APPENDIX A BASELINE DISTURBANCE MAPS

A.1 Information Sources

The land use features identified in the disturbance mapping were acquired from the following sources:

- National Topographic Database (NTDB) – 1:250,000-scale vector data, e.g., airstrips, towers, tanks, urban areas, roads, pipelines, seismic lines
- Department of Indian Affairs and Northern Development (DIAND) – land use permit and surface disposition point data, e.g., military sites, gravel extraction
- National Energy Board (NEB) – vector data, e.g., seismic lines, well sites
- Ikhil Resources Ltd. and Enbridge Pipelines (NW) Inc. – system pipeline alignments and as-built pipeline alignment sheets
- Alaska Gas Producers Pipeline Team and Tarin Resource Services Ltd. – digital ortho-rectified aerial photography
- Space Imaging Inc. – Indian Remote Sensing (IRS) satellite imagery
- Radarsat International – Landsat ETM+ satellite imagery
- airborne kinematic GPS field surveys (Canadian National Telegraph cut line, proposed alignment for extension to the Mackenzie Highway and Wrigley to Fort Good Hope winter road)
- Public Works Canada – report mapping from the 1970s, e.g., towers, airstrips, military sites, and areas of disturbance or special interest

Data Quality

Generally, for northern Canada, base map data is old, of coarse scale or varying positional accuracy, or unavailable. Traditionally, EIAs use high-quality, current, large-scale base mapping data with known and consistent positional accuracy. This is often provincially developed data, with scales ranging from 1:5,000 to 1:50,000. Though 1:50,000 National Topographic Service (NTS) hard copy mapping is available throughout Canada, the 1:50,000-scale digital format is not available through much of the North. The quality and consistency of the 1:250,000 mapping acquired for the project is variable, as dates range from 1960 in unsettled or remote areas to 1995 in Norman Wells. Feature accuracy ranges from +/- 100 m to +/- 500 m. Even considering these limitations, the 1:250,000-scale NTDB mapping is the best available base map data throughout the project study area.

Data quality issues apply also to the DIAND land use data and NEB datasets. In the DIAND data, insufficient location information was supplied to accurately

locate the features. For the NEB seismic and well data, the location information is accurate, but the programs and wells are more than five years old.

Data Correction

Because of these limitations, satellite imagery and digital ortho-rectified imagery were used to refine and correct the datasets. Aerial photography acquired for the project ranged in scale from 1:30,000 to 1:60,000 and was obtained between 1999 and 2003. This photography was used to correct features within a 1-km study corridor centred on the pipeline. Additionally, 5-m resolution IRS satellite imagery, collected between 1999 and 2002, was used to correct the location of features outside the area covered by the digital photography. Landsat ETM+ 1.5-m resolution panchromatic satellite imagery was used to capture gravel extraction sites in areas not covered by IRS imagery and aerial photography.

The correction process involved overlaying vector data on the imagery or digital photography and editing or correcting the location of the feature in question. For the Enbridge and Ikhil pipeline alignments, as-built pipeline alignment sheets were also used. To ensure the seismic line dataset was complete, the NTDB seismic lines were combined with the NEB data and overlaid on the digital photography. During this process, it became apparent that many of the programs in the Tundra and Transition Forest ecological zones left less of an impact than those in the North and South Taiga Plains ecological zones as they were run in the winter and did not require brushing or clearing of vegetation.

For terrestrial modelling, the seismic lines provided by the NTDB and NEB in the Tundra and Transition Forest ecological zones were not used to measure vegetation loss. In this analysis, lines visible on the aerial photography were digitized instead. Since the imagery was more current than the dated information from the NEB and NTDB, this process provided a more accurate version of the effects on vegetation cover. Finally, the Canadian National Telegraph cut line and proposed extension to the Mackenzie Highway between Fort Good Hope and the Dempster Highway (marked by a cut line on the ground) were captured using airborne GPS methods, which is both accurate and current, but time consuming and therefore suitable only for specific features of high importance.

A.2 Project Inclusion List

The project inclusion list (PIL) lists those land uses or development projects that were identified for the cumulative effects assessment for the project (see Table A-1).

