The Panel denied the motion on two grounds. Firstly, the Sierra Legal Defence Fund had misinterpreted the recommendations made in the Greig-Duinker report with respect to timing. Secondly, although the Greig-Duinker Report had been commissioned by the Panel, it had not been fully tested in a hearing before the Panel. A future hearing was already scheduled to focus specifically on the issue of cumulative impact assessment and many of the matters raised in the Sierra Legal Defence Fund motion. The Panel was of the view that it would not be proper for it to make a ruling on a recommendation that had not been fully tested.

18.3.4 PANEL VIEWS AND RECOMMENDATIONS

IMPLEMENTATION OF THE CUMULATIVE IMPACTS MONITORING REGIME

The Panel heard widespread concerns about the regional cumulative impacts that could result from the Project in combination with other developments, particularly developments that might be induced by the Project and the ability to manage those cumulative impacts. In many respects, this was the central issue of the Panel's hearings.

The Panel notes that the purpose of the MVRMA is to provide for an integrated system of land and water management in the Mackenzie Valley. The government is required to undertake a number of activities for the purpose of monitoring the cumulative impacts on the environment of developments in the NWT. Although preliminary work has been undertaken for the NWT CIMP, this program is not yet fully established or funded. While it is a work-in-progress and continues to evolve, the implications associated with continued failure to implement CIMP were succinctly stated in the 2005 audit report:

The absence of systematic approaches to identify, evaluate and respond to regional/territorial cumulative effects was identified as one of the most common reasons that projects are referred to Environmental Assessment. Regulatory decision-makers lack the tools necessary to make informed planning and approval decisions based on the regional/territorial cumulative effects of projects. This gap is tied directly to the absence of land use plans and a fully implemented CIMP. (J-INAC-00065, p. 7)

Many participants called on the Panel to provide substantive direction on matters of design and implementation related to cumulative impacts assessment, management and monitoring in the Beaufort Delta and Mackenzie Valley.

In the Panel's view, the foundation already exists in the MVRMA to manage, on a comprehensive and integrated basis, the land and water of the Mackenzie Valley. Significant effort has been devoted to the planning for the CIMP and the linkages it would have with other programs. Some of those other programs, such as land use plans, are under the provisions of the MVRMA. Other programs, such as protection of areas of high conservation values, are outside the regime created under the MVRMA but are under the purview of other legislation, and equally critical to the overall northern expectations for maintaining ecological integrity throughout the NWT. The need for completion of these latter two initiatives has been noted and is the subject of recommendations from the Panel in Chapter 11, "Conservation Management and Protected Areas."

The Panel heard extensively about the uneven and incomplete implementation of this regime and how the absence of some of the components is compromising the effectiveness of the management system as a whole. The Panel is of the view that

it is imperative that all components of the regime be in place and functional so as to effectively manage the impacts and cumulative impacts arising from a project of the magnitude and geographic scope of the Mackenzie Gas Project. If the Project were to proceed in the absence of the entirety of this system, there is a strong risk that neither the necessary baseline against which to monitor Project impacts and cumulative impacts nor the monitoring programs necessary for adaptive management would be in place for effective management of the Project's cumulative impacts.

For the CIMP to be fully effective, a strong government commitment to the program is required. The Panel observes that the key hurdles to the full implementation of the MVRMA include the following:

- **Establishment of CIMP** — while there has been a great deal of time and resources devoted to the preliminary planning for the CIMP, the focus must now shift to the formal establishment and implementation of the CIMP.
- **Delegation of a responsible authority for CIMP** — the Minister of DIAND has not yet designated a Responsible Authority under the MVRMA, to undertake activities for the purpose of monitoring cumulative impacts on the environment. Without a responsible authority designated to be responsible and accountable for its successful implementation, CIMP will not be able to achieve its monitoring and management goals.
- **Application of CIMP to the ISR** — the Panel notes that the application of CIMP has been extended to the ISR by a Memorandum of Understanding and that the Inuvialuit currently participate as full members in the CIMP working group. However, given that many of the cumulative impacts would occur within the ISR, the Panel questions whether an administrative agreement is a sufficiently robust instrument to ensure the implementation of CIMP within the ISR. Ideally, the application of CIMP would be extended to the ISR by legislation so that it would apply on the same legal footing throughout the Northwest Territories.
- **Fulfillment of legal obligation to enable CIMP** — the lack of secure long-term funding for CIMP is another obstacle that has impeded the establishment and implementation of CIMP.
- **Contents of the CIMP program** — establishment of the CIMP would benefit from clear guidance with respect to the program design. It would also benefit if the design of the CIMP research were informed by the analysis of scenarios of possible future development in the NWT. CIMP's effectiveness would also be enhanced through the establishment of thresholds, as discussed in Chapter 11, to determine if and when management actions were needed.

