13.0 WASTE MANAGEMENT

The primary consideration in waste management strategy is compliance with all applicable federal, state, and local government requirements.

For the Point Thomson Gas Cycling Project, several environmental considerations must be factored into the design of the facilities. The waste management strategy must address:

- Disposal of domestic and production waste streams at a small, remote facility;
- Seasonal availability of disposal options;
- Alternatives for waste disposal should a primary system not be available;
- Disposal of wastes uniquely associated with oil and gas production and related processes;
- Changes in types and quantities of wastes during construction and operations; and
- Handling, holding, or storage of waste to facilitate proper disposal.

Waste minimization, product substitution, beneficial reuse, and recycling will be integral parts of the overall waste management strategy for the project.

The following sections describe the general waste management approach that will be followed during construction, drilling, and operation of the Point Thomson Gas Cycling Project. First, the major regulatory considerations are reviewed and then the approach to meet those regulatory requirements is presented. Section 13.2 provides a listing of the kinds of wastes anticipated for the project, with a brief description of the handling approach for the wastes.

13.1 MANAGEMENT APPROACH

13.1.1 General

The strategy for project waste management consists of waste minimization to the greatest extent possible coupled with onsite disposal wherever practical. The design considerations associated with implementing this strategy include site access, onsite storage capability, and regulatory compliance.

Site access mechanisms vary based on the time of year, and may be severely limited with regard to hauling waste offsite during certain portions of the year. During the open-water season, there will be access to and from the facility by seagoing vessels. During the construction phase of the project, it is envisioned there will be access via an ice road in winter.

Hauling of waste offsite is possible, but not necessarily the most effective option. After initial construction, ice roads will not be available for waste hauling during the winter; access to the site will be limited to air transportation during the spring and autumn (breakup and freezeup). During

these times, waste that cannot be disposed of onsite will be stored for transportation to other disposal facilities during the summer sea-access windows.

Onsite disposal options discussed in this waste management plan will be used to the fullest extent practical. A permanent incinerator will be located onsite to dispose of non-hazardous burnables (wood, food, etc.). Additional temporary incinerators may be used to deal with the high volumes of burnables during construction and drilling activities. There will also be a permanent sewage treatment facility to treat camp wastewater. This will be used before the disposal well is operational and at times when the disposal well is not available. Initially, the pioneer construction camp will use dedicated water and waste treatment utilities; however, after the camp is moved to the south end of the CPF, it is anticipated that the camp will use the permanent camp water and waste treatment utilities.

Another important factor in design considerations associated with Point Thomson waste management is regulatory compliance. It is the project's philosophy to employ waste minimization techniques to the greatest extent possible in our operations and to prevent discharge of drilling wastes or produced fluids. Two permitting activities are being conducted to achieve this waste management strategy for this project.

The first activity includes permitting two Class I non-hazardous waste disposal well locations on the CWP. A location for a future third disposal well has been identified on the CWP but will not be permitted at this time. Only one Class I disposal well will be drilled and a second permitted in case it is needed in the future. The present plan is to permit and perform annular injection for the disposal of the drilling muds and cuttings at the East, West and Central Well Pads. The Class I disposal wells will be permitted so that all of the drilling waste as well as facility-generated wastewater onsite can be injected down the Class I disposal well. It is not planned at this time to take the drilling muds and cuttings down the Class I well on a routine basis for all wells drilled. The application for the UIC Class I Industrial well permit requests approval to dispose of the maximum anticipated volume of waste generated, including muds and cuttings from all wells drilled. G&I facilities are being incorporated into the execution plan to facilitate handling of drilling muds and cuttings. The G&I system is intended to be mobile with the drilling rig in order to facilitate annular injection of the drilling muds and cuttings. As a contingency, application will be made for two Class II disposal wells (same well slots as the Class I well locations) to ensure that if there are delays in processing the Class I well applications, a Class II well would be available for drilling and Class II wastes.

The second waste disposal permitting activity is that of obtaining the NPDES permit. The NPDES permit application will be submitted to the EPA for review and approval. The permit application will address all anticipated effluent streams. The permit will also include occasional discharges associated with testing the fire control system, as well as sanitary and domestic wastes associated with the camp during the occasional times when a Class I disposal well is not available for injection and prior to the well becoming operational (Figure 13-1). Storm-water runoff will be permitted under the NPDES program as surface drainage, and applicable Best Management Practices (BMPs) will be developed to mitigate storm-water contamination during construction and operations (Figure 13-2). Except for permitted NPDES discharges associated with the Point Thomson facility, no process streams will be designed to discharge into the environment. The majority of facility operations will be located in modules or containment areas where there is little risk of a release.

Disposal options for waste generated during construction, drilling, and operations are based on the strategy and design considerations outlined above and discussed below.

