ExxonMobil

Point Thomson
Gas Cycling Project

Airstrip Needs Report
Revision 0

February 24, 2003

1 INTRODUCTION

Point Thomson is remote and has no established infrastructure. In the short summer open water season it can be reached by marine transport via the Beaufort Sea and in winter it can be reached by ice road. However, construction of ice roads is expensive and can only be justified during the first 2 construction years of the Project. During the operation of the Point Thomson facility there will be a gap of about 10 months when the only mode of transport available is air. All-year access is essential for the movement of personnel, priority and perishable freight and in order to respond to any emergency or unexpected contingency. Therefore air access is essential.

Helicopters would provide an air link. However, the heavy operating costs and their restricted payloads render them unsuitable as anything but a temporary expedient until a runway can be built for fixed-wing craft. Continued use of helicopters is neither practicable nor economical. An airstrip is therefore essential.

It is not anticipated that an ice runway will offer any benefit to the project since year round access is essential. Ice roads also do not provide year-round access and are cost prohibitive for long-term operations.

Environmental and economic concerns both motivate a need to restrict the runway size to the smallest allowed that safely meets the transport requirements.

This paper is specific to the ExxonMobil Point Thomson project.

2 PROJECT NEEDS

2.1 General

All year access is required for transporting the following:

- Personnel both for routine deployment and rotation and in emergency,
- Priority and perishable freight,
- Emergency equipment (in addition to that held on site),
- Spares and replacement parts outside open water season

2.2 Cargo

For reasons of both cost and practicability, it is not anticipated that much freight will travel by air. However, since this is the only means of all-year transport, perishable items and high priority cargo will of necessity be delivered by aircraft, particularly during spring and autumn when no other means is available. Additionally, during drilling, contingency movements may be necessary, for example in the unlikely event of a well blowout. In this event a large cargo aircraft would be required. During the operations phase, it will not be possible to anticipate the need for all spare parts, nor would it be economic to hold them all at Point Thomson, both in terms of the value of the items and the space that would be required to store them. Some operational and/or drilling items, if not obtained immediately, would result in a loss of facility production; these include blow-out control equipment, well capping equipment, mud motors, MWD/LWD tools, rig motors and tires. Specific items which contribute to the determination of the minimum required aircraft capacity include:

- The Gas Turbine Generator Rotor – 9'H x 7'W x 12'L and 10 tons
- Drilling Counter Weight for the Athey Wagon – 16 tons plus spreader bar
- Drilling Heavy Boom Section – 34.25'L
- Gas Compressor Bundle - 8' x 9' x 25' and 11 tons

2.3 Personnel

Initially personnel will be moved by helicopter or along the sea ice road. After the 2005 sea ice road becomes unserviceable, personnel will be moved by helicopter until the airstrip is established and can receive passenger aircraft. The estimated personnel occupation of Point Thomson is shown in Table 1 - Estimated Daily Personnel at Point Thomson

Year	Calendar Years	Estimated Average Daily Personnel	Estimated Peak Daily Personnel
1	Nov. 2004 to Oct. 2005	200	285
2	Nov. 2005 to Oct. 2006	370	560
3	Nov. 2006 to Oct. 2007	300	350
4	Nov. 2007 to Oct. 2008	200	270
5	Oct. 2008 and beyond	100	100

Table 1 - Estimated Daily Personnel at Point Thomson

Different groups of personnel will be on different rotation schedules. On average, crews will be rotated every 2 - 4 weeks.

3 ALTERNATIVES

3.1 Cargo

We considered cargo aircraft already operating on the North Slope and those that could readily be made available. The Globemaster C-17 is not available commercially. The aircraft evaluated included the Hercules C-130, Douglas DC-6 and Antonov AN 124. Table 2, Capability of Aircraft to Meet Maximum Cargo Weight and Dimension Requirements, shows the capacities of these aircraft.