Table A-1: Project Inclusion List

Temporal Boundary	Land Use	Location
Existing	**Communities**	
	Townsites, hamlets	Various, including Inuvik, Tuktoyaktuk, Tsiigehtchic, Fort Good Hope, Norman Wells, Fort Simpson
	Inuvialuit, Gwich'in and Sahtu private lands	ISR, GSA, SSA
	Facilities	
	Medical facilities	Various, including Inuvik, Norman Wells, Wrigley and Fort Simpson
	Police facilities	Various, including Fort McPherson, Norman Wells, Trout Lake
	Military sites (hanger and associated facilities, Dew line sites)	Inuvik, Tuktoyaktuk
	Transportation	
	All-weather roads	Dempster Highway from Fort McPherson to Inuvik, Mackenzie Highway from Kakisa to Wrigley
	Limited use (seasonal) roads	Various, including winter roads from Inuvik to Tuktoyaktuk, Wrigley to Fort Good Hope, Tulita to Déline, Fort Good Hope to Colville Lake
	Bridges	Along Mackenzie Valley winter road at Ochre River, White Sand Creek, Vermillion (South) Creek, Steep Creek, Saline River, Prohibition Creek, Overflow Creek
	Airstrips, runways, seaplane bases, barge landings, docks, wharves	Various near communities
	Barge traffic	Various to communities along Mackenzie River and Mackenzie Delta
	Scheduled air traffic	Out of various communities, including Aklavik, Colville Lake, Déline, Fort Good Hope, Fort Liard, Fort McPherson, Fort Providence, Fort Resolution, Fort Simpson, Fort Smith, Hay River, Holman, Inuvik, Jean Marie River, Lutselk'e, Nahanni Butte, Norman Wells, Paulatuk, Rae Lakes, Sachs Harbour, Trout Lake, Tuktoyaktuk, Tulita, Wekweti, Wha Ti, Wrigley, Yellowknife
	Fuel caches	Various, including Mackenzie Mountains and along Mackenzie River
	Oil and Gas Industry	
	Abandoned or suspended well sites	Various in NWT (Beaufort-Mackenzie, Central Mackenzie, Liard and Cameron Hills regions)
	Exploration Licences (ELs) and Significant Discovery Licences (SDLs)	Various in NWT (Beaufort-Mackenzie, Central Mackenzie, Liard and Cameron Hills regions)
	Imperial Oil oil production	Norman Wells
	Inuvialuit Petroleum Corporation Ikhil gas field	North of Inuvik
	Artificial islands	Beaufort Sea, Mackenzie River near Norman Wells

Table A-1: Project Inclusion List (cont'd)

Temporal Boundary	Land Use	Location
Existing (cont'd)	**Oil and Gas Industry (cont'd)**	
	Exploration wells: Chevron Canada, Petro-Canada/Devon Canada, Devon/Shell, EnCana, Devlan Exploration	Mackenzie Delta
	Exploration wells: Apache/Paramount Resources, Canadian Natural Resources Limited	Colville Lake
	Exploration wells: Anadarko/Paramount, Chevron Canada, Canadian Natural Resources Limited, Canadian Forest Oil	Fort Liard/Nahanni Butte
	Exploration wells: Paramount Resources	Cameron Hills
	Exploration wells: EnCana, Northrock Resources	Tulita
	Seismic and cut lines: unknown, Devon, Western Geco/Geco Snapper, EnCana, Petro-Canada, Paramount Resources, Apache/Paramount, Chevron/BP/Burlington	Various in NWT (Beaufort-Mackenzie, Central Mackenzie, Liard and Cameron Hills regions)
	Enbridge oil pipeline, including valve sites, pump stations, maintenance sheds	Norman Wells to Alberta
	Inuvialuit Petroleum Corporation Ikhil gas pipeline	Ikhil gas field to Inuvik
	Other industry	
	Sawmills, active and abandoned	Various, including near Fort Good Hope, Fort Liard, Nahanni Butte, Jean Marie River and Fort Smith
	Mining dispositions	Various, including near Norman Wells, near Mackenzie River in SSA and northern DCR near Wrigley
	Aggregate quarries, active and abandoned	Various, including Caribou Hills west and on Tuktoyaktuk Peninsula, near Inuvik town site and near Fort Liard
	Grazing	Near boundary of Wood Buffalo National Park
	Kuññek Resource Development Corporation Kennek Western Arctic Reindeer Herd	Mackenzie Delta
	Canadian National Telegraph, abandoned cut line	Fort Good Hope to Fort Simpson along Mackenzie River
	Power and communications facilities	Various in NWT