13.1.2 Construction

Winter construction operations will use ice roads and the existing Prudhoe Bay gravel road infrastructure to provide access between the construction sites and existing North Slope waste management facilities. Wastes generated during the initial construction stages of the project, when disposal options are limited at Point Thomson, will be back-hauled to waste facilities for disposal in the Prudhoe Bay area. Wastes generated during early pad and infrastructure construction activities in the summer will be consolidated and stored onsite, and transported by barge to Prudhoe Bay/Deadhorse. Additional options for waste disposal will become available as the drilling and operations phases of the project progress.

13.1.3 Drilling

Due to limitations on available space, onsite disposal options for the disposal of drilling wastes will be used to the fullest possible extent. Onsite disposal options include Class I disposal well, mobile G&I unit assigned to a drill rig, annular injection, and an incinerator. It is anticipated that the Class I disposal well will be the first well to be drilled. The Class I well be authorized to receive all non-hazardous Class I fluids and all Class II fluids.

The Point Thomson G&I facility will be designed to inject ground drill cuttings, waste mud and water from drilling activities. The G&I system will be mobile and assigned to drill rigs located on the CWP, East Well Pad, or the West Well Pad. After the cuttings are processed and slurrified by the G&I system, the slurry will be disposed by annular injection. At completion of the drilling program it will be determined whether the G&I system will be left at the Central Well Pad for injection of materials that would require the system.

Surface gravel from the upper holes is intended to be washed and used for road and pad maintenance, rather than being processed by a G&I unit. At the drill site, the larger rock (1/8-in. and bigger is allowed by permits for other recent projects) will be screened out, washed, and spread on the back slopes of existing pads and roads.

The G&I units will be designed to the capacity to grind the remaining cuttings to a 20-mesh size. Each mill train is capable of grinding approximately 6 cy of rock per hour, which is more than 100% of the volume of material expected. It is estimated that approximately 1.1 cy of rock per hour will be produced from each drilling rig operation at Point Thomson.

Grinding and injecting is generally performed in batches with a fixed volume ground up and converted to slurry for injection. The slurry injection pumps with capacities of approximately 168 gallons per minute and maximum discharge pressures of approximately 5,000 psi are typically used (actual injection pressures of 3,000 psi are normal).

A plant incinerator installed early in the construction process will be used to dispose of wood pallets, mud bags, and other burnable materials. It is likely that the peak use that defines rating and sizing requirements will occur during the construction and drilling phases. Air emissions from the incinerator will meet permit requirements for Prevention of Significant Deterioration (PSD).

13.1.4 Operations

The disposal well, a cuttings G&I unit, and an incinerator will be available as disposal options during operations. Evaluation continues to determine if a G&I unit will be needed to support operations activities. Vessels will be used during the open-water period to transport waste material that cannot be disposed of by these means and must therefore be transported from the facility for disposal. This material will be stored until transport options are available or will be carried to Prudhoe Bay/Deadhorse using alternate means of transportation, such as aircraft.

It is anticipated that by the time the operations phase has commenced, the Class I disposal well permit will be in-hand. If the permit has not yet been obtained, Class I fluids will either be reused in the drilling process, back-hauled to existing North Slope facilities, or temporarily stored onsite until the permit is obtained.

The Class I well will require stringent operational and record-keeping requirements as mandated by the EPA. A waste analysis plan, which will include information on waste tracking and waste identification, will be submitted for approval to the EPA before Class I disposal operations begin.

13.2 STORAGE AND DISPOSAL OPTIONS

The following discussion of waste disposal options for specific wastes addresses the three phases of the Point Thomson Gas Cycling Project (construction, drilling, operations) unless otherwise identified by waste type.

13.2.1 Non-Hazardous Solid Waste

Non-hazardous solid waste consisting of trash, food wastes, wood debris, metal debris and construction debris will be segregated onsite at main collection points into:

- Burnables (trash, food wastes, wood debris, etc.);
- Landfill (non-burnables); and
- Recyclable metal.

The waste will then be stored in designated dumpsters. Burnables will either be incinerated at Point Thomson in a permitted incinerator or be transported to processing facilities in Deadhorse. Landfill material and recyclable metal will be transported to permitted facilities (e.g., Deadhorse) for processing.

13.2.2 Oily Trash

Non-hazardous oily trash consisting of oily rags and sorbents, drained oil filters, rags and sorbents with non-hazardous chemicals, oily pit liners, empty oil and grease containers, and oily debris will be collected and stored onsite in designated lined and labeled dumpsters. The waste will be incinerated onsite in a permitted incinerator or transported to Deadhorse facilities for processing.