Aircraft	Maximum Load Size	Maximum Cargo Weight *	Result
Hercules C-130	9'H x 10'W x 53.5'L	22.5 tons	Acceptable – Meets maximum weight and size criteria
Douglas DC-6	6.3'H x 10.3'W x 66'L**	13.5 tons	Unacceptable for maximum loads but available and useful for routine cargo
Antonov AN 124	14.43'H x 21'W x 120' L	120 tons	Acceptable

* Weight Restriction from Deadhorse
** Loading Door Limits Size

Table 2 - Capability of Aircraft to Meet Maximum Cargo Weight and Dimension Requirements

While the Antonov AN124 would be acceptable in that it meets project needs, the requirement for 9,200 feet of runway renders it impracticable. The C-130 meets needs but will only be used on occasions when its capacity is required. Routine regular movement of air cargo will be by DC6 or similar aircraft.

3.2 Personnel

The most efficient method of moving personnel is by air. Personnel could be moved in the open water season by crew boat, but this would take too long. During the periods in 2005 and 2006 when the ice roads are available personnel can be moved by bus. In addition to planned movements, there will be a recurring need to move people in emergencies; these numbers are expected to be small and can be included in the planned movements. The expected number of passengers to be moved varies widely during the construction and drilling phases before settling down to a lower routine number during the ongoing operation of the facility.

The project considered small, medium and large passenger aircraft, particularly the types which would be readily available, and these are shown in Table 3 - Available Passenger Aircraft.

Size	Capacity	Available Type
Small	Up to 19 seats	Beechcraft 1900D, Twin Otter, CASA212.
Medium	Up to 40 seats	DHC Dash 8
Large	Up to 110 seats	Boeing 737

Table 3 - Available Passenger Aircraft

There are two basic options when considering personnel movement by fixed-wing aircraft:

3.2.1 Option #1: Commuter Shuttle to Point Thomson from Deadhorse.

Passengers would fly from Anchorage International Airport to the Deadhorse Airport. The passengers would be shuttled by Bell-412 helicopter until the runway becomes available, and then the helicopter would be discontinued. At that time a 19-passenger Beech 1900-D (or similar aircraft) would accomplish the shuttles.

Comments relevant to this option are as follows:

1. The Transportation Security Administration (TSA) security requirements would not be an issue due to the passenger screening being conducted at the Deadhorse Airport.
2. This option also provides the advantage of flexible scheduling since there are many commercial and chartered flights to Deadhorse.
3. This option also offers the most flexibility to passengers for the scheduling of work and transportation.

3.2.2 Option #2: Boeing 737 into Point Thomson.

This option considers a 737 directly into Point Thomson after completion of the runway.. The passengers would initially be flown into Deadhorse and then shuttled by a Bell-412 helicopter until the runway becomes available at Point Thomson and the helicopter would be discontinued. At that time passengers would be taken directly into Point Thompson via a 737 which could fly from Anchorage, Deadhorse, Barrow and Kurparuk into Point Thomson.

A small commuter airplane to Deadhorse would still be needed to support ad-hoc needs and interfaces with Deadhorse during Construction and Drilling. Once Construction and Drilling is complete at Point Thomson, the long-term operations would be supported by 737 flights to Deadhorse, then small commuter flights to Point Thomson. Direct flights to Point Thomson with a 737 would not be justified for the anticipated staffing for long term Operations (<100 people at site).

Comments relevant to this option are as follows:

1. The runway would have to be built to accommodate the longer runway requirements of the Boeing-737.
2. There would need to be additional fire fighting/crash rescue requirements for the larger 737 passenger aircraft (139 certification).
3. We would need to meet TSA security requirements since the passengers would be flown out of Point Thompson and directly into Anchorage International.
4. An advantage to this option is removing the layover at Deadhorse (direct flight).

3.2.3 Emergency Evacuation

In the event of a serious incident, which required emergency evacuation of Point Thomson, whatever available and usable resources at that time will be deployed. It is considered that in either option above, the quicker and more flexible response would be to mobilize all available small passenger aircraft from Deadhorse to evacuate Pt Thomson to the closest safe location. A 737 would be able to move more personnel at once, but the most likely case would be that the 737 could not be mobilized to Point Thomson before multiple small aircraft had already responded.

