

9.0 LOGISTICS AND TRANSPORTATION

9.1 INTRODUCTION

The Point Thomson facility will be a remote operating facility that will be approximately 50 miles from any existing North Slope road infrastructure. The Badami development approximately 22 mi to the west was also developed as a remote facility with no permanent road access due to environmental impact concerns related to a permanent gravel road and the high costs of a road, in particular, the need to construct bridges over the major rivers such as the east channel of the Sagavanirktok. Consequently, permanent road access was likewise deleted from consideration for Point Thomson during the Conceptual Engineering phase. As a result of the Badami and Alpine developments, there is considerable experience in operating and supporting such a remote facility, although specific details relating to transportation and logistics vary among these facilities.

Another important consideration in the logistics and transportation strategy is the plan to construct large process-facility modules, which can only be transported safely and efficiently to Point Thomson by sealift. Sea barges are typically used to transport large modules¹ and other supplies and equipment to the Alaska North Slope. Air transport is not a realistic option due to the size and weight of these items. Rail and road are not practical due to the remoteness of the site, length of rail/roadway required, and the associated habitat impacts.

Mobilization and supply of the drilling rigs are also important considerations. Again, as with the modules, barge shipment of the rigs and major resupply by sea offer the most cost-effective transportation method and allow the rigs to be available for an early start. Provision of a dock is thus a vital component of the development plan for Point Thomson.

Year-round access is, however, still essential for the project both for routine operations and in the event of an emergency. Air transportation will be used year-round for personnel, materials, and emergency support when there is no ice road and no barge traffic. The proposed airstrip is therefore sized to handle relatively large aircraft (e.g., Hercules C-130) and is located inland to maximize weather operability.

It is anticipated that for the first two years a winter ice road will be required for the construction of the gravel pads and airstrip, pipeline construction, delivery of early infrastructure facilities, and the transport of personnel, fuel, equipment, and materials. Ice roads may also be required in subsequent years to support ongoing drilling and plant operations. During the first two summers, barges will be used extensively, as noted above, for transporting drill rigs, major modules, other equipment, and supplies to the project site.

¹ Large process modules have been selected as the most efficient and economic design to minimize onsite assembly, and to facilitate expeditious commissioning and startup.

Tables 9-1 through 9-4 summarize the current estimated round-trips for marine, aviation, ice road, and infield gravel road traffic. The logistics and transportation plan will be refined as engineering and execution planning progress. This planning process will weigh the relative merits and costs of ice road transportation for major consumables, marine transport, and storage onsite. This will provide additional information on project traffic and specific routings.

9.2 SEALIFT

Large process-facility modules can be transported safely and efficiently only by sealift. Sealift is also the most cost-effective mode of transport for the drilling rigs and will allow them to be available to start drilling as early as possible. The shallow approaches to the Point Thomson area preclude beach landings, which are in any case difficult and costly. Provision of a dock is therefore a vital component of the development plan for Point Thomson.

Because of weather, marine access will be available via the Beaufort Sea only from mid-July through September to a dock to be constructed as part of the project (Figures 9-1 and 9-2). The dock will be connected to the central facilities area by a compacted gravel access road. Sealifts to support construction and drilling are currently planned to take place in the mid-July to September weather windows of 2005 and 2006 (Table 9-1). Additional sealifts could be planned for subsequent years when required to support drilling and operations. The special characteristics of the region demand contractors with suitable registered vessels, experience in similar operations in Alaska, and quality control and environmental procedures of the highest standards.

It is anticipated that the first-year inbound loads will include the drilling rigs, bulk materials and some small modules. Outbound loads will include bulk waste and redundant equipment.

It is anticipated that second-year loads will include the facility modules. The return legs of these deliveries will provide the opportunity to redeploy construction equipment and to remove bulk waste.

9.3 LOCAL MARINE TRAFFIC

In the summers, local barge and small boat traffic will be used as required between the roadheads at Endicott, Prudhoe Bay, and Point Thomson to deliver articles that are too heavy or too large to be shipped by air. This will also provide a timely means for resupply of heavy and large bulk materials, and to remove waste and redundant equipment (Table 9-1).

9.4 AIR TRAFFIC

Air transportation will be used on a year-round basis for personnel, materials, and emergency support during the period when there is no ice road and no sea access. The proposed airstrip therefore will be sized to handle relatively large aircraft (e.g., Hercules C-130) and will be located inland to take advantage of better weather conditions.

Until the airstrip is constructed and commissioned, air traffic will be restricted to helicopters. During this early period, helicopters will also provide the only means for rapid medical evacuation and emergencies. After the airstrip is commissioned, fixed-wing aircraft will be the normal route for deployment and rotation of personnel, including emergency medical evacuation.

After construction, aircraft will be the only means of transport in and out of the Point Thomson Unit except during the summer weather window when sea access is available. Preliminary estimates anticipate that several helicopter trips per week in addition to daily flights by other aircraft will be required to support operations activities. During the construction phase of the project numerous flights per day, either by helicopter and/or fixed-wing aircraft, will be required to support activities. The numbers of flights will depend on the activities and the extent of infrastructure in place (Table 9-2). Helicopters may also be required for emergency evacuation during pipeline construction.

9.5 ROAD TRAFFIC

The Badami development approximately 22 mi to the west was also developed as a remote facility with no permanent road access due to environmental impact concerns related to a permanent gravel road and to the high costs of a road, in particular, the need to construct bridges over the major rivers such as the east channel of the Sagavanirktok. Consequently, permanent road access was likewise deleted from consideration for Point Thomson during the Conceptual Engineering phase. However, roads will be needed to provide the essential link between the various elements of the facility (i.e., the CPF, the East and West Well Pads, the airstrip, and the gravel mine).