In the Panel's view, monitoring of regional cumulative impacts requires a dedicated, focused and integrated program of activity over many years. This must be the work of competent

professionals, but in the context of the Project Review Area, local involvement in program design and execution is also essential. It follows that such a program requires a long-term and secure source of funding, consistent direction and management, the retention of key personnel and the use of expert advisory personnel as required. These conditions are unlikely to be met by simply adding responsibilities to personnel or units within government agencies that are primarily responsible for the delivery of ongoing programs or that have ongoing regulatory responsibilities. Initial funding allocations with no secure continuity are also likely to be counterproductive. Public confidence in monitoring results and assessment will likely be enhanced if the responsible agency is at arm's length from day-to-day policy or regulatory activity.

The CIMP should have, in addition to a governing board, a technical committee of experts from such federal agencies as EC and DFO, and from such territorial agencies as Environment and Natural Resources and the NWT Bureau of Statistics that could also obtain external expert advice as required.

The Panel therefore makes the following recommendations:

RECOMMENDATION 18-12

The Panel recommends that, within six months of the date of the Government Response to the Panel's Report, the Minister of Indian Affairs and Northern Development take the steps necessary to complete the establishment of the Cumulative Impact Monitoring Program and appoint a Responsible Authority as required under the Mackenzie Valley Resource Management Act.

RECOMMENDATION 18-13

The Panel recommends that the Minister of Indian Affairs and Northern Development consider appointing, as the Responsible Authority for the Cumulative Impact Monitoring Program under the Mackenzie Valley Resource Management Act, a corporate entity with a board consisting of one representative from each region in the Northwest Territories and representation from the appropriate government departments of Canada and the Northwest Territories. The Panel also recommends that the Responsible Authority for the Cumulative Impact Monitoring Program have a technical committee and a full-time secretariat to support the board.

RECOMMENDATION 18-14

The Panel recommends that, within six months of the date of the Government Response to the Panel's Report, the Minister of Indian Affairs and Northern Development take all reasonable steps to extend the legal application of the Cumulative Impact Monitoring Program into the Inuvialuit Settlement Region, thereby making the program a legal requirement throughout the Northwest Territories.

RECOMMENDATION 18-15

The Panel recommends that, within six months of the date of the Government Response to the Panel's Report, the Government of Canada make available sufficient long-term stable funding to implement

the Cumulative Impact Monitoring Program as specified in Panel Recommendation 18-16 and as required by law.

RECOMMENDATION 18-16

The Panel recommends that when establishing the Cumulative Impact Monitoring Program (CIMP), the Minister of Indian Affairs and Northern Development authorize the CIMP Responsible Authority to do the following:

- establish an integrated set of biophysical and socio-economic indicators for the entire Northwest Territories;
- establish an integrated set of thresholds for evaluating cumulative impacts and levels of acceptable change in the biophysical and the socio-economic environments;
- establish a program for conducting scenario-based cumulative impacts assessments;
- establish a program for monitoring the interaction of cumulative impacts on multiple valued components;
- establish Traditional Knowledge study programs;
- provide guidance to impact assessment monitoring programs of the Mackenzie Gas Project and other activities regarding the form in which data is to be collected and provided to the CIMP;
- establish protocols for data access, control and release;
- establish a program for reporting monitoring results to appropriate agencies at a time and frequency that meets the need of the particular agency including the provision of results of the CIMP to the Mackenzie Valley Environmental Impact Review Board, Land Use Planning Boards, NWT Oil and Gas Socio-Economic Advisory Board, Corporation for the Mitigation of Mackenzie Gas Project Impacts, regulators, government departments and renewable resource management agencies for the purpose of informing the decisions of those agencies; and
- provide guidance to the Land Use Planning bodies on cumulative impact thresholds.