3.3 Airstrip Size

The cost of the airstrip is directly related to its size and therefore needs to be as small as possible while meeting regulatory and safety requirements.

3.3.1 Runway Lengths.

Minimum runway length required for safe operation of an aircraft is mandated in the Flight Manual for each particular aircraft type and model. This length varies with payload and runway surface composition and condition. The Flight Manual is published by the manufacturer under the authority of and with the sanction of the FAA. Runway length requirements for the subject aircraft types are summarized in Table 5 - Runway and Safety Area Dimensions.

3.3.2 Runway Widths and Safety Areas

The FAA classifies aircraft into Design Groups; runway width standards for each Design Group are contained in FAA Advisory Circular (AC) 150/5300-13 - Airport Design. This AC also contains standards for additional safety areas around the runway as shown in Figure 1 below. These safety areas are required to be at the same elevation as the runway and load bearing. In most locations, a cleared grass-covered area would suffice as the safety area, but the required technique for building up the gravel pad prevents the tundra from being used as the safety area, and the safety area has to be graveled at the same elevation as the runway to prevent structural damage to an aircraft entering it.

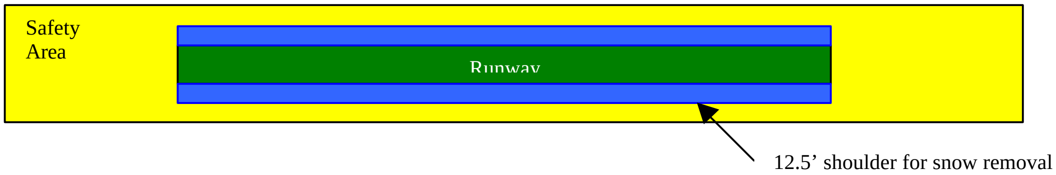


Figure 1 – Airstrip (runway, safety area and snow removal)

Since the tundra cannot be used as the Safety Area, in effect there will be no difference between the runway and safety areas as shown in Figure 1; additionally, a 12.5' shoulder along each side of the runway is recommended by the AC for snow clearance. For purposes of this paper, the combined areas of runway, snow clearance shoulders and safety area are referred to as the "airstrip."

Runway and safety area recommendations for the subject aircraft types are summarized in Table 4 - Runway and Safety Area Dimensions.

The standards in the AC are recommended, not mandatory for non-certificated airports. However, operation of passenger aircraft with more than 30 seats requires certification under Federal Aviation Regulations Part 139, Certification and Operations: Land Airports Serving Certain Air Carriers, Subpart D. These standards may be used by the FAA to satisfy specific requirements of those regulations.

3.3.3 Point Thomson Airstrip Design Basis

For the Point Thomson Project only, ExxonMobil plans to apply the FAA AC safety area recommendations in the following manner:

- Fully comply with Flight Manual requirements for runway length, AC recommendations for runway width and AC recommendations for runway safety areas, for all passenger aircraft.
- Fully comply with Flight Manual requirements for runway length and AC recommendations for runway width, for all cargo aircraft.

Table 4 - Runway and Safety Area Dimensions, provides:

Aircraft	**Runway size**	**Runway Plus FAA Safety Area**
Beech 1900D (19 seats)	4000’ x 75’	4600’ x 150’
DeHavilland-8 (37 seats)	4000’ x 100’	5200’ x 300’
DC-6	5000’ x 100’	6200’ x 300’
C-130	5000’ x 150’	7000’ x 500’
Boeing 737 (110 seats)	6500’ x 100’	8500’ x 500’

Table 4 - Runway and Safety Area Dimensions

"Runway Size" - is the mandated length required by the Flight Manual for a fully loaded aircraft and the AC recommendations of minimum runway width. These are the minimum dimensions ExxonMobil would design an airstrip for cargo aircraft for the Point Thomson Project.

"Runway Plus FAA Safety Area" - is the Runway Size plus the additional recommended safety areas included in the FAA AC (see Figure 1). These are the minimum dimensions ExxonMobil would design an airstrip for passenger aircraft on the Point Thomson Project.