Truck traffic provides the most effective and efficient method of delivering the equipment and material necessary to construct the required infrastructure and to prepare the wellhead and processing sites. The roadhead at Endicott provides an all-year connection to the existing road system for normal truck and bus traffic. Starting in late November 2004, the project will construct a sea-ice road from Endicott to Point Thomson for deploying construction equipment, personnel, camps, and material. These will be mobilized in increments from Endicott as the infrastructure is developed (Table 9-3). A sea-ice road will be rebuilt the following year to provide similar road access to complete the initial project development (preliminary drilling) and to provide a route out for redundant equipment (Table 9-3).

9.6 INFIELD VEHICLE TRAFFIC

Vehicle traffic will take place on the infield roads as construction of the roads is completed. During summer facilities construction and installation activities, numerous daily vehicle trips can be expected on the infield gravel roads between the pads (Table 9-4).

**TABLE 9-1
MARINE VESSEL TRAFFIC SUMMARY**

MARINE TRAFFIC	NUMBER OF ROUND TRIPS											
	2005			2006			2007			2008		
	July	Aug	Sep	July	Aug	Sep	July	Aug	Sep	July	Aug	Sep
Barge (Fuel) ¹		1			1			1			1	
Barge (North Slope Coastal) ²	9	36	36	8	27	27	7	28	28	4	16	5
Barge (via Mackenzie River) ³												
Large Barge (Sealift)					9							
Other Vessels ⁴	11	2	2	3	10	2	1	4	2	1	4	2
Total	20	39	38	11	47	29	8	33	30	5	21	7

NOTES:

1. Does not include lighter barge trips.
2. Chemicals represent 4% of the overall trips.
3. There is a possibility that some trips may come from the Mackenzie River.
4. Mobilization of ACS fleet, bathymetric survey, sealift assist tugs and screed barges.
5. After 2008, assume 6 Coastal Barge round trips per year (in August) for the life of the facility.
6. After 2008, assume 6 Other Vessel round trips per year (in August) for the life of the facility.
7. After 2008, assume 1 Fuel Barge round trip per year (in August) for the life of the facility.
8. All barges will be single tow (i.e., no tandem tows).
9. Return trips from Point Thomson may have some tandem tows.

**TABLE 9-2
AVIATION TRAFFIC SUMMARY**

TRAFFIC	NUMBER OF ROUND TRIPS															
	2005				2006				2007				2008			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
POINT THOMSON																
Helicopter (Bell 412)	10	39	10			198	232									
Small Passenger Aircraft (Beech 1900)			166	207	192	12	3	253	177	155	142	153	153	120	97	74
Medium Cargo Aircraft (DC-6)				6				12	12	12	12	12	12	12	12	12
Large Cargo Aircraft (C-130)				1				1	1	1	1	1	1	1		
TOTAL FOR POINT THOMSON	10	39	176	214	192	210	235	266	190	168	155	166	166	133	109	86
BADAMI																
Small Passenger Aircraft (Beech 1900)	100	69	20	5	66	31	5									
Large Cargo Aircraft (C-130)				1												
TOTAL FOR BADAMI	100	69	20	6	66	31	5									

NOTES:

1. After 2008, assume 3 Small Passenger Aircraft (B-1900) flights per week for the life of the facility.
2. After 2008, assume 16 Medium Cargo Aircraft (DC-6) flights per year for the life of the facility.
3. After 2008, assume 4 Large Cargo Aircraft (C-130) flights per year for the life of the facility.
4. It is likely that Helicopter trips may be required periodically through the life of the project but cannot be predicted at this time.
5. Small Passenger Aircraft for personnel billeted at Badami is required to support ice road, gravel, and pipeline construction.

**TABLE 9-3
ICE ROAD TRAFFIC SUMMARY**

ICE ROADS TRAFFIC	NUMBER OF ROUND TRIPS							
	2005				2006			
	Jan	Feb	March	April	Jan	Feb	March	April
General Cargo (Trailers)	63	350	429	188	25	63	63	31
Storage Tanks			13					
Truckable Modules			75	45		50	50	15
Fuel (Tankers)	119	106	254	84	94	118	281	89
Chemical (Tankers)								
Pipeline Construction					113	216	313	125
Drilling					25	156	163	38
Equipment Mobilization	114	146	13					
TOTAL	295	602	783	317	256	603	869	298

NOTES:

1. No ice roads are currently planned for after 2007 (although ice roads may be used for drill rig demobilization as an option in 2008).
2. Truckable module trips include support vehicles.
3. Fuel transported in January 2005 fills Badami tank.

**TABLE 9-4
INFIELD GRAVEL ROAD TRAFFIC SUMMARY**

GRAVEL ROADS	NUMBER OF ROUND TRIPS													
	2005		2006				2007				2008			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
East Road - Drill Site Facility Construction		1500	2250	2250	2250	1500								
East Road - Drilling/ Operations	563	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1200	225
West Road - Drill Site Facility Construction		1500	2250	2250	2250	1500								
West Road - Drilling/ Operations	563	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1200	225
Airstrip Road - After Construction	300	900	900	900	900	900	900	900	900	900	900	900	450	450
Total	1425	7275	8775	8775	8775	7275	4275	4275	4275	4275	4275	4275	2850	900

NOTES:

1. From 2009 until 2037, assume 30 roundtrips per month to each well pad.
2. From 2009 until 2037, assume 30 trips per month to the airport/mine site.
3. Roundtrips do not include traffic related to gravel construction of the infield road system and pads.