Table A-1: Project Inclusion List (cont'd)

Temporal Boundary	Land Use	Location
Existing (cont'd)	**Recreation and Tourism**	
	General	Various activities along Mackenzie River, including Manual Lake, Kelly Lake and in Fort Simpson area
	Sightseeing (boat tours, Aircraft overflights)	Various in Mackenzie Delta and Mackenzie River
	Territorial Points of Interest (day use parks, campgrounds, community park)	Various, including Mackenzie Delta and around Great Slave Lake
	Outfitting camps and lodges	Various, including in Mackenzie Mountains throughout the GSA, SSA and DCR
	Fishing lodges	Various, including in Mackenzie Delta, near Keele River, near Mackenzie Highway and Trout River
	Hunting, fishing and trapping cabins	Various, including Mackenzie Delta and along Mackenzie River
	Commercial campsites	Various, including Campbell Lake, Kidluit Bay, Edhezie and along Mackenzie Highway from Kakisa to Alberta boundary
	Protected and Conservation Areas	
	Inuvialuit Community Conservation Plan (CCP) Management Categories A to E, Gwich'in Protected Lands and Sahtu Protected Areas	ISR, GSA and SSA
	NWT Candidate Protected Areas with Interim Protection: Edacho (Scented Grass Hills), Sayyoue (Grizzly Bear Mountain), Edehzie, Pehdzeh Ki Deh	Déline District on west side of Great Bear Lake, Déline District on south side of Great Bear Lake, Deh Cho on the Horn Plateau
	Kendall Island Bird Sanctuary	Kendall Island and Anderson River Delta
	National Historic Sites: Nagwcihoonjik, Our Lady of Good Hope Church	Along the Mackenzie River in the GSA, Fort Good Hope
	National Park Reserves: Tuktuk Nogait, Nahanni	Inuvialuit Settlement Region, South Nahanni River adjacent to Nahanni Butte
	Pingo Canadian Landmark	Near Tuktoyaktuk
	Territorial Points of Interest	Various points of interest including community and wayside parks, including Paniksak Wayside Park, McKinnon Park
	Campbell Lake Territorial Park	Campbell Lake
	International Biological Program (IBP) sites	Various, including Anderson River Delta, Kugaluk River and Estuary, Caribou Hills, Middle Mackenzie Delta, Dolomite and Campbell Lake, Willow Lake, and Ebutt Hills
	Mackenzie Bison Wildlife Sanctuary	Northwest of Great Slave Lake

Table A-1: Project Inclusion List (cont'd)

Temporal Boundary	Land Use	Location
Reasonably Foreseeable	Devon Canada Corporation Beaufort Sea Exploration Drilling Program	North of Richards Island
	Deh Cho Corporation Mackenzie River bridge	Highway 3 near Fort Providence
	GNWT winter bridges	Mackenzie winter road between Wrigley and Fort Good Hope
Hypothetical	Hydrocarbon (oil and gas) exploration	Beaufort-Mackenzie, Central Mackenzie, Liard and Cameron Hills regions
	Gas production to Mackenzie Gas Project	Beaufort-Mackenzie, Central Mackenzie, Liard and Cameron Hills regions
	Mineral exploration and production	NWT
	Telecommunications line along the Mackenzie River	Mackenzie River Valley
	All-weather resource access road southward from Tuktoyaktuk	Mackenzie Delta
	Upgrading of winter road between Wrigley and Fort Good Hope and completion of Mackenzie Highway access between Fort Good Hope and Tsiigehtchic	Mackenzie River Valley

NOTES:
ISR = Inuvialuit Settlement Region,
GSA = Gwich'in Settlement Area,
SSA= Sahtu Settlement Area,
DCR = Deh Cho Region
NWT = Northwest Territories

A.3 Disturbance Maps

This Appendix provides maps that show existing land uses in the terrestrial Regional Study Area (RSA). The map series begins with Figure 12A-1 in the production area, concluding with Figure 12A-12 at the NOVA Gas Transmission Ltd. (NGTL) interconnect facility.