4 FEASIBILITY

The operational costs of Option #1 and Option #2 are very similar, but the capital cost and tundra footprint vary greatly between the two Options.

4.1 Airstrip Size

The Original Concept Design Basis of 4700'x100' does not support a C-130, nor does it have full safety areas recommended by FAA AC for a Beech 1900D passenger aircraft. This is not feasible.

Section 3.3.3 establishes the basic design basis that ExxonMobil will use in establishing the airstrip size. Using the design basis in Section 3.3.3 and Table 5 dimensions, we are able to determine the size of the airstrip required for each Option .

Option 1. Commuter Shuttle to Point Thomson
- Runway size established by the largest aircraft landing (C-130). Runway size = 5000'x150'
- Must have at least the minimum FAA recommended safety area for the largest passenger craft (Beech1900D), which is 4600'x150'.

- The 5000'x150' dimension satisfies both conditions above. Add 25' additional width for snow removal (150' + 25' = 175')
- The final airstrip size is 5000'x175'.

Option 2. Boeing 737 into Point Thomson.

- Runway size established by the largest aircraft landing (737). Runway size = 6500'x100'
- Must have at least the minimum FAA recommended safety area for the largest passenger craft (737), which is 8500'x500'.
- The 8500'x500' dimension satisfies both conditions above and no additional width for snow removal is need since the safety area serves as snow removal shoulders.
- The final airstrip size is 8500'x500'.

Costs and pros and cons of the two airstrip sizes are shown in Table 5 - Airstrip Dimensions, Gravel Cost and Pro/Cons.

Airstrip Dimensions	**Gravel Cost**	**Pros/Cons**
Option #1		
5000’ x 175’ (150' wide runway with 12.5' gravel on each side for snow removal)	$3.7 million	• 1.6 times the tundra footprint and gravel quantity than the conceptual estimate • Supports runway length requirement for C-130, but not 737 • Includes minimum AC recommended runway width for aircraft up to a C-130 • Includes AC recommended safety areas for small passenger aircraft (Beech 1900D) • Does not includes AC recommended safety areas for the C-130 cargo aircraft
Option #2		
8500’ x 500’	$15 million	• 9 times the tundra footprint and gravel quantity than the conceptual estimate • Supports runway length requirements for C-130 and 737 • Includes minimum AC recommended runway width for aircraft up to a C-130 and 737 • Includes AC recommended safety areas for large passenger aircraft (737-200) • Include AC recommended safety areas for the C-130 cargo aircraft

Note: This table excludes other gravel requirements such as ramp areas.

Table 5 - Airstrip Dimensions, Gravel Cost and Pro/Cons

4.2 Support Facilities

The airstrip needs the following facilities to support its operations:

Option 1 and Option 2 both have similar needs:
- A gravel ramp for aircraft to be maneuvered off the airstrip for cargo and passenger unloading.
- A navigation system that requires remotely located equipment in the tundra. This will be installed on either a small gravel pad or using vertical support members.
- Two small buildings for weather, control, power distribution and other utility functions.

