

10.0 CONSTRUCTION PLAN

10.1 FIRST-YEAR CONSTRUCTION SCOPE

The objective of the first construction year is to have all required drilling support infrastructure in place by October 2005, the proposed start of development drilling. The scope of work for 2005 includes gravel mine-site development; construction of all pads, infield roads, the dock, and the airstrip; and installation and commissioning of equipment required to support drilling operations as detailed in Section 4.0.

Most civil construction is planned to take place during the winter using both sea and inland ice roads to minimize impact to the tundra. Construction will be done using proven conventional arctic onshore equipment and techniques. The majority of civil construction is expected to be complete by April 2005, with the exception of final gravel compaction, shaping, and grading activities during June to July 2005. By late summer 2005, the dock is expected to be fully operational, and the airstrip is expected to be ready for use by the autumn of 2005.

10.1.1 Ice Roads

Depending on weather conditions, construction of a grounded-sea-ice road connecting Endicott to Point Thomson could begin as early as November 2004 and is expected to be completed by late December 2004 to early January 2005. The ice road will be designed, constructed, and maintained to support the first-year construction effort, including transport of heavy equipment, materials, construction camps, and personnel to the site.

An inland ice road will be built from the dock location to the mine site to facilitate mine development activities. Construction of the inland ice road will start once construction equipment can be mobilized to the site in early 2005. Fresh water from nearby permitted lakes will be the primary source for inland ice-road construction. Ice chips may also be used to reduce the amount of free water that is withdrawn from the lakes. Ice road maintenance will continue throughout the winter season.

10.1.2 Mine Site Development

The proposed Point Thomson gravel mine will serve as a major source of gravel for construction of the project facilities and for use as a maintenance stockpile. Other sources will include gravel obtained from nearby abandoned and/or rehabilitated sites. A *Draft Gravel Mining and Rehabilitation Plan* (Appendix B) has been prepared to satisfy the regulatory requirements of State of Alaska and federal resource agencies. The information will be updated with additional details of the rehabilitation approach, proposed performance standards, and needed monitoring as project design, execution planning, and agency consultation progress.

The proposed Point Thomson gravel mine site is located approximately 2 mi south of the Point Thomson Unit #3 exploratory well pad (see Figure 5-2). Preliminary results from a geotechnical investigation conducted in March 2000 indicate the presence of gravel to a depth of 30 ft to 60 ft. The gravel is overlain by an overburden layer of peat and silt that ranges from 3.5 ft and 12 ft thick. A vegetation analysis conducted for the *Point Thomson Gas Cycling Project Environmental Report*¹ indicates that tundra vegetation types potentially impacted by gravel mine development (including overburden storage area and gravel stockpile) will mainly consist of Moist or Dry Tundra and Wet Tundra, and to a lesser degree Moist/Wet Tundra.

10.1.3 Gravel Haul and Placement

Gravel haul and placement activities include gravel mine development to support construction of the roads, pads, airstrip, dock, and gravel stockpile for future road maintenance. Construction activity for field development will begin as soon as possible in the winter of 2004-2005. A sea-ice road will be constructed to mobilize equipment and materials to the Point Thomson area.

During the winter months, the gravel mine site will be developed, and gravel from the mine will be used to construct the field gravel structures (pads, dock, airstrip, infield road system). These gravel structures will have an initial nominal thickness above the tundra of 7-ft side slopes of the roads, pads, and airstrip will be constructed initially to approximately 1.7:1 horizontal to vertical (1.7H:1V). Following thawing, settling, and final grading and grooming during the ensuing spring, summer, and fall, the nominal finished thickness of roads, pads, and the airstrip will be 5 ft, and finished side slopes will be nominally 2H:1V.

Snow and ice will be removed from the tundra surface and stored near the construction sites. Gravel will then be laid, graded, and compacted. Typical construction equipment to be used will include bulldozers, front-end loaders, rollers, trucks, and other heavy equipment. After the spring of 2005, some thawing and subsequent settlement of the gravel structures are expected to occur. These gravel structures will be regraded and recompacted as necessary while they are thawing in the summer of 2005.