13.2.3 Oily Solids from Vessels

During the facilities' operations phase, oily solids from process tanks, vessels, and lines will require handling and disposal. The oily solids will be slurried and disposed of in the disposal well or transported to other North Slope facilities for injection in an approved disposal well. These types of solids are exempted from hazardous waste determination and may not be tested prior to disposal.

13.2.4 Drilling Mud

Drilling mud generated during drilling operations at Point Thomson will either be disposed of in the permitted Class I and/or Class II disposal well or through annular injection. If these options are not available (e.g., for the first well drilled), mud will be stored onsite until disposal is available or transported to existing Prudhoe Bay or Badami facilities for disposal.

13.2.5 Drill Cuttings

Presently it is envisioned that the gravel portion of the surface hole drill cuttings generated during drilling operations will be washed and stockpiled on the pad for future use. The finer fractions from the surface hole drill cuttings and the below-surface hole cuttings will be ground and injected as a slurry into the disposal well or into a well annulus. Cuttings may be temporarily stored until a disposal option becomes available.

13.2.6 Non-Hazardous Class I Fluids

Until onsite Class I fluid disposal is available, non-hazardous waste fluids generated during construction will be transported to existing North Slope facilities for disposal under third-party use agreements. The non-hazardous fluids include certain chemicals, tank rinse, sump fluids, and contaminated snowmelt. Approval from the disposal facilities will be obtained prior to transport. Temporary onsite storage consisting of portable tanks or tank trucks may be necessary until approvals are acquired.

After initiation of the drilling phase of the Point Thomson Gas Cycling Project, fluids will be evaluated for reuse in the drilling process. The Class I well will be used for disposal of non-hazardous Class I fluids after the Class I permit is obtained. All materials will be documented to be non-hazardous prior to disposal.

13.2.7 Class II Fluids

Class II fluids, defined as those fluids originating in the well bore (such as produced water, well returns from workovers, and fluids generated from process vessels) will be disposed of in the disposal well. These types of fluids are exempted from hazardous waste determination and will not be tested prior to injection. Certain fluids, such as mud and slurried cuttings, may be disposed of through annular injection.

All volumes of materials injected for disposal will be documented to meet agency reporting requirements.

13.2.8 Recyclable/Reusable Fluids

All fluids consisting of used oils, diesel, glycol, and other hydrocarbons, or chemicals, determined to be recyclable or reusable materials in accordance with state and federal regulations, will be managed as such and not as waste products.

Used oil will be segregated from other materials and stored in containers marked with the words "Used Oil." All used oil will be tested to verify acceptability for recycling and inserted into the export stream (e.g. condensate or crude oil) at Point Thomson or other North Slope facilities. Testing may consist of a halogens screen and flash point test. Used oil generated during the construction phase will be transported to existing facilities for insertion into the export stream after testing. Used oil generated from a known source with known inputs (such as from a turbine within the facility) will be evaluated for recycling based on Material Safety Data Sheet (MSDS) information.

During the construction and drilling phases of the project, used oil will be disposed of in an approved manner. All other materials determined to be potentially reusable will, at a minimum, be visually inspected. Suitable materials will be labeled with the container contents and stored until reused. Testing will be conducted on fluids found to be questionable. All materials determined to be unsuitable for reuse or recycling will be managed as a waste material and characterized for disposal. Used oil that cannot be reused or recycled will be managed as a waste and disposed of in an appropriate manner, either as a Class I liquid or as a hazardous waste.

13.2.9 Hazardous Waste

All wastes determined to be hazardous according to the Resource Conservation and Recovery Act (RCRA) will be managed in accordance with all federal and state guidelines. Hazardous waste will be placed in drums or other approved containers for storage. All containers will be marked with the contents, the date generated, and the words "Hazardous Waste." All containers will be stored in a containment area with an impermeable liner. All hazardous waste will be transported to management facilities located in the Lower 48 for recycling and/or disposal.

RCRA compliance files will be maintained onsite and will include information on waste identification, transportation manifests, and all correspondence with state and federal agencies regarding hazardous waste shipment.

13.2.10 Gray Water

Gray water generated from construction, drilling, and facility operations will be injected into the disposal well, once it is available. Prior to commissioning of the disposal well and during periods when the disposal well is unavailable for injection, gray water will be discharged through an outfall regulated by an NPDES permit after proper treatment by the sewage treatment facility (Figure 13-1).

13.2.11 Sewage Sludge

Sewage sludge generated from camp operations will either be injected down the Class I disposal well, when it is available, or back-hauled to existing North Slope facilities for treatment and disposal.

13.2.12 Incinerator Ash

Ash generated from waste incinerators will be characterized in accordance with RCRA guidelines. Ash determined to be hazardous will be managed as hazardous waste. Ash determined to be non-hazardous will be transported to Deadhorse facilities for processing, or slurried and injected into the onsite disposal well.