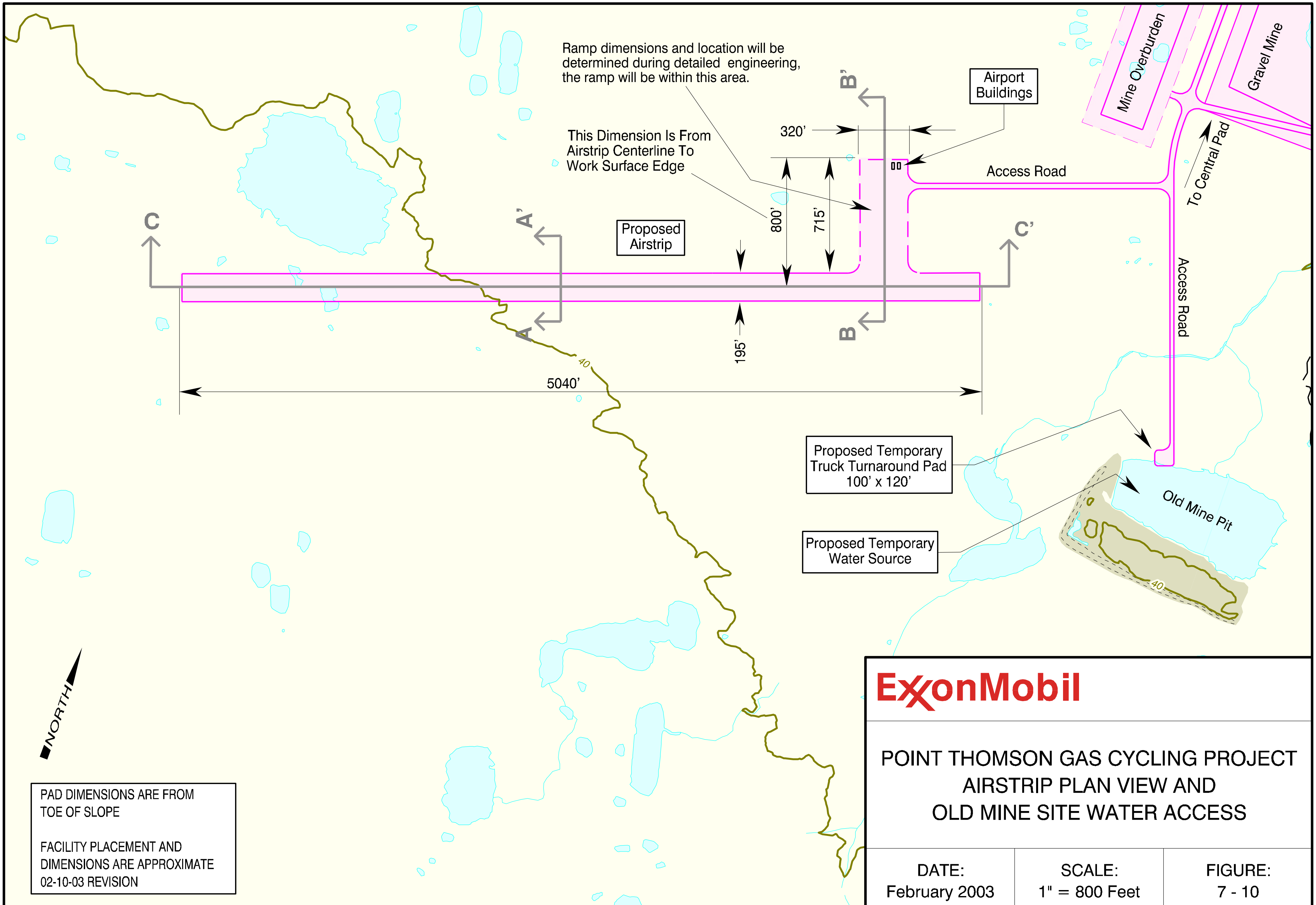
Option 2 requires additional support facilities beyond what Option 1 requires. These facilities add $1.8 million capital cost to Option 2 and are:
- Transportation Security Administration airport security equipment
- FAA Part 139 fire fighting equipment for a 737

5 CONCLUSION CONCERNING AIRSTRIP SIZE

Option#1, using Beech 1900D aircraft for passengers and with the capability for C-130 for cargo is the better option. Option 1 meets the project requirements to move personnel and cargo, is more cost effective, has the smaller tundra footprint, and follows the AC safety area recommendations for passenger aircraft in the B1900D, but does not follow the AC safety area recommendations for large cargo aircraft.

It is possible for the FAA to require the airstrip to include the FAA safety areas for cargo aircraft, which would require the airstrip to be 7000'x500' (see table 5). However, the FAA has not required previous North Slope private operators to comply fully with the FAA ACs.

The location of the airstrip and ramp is shown in Attachment 1- Plot Plan of Airstrip (Figure 7-10 from the Draft Project Description Revision B).



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POINT THOMSON GAS CYCLING PROJECT
AIRSTRIP PLAN VIEW AND
OLD MINE SITE WATER ACCESS

DATE:	SCALE:	FIGURE:
February 2003	1" = 800 Feet	7 - 10

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