During the hearings one particular area of cumulative impacts monitoring was brought forward by the Fisheries Joint Management Committee. The FJMC recommended an integrated long-term aquatic monitoring program for the Mackenzie River watershed. The Panel agrees and considers that it would be properly housed within the CIMP. Therefore the Panel makes the following recommendation.

RECOMMENDATION 18-17

The Panel recommends that the Cumulative Impact Monitoring Program establish a program for integrated long-term aquatic monitoring of the Mackenzie River watershed that is consistent with and contributes to the Canadian Aquatic Biomonitoring Network.

18.3.5 FOLLOW-UP PROGRAM FOR CUMULATIVE IMPACTS MANAGEMENT AND MONITORING

In considering the requirements of a follow-up program for the MGP, the Panel has taken into account CEAA's Operational Policy Statement, which gives attention to the management of cumulative impacts. Pursuant to the CEA Act and the MVRMA, the purpose of a follow-up program is to establish the necessary measures to verify the accuracy of a project's predicted impacts and to determine the effectiveness of mitigation measures.

Of particular relevance to the MGP are the following provisions of the OPS that state that a follow-up program is also used to:

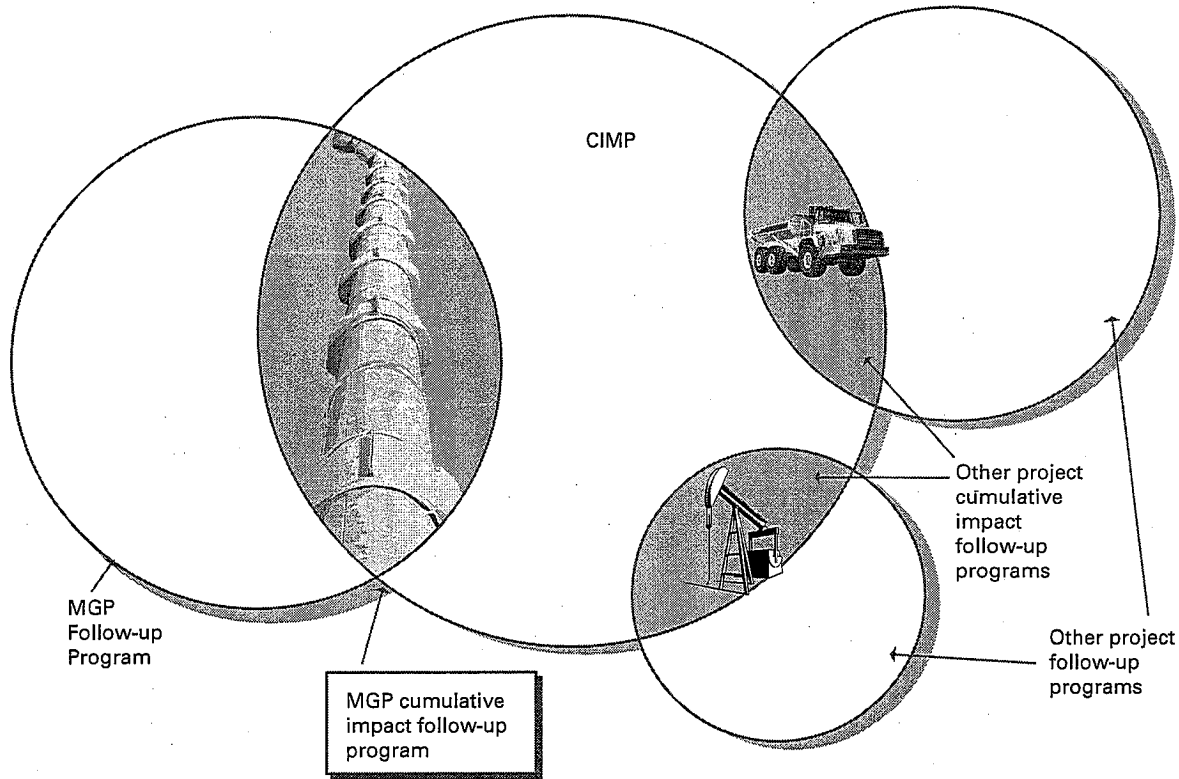
- support adaptive management measures;
- provide information on environmental effects and mitigation that can be used to improve and support environmental assessment of future projects and their cumulative effects; and
- support environmental management systems in the management of environmental effects. (OPS, p. 2)

The demands on cumulative impacts management are particularly challenging for the MGP given its scale, the possibilities for further developments that might follow, the limited capacity of regional management agencies, and the lack of established cumulative impacts thresholds and sources of monitoring information. These elements are all criteria listed in the OPS for consideration of a follow-up program. The Panel has considered the ability of governments and other agencies to anticipate, monitor and manage the cumulative impacts of the Project. This includes the impacts associated with the pace and scale of development and climate change, and applies at a Project-specific and cumulative, regional scale.