Most of the heavy construction equipment will be demobilized from the site via ice road before the ice road is no longer serviceable in late April or early May 2005. Most of the remaining heavy equipment will be demobilized via barge during July and August 2005.

10.1.4 Dock

During the first winter season of construction, the dock will be constructed by flooding as necessary to ground the sea ice, then removing ice in the construction area and disposing of the ice blocks at a suitable location. Gravel will be dumped onto the exposed seabed to form the bulk of the dock structure during the winter. Final dock construction, including installation of the dock hardware (i.e., sheet piles, dock head, etc.), gravel compaction, and shaping for all areas, will continue until the dock is operational in July 2005.

¹ URS Corporation (2001). *Point Thomson Gas Cycling Project Environment Report*. Prepared for ExxonMobil Production Company on behalf of the Point Thomson Unit owners by URS Corporation (Anchorage, Alaska). July 30, 2001.

10.1.5 Channel Dredging and Spoils Disposal

The channel will be dredged from the sea ice during the winter prior to the sealift of process modules. Sea ice over the channel location will be removed in blocks and stockpiled on grounded sea-ice near the shoreline. Excavation will be performed using either a backhoe or a cutter/suction dredge. Spoil excavated by backhoe will be placed in trucks and hauled to permitted disposal areas. Spoil excavated by a dredge will be discharged into bermed areas atop the ice and allowed to freeze, after which it will be excavated and trucked as solid material to permitted disposal areas. Current areas proposed for spoil disposal include the Point Thomson spit, the grounded sea-ice offshore of the Point Thomson spit, the grounded sea-ice adjacent to the dock road, and the lagoon coast adjacent to the east side of the CWP.

Additional dredging operations may be required once the channel is established. However, it is believed that screeding (i.e., flattening of the sea floor without actual disposal of material) before module arrival and occasionally afterwards is more likely to be needed than additional dredging.

10.1.6 Infrastructure Installation

The following infrastructure will be installed during the first year when gravel has been placed and suitably compacted:

- Permanent camp and control room,
- Temporary camp,
- Diesel storage tanks,
- Warehouse,
- Utility module,
- Power plant (diesel generators and main turbine generators), and
- Telecommunication tower.

Spoils associated with module facility piling will be deposited in the overburden pile located near the mine site. Spoils generated from piling installation within one of the abandoned reserve pits on the Point Thomson Unit #3 pad will be segregated and treated and disposed of as a Class II waste.

10.1.7 Pioneer Construction Camp

The pioneer construction camp will be established early in the first winter construction season and located initially on the far east side of the Point Thomson Unit #3 gravel pad. This location allows for gravel-fill and grading activities to progress on the CWP and CPF. Initially, the pioneer construction camp will be provided as a stand-alone unit with its own water and waste treatment utilities. Once the final compaction of the CWP and CPF pads is completed, the pioneer construction camp will be moved to the extreme south end of the CPF. The pioneer construction camp will start using the permanent camp water and waste treatment systems once they are operational and tie-ins can be completed.

10.2 SECOND-YEAR CONSTRUCTION SCOPE

The objective of the second construction year is to install and commission all pipelines, the CPF modules, flare area, well pad facilities, and remaining telecommunications and controls equipment to support first production in the fourth quarter of 2006 or early 2007. Most pipeline construction will be conducted during the winter using both sea and inland ice roads to minimize impact to the tundra. All pipelines will be installed above ground using VSMs.

The construction workforce is expected to peak during the first quarter of 2006 with simultaneous ice road construction and maintenance, drilling operations, pipeline construction, and civil construction works for the CPF modules. Should actual workforce requirements exceed the combined capacity of the construction and permanent camp facilities, camps at existing oil field facilities and in the Deadhorse area may be used for overflow.

Work in the second year will include sealift and installation of the process modules and facilities at the East and West Well Pads, and commissioning and start-up of the Point Thomson Gas Cycling Project.

10.2.1 Ice Roads

Construction of the sea-ice road for the second year of construction will be similar to that of the first year. Work will begin in November 2005, weather permitting, with completion in early January 2006. Construction of the inland ice roads for both the infield gathering lines and export condensate pipeline is expected to begin mid-January 2006 based on the anticipated opening date for tundra travel, and should be complete by mid-February 2006.