13.2.13 Contaminated Snow

Contaminated snow generated from spill cleanup operations during the operations phase of the project will be melted onsite and injected into the disposal well or disposed of by other regulatory approved methods. Only non-hazardous meltwater will be disposed of in the well. Snow with the potential for testing as hazardous will be segregated and melted in a designated bin to recover material for reuse.

Contaminated snow generated from spill cleanup operations during the construction and drilling phases of the project may be temporarily stored at the point of generation and/or at a central storage location, or transported as generated to disposal facilities. Storage areas will consist of impermeable containment. During drilling, the snow may be melted onsite and reused as a fluid in the drilling process or injected into the disposal well as either a Class I or Class II fluid. Until the Class I permit is obtained, snow contaminated with fluids not suitable for melting and reuse in the drilling process will be transported to existing North Slope facilities for disposal.

Storage logs will be maintained onsite for all material added to containment areas. The information documented will include volume, material spilled, date of generation, and certification that the material is non-hazardous.

Snow contaminated with gravel, soil, trash, wood, and other debris will be staged onsite and melted by natural or mechanical means. All resulting debris will be recovered and disposed of properly.

13.2.14 Contaminated Gravel

Contaminated gravel and soil generated from spill cleanup operations will be remediated onsite or at other North Slope facilities. Gravel will be recovered for pad maintenance or other uses. If needed, storage areas will consist of impermeable containment and will be constructed in accordance with Alaska Department of Environmental Conservation guidelines for storage of contaminated material. Remediation may consist of incineration, washing, and injection or other approved technology.

Storage logs will be maintained onsite for all material added to containment areas. The information documented will include volume, material spilled, date of generation, and verification that the material is non-hazardous.

13.2.15 Naturally Occurring Radioactive Material

Naturally occurring radioactive materials (NORM) may be present in some production facilities and will be properly identified and handled. Well tubulars and piping will be scanned for NORM when they are pulled from a well or removed from the process. Piping and tubulars that show

indications of NORM will be stored onsite. When enough NORM-active pipes have been accumulated, they will be transported to a Prudhoe Bay area facility specially designed for NORM removal using high-pressure water. The resultant water-based slurry will be injected in a Class II disposal well.

13.2.16 Special Cases

The items listed below may be used during the construction and drilling phases of the development and, if so, will be managed in accordance with the following procedures indicated for facility operation.

- ***Empty Drums:*** Due to waste minimization efforts and limited storage space, drum stock will be kept to a minimum. Empty drums will be stored onsite and back-hauled to existing North Slope facilities for flushing, crushing, and processing. Empty drum storage will be in secondary containment if there is any threat that residual fluids will be released from the drums or if the physical condition of the drums will result in the contamination of snow or gravel (i.e., the drums are "dirty").
- ***Aerosol Cans:*** Aerosol cans that are completely empty (nothing is heard or felt when shaken) will be placed in a separate non-burnable container or dumpster. Non-empty cans will be punctured and the contents collected using a drum-mounted can crusher. Punctured cans will be placed in the non-burnable container, and the contents will be characterized for disposal. Aerosol cans will not be emptied into facility sumps.
- ***Lead Acid Batteries:*** Lead acid batteries will be segregated from waste streams and stored inside until transported to Deadhorse for exchange for new batteries with the supplier. Lead acid batteries that are not standard size (e.g., from heavy equipment) may not be accepted by suppliers for exchange and may have to be transported to recycling facilities in the Lower 48.
- ***Medical Waste:*** Medical waste will be stored in containers marked "Medical Waste" and will be shipped offsite to a regulated medical waste incinerator for disposal.
- ***Fluorescent Light Tubes:*** Fluorescent light tubes will be collected, crushed into drums or maintained in original packaging, and sent to recycling facilities in the Lower 48. Crushing will be accomplished by using a manually fed drum-mounted unit, which crushes the tubes and deposits the debris in the drum.
- ***Used Oil Filters:*** Used oil filters will be punctured and hot-drained onsite as generated. The collected oil will be screened for halogens and flash point prior to insertion into the crude stream, and the drained filters will be placed in a separate oily trash container or dumpster.
- ***Radioactive Waste:*** All radioactive waste will be characterized for disposal as generated. Common sources of radioactive waste are exit signs and smoke detectors. These materials will be stored in containers with the contents clearly identified.
- ***X-Ray Fluid:*** X-ray fluid will be processed through a silver recovery unit. The silver recovery cartridge will be shipped to an approved offsite reclaimer. The remaining fluid is non-hazardous after recovery of silver and then can be disposed of properly (e.g., in the Class I well).
- ***Hydrotest Fluid:*** Depending on the composition and previous use of the fluid, the following options may exist:
    - Point Thomson disposal well or other approved facility
    - Discharge under NPDES permit
    - Reuse