In the Panel's view, CIMP provides a logical platform from and within which to implement the recommended follow-up program for the assessment, monitoring and management of the MGP's cumulative impacts. This view assumes the acceptance of the Panel's recommendations for the full implementation of CIMP as presented above.

While individual Proponents have a role to play in contributing Project-specific impacts monitoring results to the Panel's recommended follow-up program, the key responsibility for collecting and analyzing the results from the Project's cumulative impacts would rest with the CIMP Responsible Authority. Actual management actions in relation to cumulative impacts identified through such analysis, would be the responsibility of the appropriate regulators, including the regulators that would oversee implementation by the Proponents of the appropriate adaptive management measures to accommodate and make adjustments in response to these results. Figure 18-4 shows the relationship between the follow-up program for the Project, the CIMP and project-specific follow-up programs for other projects in the NWT.

Figure 18-4 Relation of follow-up program to CIMP



Source: Panel Figure

SCENARIO CUMULATIVE IMPACT ASSESSMENT

Throughout the Panel’s Report, the Expansion Capacity Scenario and Other Future Developments Scenario describe the scope of future developments identified by many participants in the Panel’s hearings as developments that might generate cumulative impacts induced by, or in addition to, the MGP. The Panel heard many concerns with respect to the uncertainty of the pace, scale and distribution of future developments in the NWT and recognizes that future developments on too large a scale or too rapid a pace could have detrimental impacts. Similarly, further development activities beyond the Project as Filed will be needed at appropriate times to maintain sustainable benefits to the people of the NWT.

At the same time, the Panel notes that the Canadian economic and political system is fundamentally one that responds to development initiatives of non-government entities. The current Canadian regulatory framework, generally speaking, is not

intended to dictate or to control the pace and scale of resource developments except where there is a determination that the adverse environmental or socio-economic impacts of such developments are likely to be significant and cannot be justified.

Given this essentially reactive role of regulators, it is critical that they be aware of potential development scenarios and can anticipate them by being prepared and equipped to respond to proposed specific developments when they are proposed. In the Panel’s view, the scenario-based cumulative effects assessment that is recommended by the Panel is an essential anticipatory undertaking to ensure that the regulators are so prepared.

The Panel views a scenario-based cumulative impacts assessment of the MGP as an important tool in the identification of potential cumulative impacts as well as the suite of corresponding management measures that can be deployed to enhance positive effects or avoid or minimize negative

cumulative impacts that might arise from the Project and other future developments. The Panel understands scenario-based cumulative impacts assessment to be an important planning exercise that could inform the design and focus of the MGP's cumulative impact monitoring program. In addition, in later years it could provide important information to the transition planning and bridging initiatives contributing to sustainability as discussed in Chapter 15, "Economic Impacts." As scenario-based assessments are not a prediction of an exact future development scenario, but an anticipatory planning tool for identifying plausible scenarios, review and revision of these scenarios periodically would assist in confirming the priorities and guiding the scope of the MGP's cumulative impact monitoring program.

RECOMMENDATION 18-18

The Panel recommends that the cumulative impact components of the follow-up program for the Mackenzie Gas Project be conducted within the operational framework of and under the guidance of the Responsible Authority for the Cumulative Impact Monitoring Program.