10.2.2 Pipelines

Pipeline construction is planned to begin mid-January 2006. The scope of work includes the installation of gathering lines from both the East and West Well Pads, high-pressure gas injection lines from the CPF to the CWP Pad, and the condensate export pipeline from the CPF Pad to the Badami tie-in. This work will be performed mostly during the winter using proven conventional arctic onshore equipment and techniques.

The pipelines will be pre-insulated offsite and trucked to the site on ice roads. All other pipeline materials (VSMs, pipe racks, pipe spools, pig launch and receiver skids, etc.) will be prefabricated and trucked to Point Thomson on ice roads beginning January 2006.

VSM and Pipeline Installation

The pipe laying process will commence in January with surveyors staking the VSM installation positions. VSM holes will be drilled and the tailings cleared. Then VSMs will be strung along the pipeline alignment together with the beams. The VSM assemblies will be set in the holes, which are typically filled with sand/water slurry. Spoils associated with VSM installation will be deposited in the overburden pile located near the mine site.

Pipeline road crossings will be installed through casing/culvert that is buried in the roadbed gravel at or above tundra grade. Figure 6-1 illustrates a typical road crossing.

Upon completion of VSM installation on a segment of the pipeline, joints of pipe will be transported to the site, strung along the pipeline alignment, and welded together to form a continuous string. Each weld produced in the field will be examined by non-destructive testing (NDT). The pipeline strings will then be lifted onto the VSMs, with tie-in welds performed and tested by NDT. Applying insulation to the tie-in welds will conclude the pipe laying activities.

Storage and laydown areas may be required in support of pipeline construction. These areas would be ice pads, snow pads, space on existing gravel pads, or space on new gravel pads to be constructed in the Point Thomson Unit.

Valves and Valve Pads

Additional areas may be required for possible valve installation along the pipeline, if valves are found to be required during the detailed design phase. Locations and sizes will be determined as engineering design matures. Any gravel pads needed to support valves will be approximately 5 ft thick and sides will be sloped nominally at 2:1.

Badami Tie-In

The connection to the Badami pipeline will include valve facilities similar to those typically used in North Slope production and may include a heater.

Pig Launching Facilities

Pig launching and receiving facilities will be provided for the export pipeline. There will be a pig launcher at the Point Thomson CPF and a pig receiver at the Badami CPU or on an adjacent pad. Section 6.0 further describes pipeline monitoring and the use of pigs.

Hydrotesting

The export pipeline will be hydrostatically pressure-tested in accordance with accepted industry codes and regulations. The procedures for hydrostatic testing and caliper pigging of the pipeline have not been established to date. If not completed during the winter construction period, these activities may be performed during the summer and fall before the start of production. Three scenarios are being considered:

- Drawing fresh water from local water sources, and filtering and discharging the water to tundra after hydrotest (as authorized under the applicable NPDES permit).
- Using sea water, and filtering and discharging the water back to the ocean after hydrotest (as authorized under the applicable NPDES permit).
- Using a glycol/water mixture, and disposing of the mixture after use in the Point Thomson disposal well or sending it to Prudhoe or other suitable facility for recycling.

10.2.3 Truckable Skids

The smaller facilities and infrastructure to be installed before the sealift of major facilities in 2006 will be prefabricated and assembled into truckable skids. These skids may either be trucked to Point Thomson via ice road in the winter or barged to the site in summer. Examples of equipment and facilities delivered in this fashion include:

- Pipe rack modules,
- Well metering/manifold skids,
- Pig launcher/receiver skids,
- Well lines,
- Methanol tanks and injection skids,
- G&I module,
- Control systems, and
- All yard piping and electrical.

Concurrent construction and drilling activities will take place during installation of the well pad modules. The plan is to have as much equipment installed as feasible prior to the arrival of the CPF modules to maintain an efficient schedule and use of onsite construction workforce.

10.2.4 Commissioning

Process modules will be sealifted and are expected to arrive at the Point Thomson dock by mid-August 2006, assuming timely open-water access to the Beaufort Sea. Three months have been allocated as the minimum time needed to install and commission the first production train to support first production startup as early as the fourth quarter, 2006. The facility will be in full production when the drilling program is completed.