RECOMMENDATION 18-19

The Panel recommends that the follow-up program for the Mackenzie Gas Project include a scenario-based cumulative impacts assessment for the Mackenzie Gas Project in combination with other developments that:

- *identifies plausible scenarios of development that could be induced by the Mackenzie Gas Project, including consideration of those formally presented to the Panel by hearing participants, and that give explicit attention to impacts from climate change;*
- *focuses on the sustainability of valued components in the human and biophysical environments and identifies anticipated cumulative impacts (positive and negative);*
- *identifies priority valued components to be monitored in the follow-up program;*
- *includes the full spatial extent of the Mackenzie Valley from the Proponents' Anchor Fields and adjacent areas in the Mackenzie Delta to the Alberta border and reflects the geological potential of areas for future development;*
- *includes as its temporal scale the anticipated life of the Mackenzie Gas Project and beyond decommissioning;*
- *is informed by relevant audit reports;*
- *is conducted by an independent facilitator and designed with the appropriate expertise; and*
- *includes the participation of the appropriate stakeholders.*

The Panel further recommends that the first scenario-based cumulative impacts assessment for the Mackenzie Gas Project be initiated within six months of the designation of the Responsible Authority for the Cumulative Impact Monitoring Program and that it be reviewed and revised every three years thereafter for the life of the Mackenzie Gas Project.

CUMULATIVE IMPACTS MONITORING AND MANAGEMENT

In the Panel's view an effective follow-up program for the monitoring and management of cumulative impacts depends on a number of key elements that, taken together, constitute a coordinated approach for anticipating, monitoring and managing the cumulative impacts of the MGP. Those elements include:

- the results of a scenario-based cumulative impacts assessment of the MGP to guide the design of an MGP cumulative impact monitoring program;
- the use of the Proponents' Project-specific impacts monitoring data, and related monitoring data from other projects, which may be induced by the MGP, and its integration with other cumulative impact monitoring data gathered by governments and other entities; and
- the application of the results of the scenario-based cumulative impacts assessment and the MGP cumulative impact monitoring program to inform the regulators, the environmental assessment and permitting of future developments, and future transition planning.

RECOMMENDATION 18-20

The Panel recommends that the Department of Indian Affairs and Northern Development require the follow-up program for the Mackenzie Gas Project to establish and conduct a Mackenzie Gas Project cumulative impact monitoring program that:

- *reflects the priority valued components and indicators identified by the scenario-based cumulative impacts assessment;*
- *requires governments, Aboriginal authorities and the Proponents to develop and design integrated research protocols for the Mackenzie Gas Project that meet the monitoring needs for Project impact monitoring and cumulative impact monitoring;*
- *identifies the indicators for which data will be required for the Mackenzie Gas Project cumulative impacts follow-up program;*
- *includes as appropriate:*
 - *select regional or community Traditional Knowledge studies;*
 - *Project-specific impact monitoring information provided by the Mackenzie Gas Project and regulators;*
 - *interaction of cumulative impacts on multiple valued components; and*
 - *is designed in conformity with the provisions of Panel Recommendation 18-3.*

The results of the Mackenzie Gas Project scenario-based cumulative impacts assessment and monitoring programs should be transmitted to downstream regulators, government agencies, Land Use Planning bodies, the NWT Oil and Gas Socio-Economic Advisory Board, and the Corporation for the Mitigation of Mackenzie Gas Project Impacts for the analysis of cumulative impacts and, for the purpose of transition planning, the Government of the Northwest Territories.

RECOMMENDATION 18-21

The Panel recommends that regulators, as a condition of any approvals or permits they might issue for activities and projects, require all proponents of future developments that would enable the throughput of the Mackenzie Valley Pipeline to be increased above 0.83 Bcf/d to provide relevant impact monitoring data to the cumulative impacts monitoring program.

EFFECTIVENESS OF CUMULATIVE IMPACTS ASSESSMENT, MONITORING AND MANAGEMENT

The Panel heard a high level of concern throughout its hearings about the management of cumulative impacts resulting from the MGP, particularly those that may result from future induced developments and the unfulfilled requirements of the MVRMA for a cumulative impact monitoring program in the Mackenzie

Valley. The Panel is of the view that it is crucial that there be independent oversight and evaluation of effectiveness of the MGP's cumulative impact monitoring program. In the Panel's view, the Audit established under the MVRMA is well-suited to this purpose.

RECOMMENDATION 18-22

The Panel recommends that the Minister of Indian Affairs and Northern Development, as part of the follow-up program, require a Project-specific audit pursuant to section 148 of the Mackenzie Valley Resource Management Act each year during construction and at least once every five years for the life of the Mackenzie Gas Project to assess the effectiveness of the impacts monitoring regime for the Project. There may be more than one audit in any given year and an audit may focus on one or more component of the Mackenzie Gas Project.