



Hydrocarbon Management

1 Introduction

Hydrocarbon management is outlined in the following sections:

Section 2: Licensing of Hydrocarbon Storage Facilities

Section 3: Storage of Hydrocarbons

Section 4: Oil Separator

Section 5: Disposal of Waste Hydrocarbons

Section 6: Spill Response

Section 7: Bioremediation

Related Documentation

C0771 Waste Management Plan

C0029 Hydrocarbon Auditing

C0756, C0757, C0759, C0780 Hydrocarbon Inspection Checklists

MSDS File

Operating & Maintenance instructions for the Walker oil separator are contained in volume 1 of the HBH North Mine Operating Manuals

2 Licensing of Hydrocarbon Storage Facilities

2.1 Objective

To describe the requirements for licencing and construction of hydrocarbon storage facilities

2.2 Background

All new hydrocarbon storage facilities designed to store volumes greater than 250L (typically diesel fuel farms) will be designed and constructed in accordance with the specifications described below. This is necessary to fulfil conditions of the site DEC Licence No. 5319/7. Each facility must also be licenced with the Department of Industry and Resources under the Explosives and Dangerous Goods Act 1981.

2.3 Procedure

2.3.1 Licensing

1. The Site Manager will arrange for the design specifications of any new hydrocarbon storage facility to be submitted to a consultant accredited by the Department of Industry and Resources to examine and endorse Dangerous Goods Storage Proposals. The list of accredited consultants is available from the Department of Industry and Resources Explosives and Dangerous Goods Division.

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2. The Site Manager will submit an *Application for a Licence to Store Dangerous Goods*, as required under the Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations 1992, to the Department Industry and Resources and Dangerous Goods Division. The endorsed storage facility design will be attached to the application.
3. The Site Manager will ensure that a copy of the application and endorsed design will be filed in the central file at SA/012.
4. The original copy of each new Licence will be filed in the fireproof licences safe located in the office of the assistant to the Site Manager Cooljarloo, and a copy filed in the central filing system at SA/012.
5. The licence will be reviewed by the Environment Group Leader each year prior to its renewal by the Site Manager.

2.3.2 Construction Standards for New Facilities

All new hydrocarbon storage facilities constructed at Cooljarloo after September 1999 will conform to the following standards:

- Bunded compounds will have floor and wall permeabilities of 10^{-9} metres per second or less.
- Bunded compounds will be designed to hold not less than 110% of the volume of the largest storage vessel or interconnected system, and at least 25% of the total volume of substances stored in the compound.
- Bunded compounds shall be graded or include a sump to allow recovery of liquid.
- Bunded compounds shall be constructed of materials that are chemically resistant to the substances stored.
- The facilities shall include valves, pumps and meters associated with transfer operations where practicable to allow monitoring of consumption and spill volumes.
- The facilities shall include adequate protection (eg. Bollards) for storage vessels and transfer equipment.
- The facilities shall be designed such that jetting from any storage vessel or fitting will be captured by the bunded area (refer to AS 1940 – 1993 Section 5.9.3 (g)).

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3 Storage of Hydrocarbons

3.1 Objective

To outline the requirements for the effective storage of hydrocarbons and to ensure compliance with the relevant licence conditions.

3.2 Procedure

3.2.1 Permanent Fuel Farms

1. All drums containing fuels, oil or grease must be stored within a designated licensed bunded area, or on bunded pallets.
2. During winter bunded pallets will be covered with tarpaulins to ensure that their storage capacity is not significantly reduced by rainfall.
3. All diesel fuel tanks on site will be located within designated licensed bunded areas.
4. Concrete bunding around diesel tanks for Tiwest, Piacentini, BIS and other contractors will be inspected monthly during dry months and weekly in wet months. The Maintenance Supervisor Mechanical (North) will ensure that Tiwest facilities will be inspected, and the individual contractor organisations are responsible for their own facilities. Inspections shall be initiated and outcomes recorded by work orders generated via the Ellipse system. Inspections will be recorded on the "Maintenance Inspection Checklist" and will include the following factors:
 - Condition of bunding, cracks or deterioration
 - Water within the bund area
 - Leaking of hydrocarbon within and/or from the bunded area
 - Volume of stored hydrocarbon within the bund (stored drums may reduce the available storage volume in the event of a tank leak see AS 1940 – 1993)
 - Operation and maintenance of the oily water separator units
 - Condition of raised tanks (coating, welds etc)
 - Valve operations
 - Earth stake and connection integrity
 - Volume of waste oil in the tank
 - Pipe and hose integrity
5. The Maintenance Inspection Checklists will be given to the Environmental Officer during quarterly audits. Copies of environmental incident reports and inspection action close-out reports will be forwarded to the Tiwest Environmental Officer for filing within the central file at ENV016ENV.
6. Chemicals that may react in a dangerous manner shall not be stored within the same bunded area. All chemical MSDSs will be reviewed by the Safety Group Leader and the Environmental Group Leader prior to being approved for use on site and appropriate arrangements made for storage in accordance with the Dangerous Goods Regulations. All new hazardous materials brought on site will be recorded in the site Hazardous Materials Register located at the Store and the

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Stores Supervisor will ensure they are stored in accordance with their MSDS in the Hazardous Materials Store located behind the Tiwest Workshop.

7. All hazardous chemicals of a volume equal to or greater than 250 litres must be stored in a bunded facility that complies with the standard set out in this procedure.
8. Rainwater falling within the bunded area behind the Tiwest Workshop drains into a collection sump and is automatically pumped to the oily water separator unit prior to discharge to the Main Entrance Washdown sump.
9. Hydrocarbon material within bunded areas shall be recovered regularly in response to actions identified from the Maintenance Inspection Checklist, and stored in the designated waste oil tank within the Piacentini bunded area to be disposed of as waste oil (see Section 5).
10. Hydrocarbon contaminated soil associated with storage areas will be recovered using a shovel, bobcat or loader depending on the extent of the spill and disposed of in the designated hydrocarbon bioremediation facility (see Section 6).

3.2.2 Waste Hydrocarbon Storage

1. All waste oils shall be stored in the designated Waste Oil Tank within Piacentini fuel farm.
2. Large grease containers (20L) will be scraped clean prior to being placed in the Ruggies recycling drum bund. Waste grease will be collected in a single drum (preferably an empty 55kg drum with sealable lid) and stored in the Tiwest bunded hydrocarbon storage area near the stores for disposal. All drums will have sealed lids in place. IT IS VITAL THAT THE CONTAINERS ARE SEALED AND THE EXTERIOR CLEAN, AS THEY NEED TO BE TRANSPORTED OFF-SITE.
3. This is the responsibility of the Maintenance Supervisor (Mechanical - North Mine)

3.2.3 Storage of Liquid Chemicals/Hydrocarbons on the Dredge Pond

1. At the start of each shift an inspection of the level indicators for hydraulic fluid storage (header tanks etc.) must be undertaken. The level for each shift must be recorded on the daily log sheet.
2. All drums of hydrocarbons must be stored with lids tightly sealed.
3. All drums of hydrocarbons must be stored on a bund pallet or within a bunded area designed to contain 110% of the total volume of the largest container stored. On the dredges unbunded drums may be stored awaiting barge pick up for a maximum period of one shift.
4. At the start of each shift an inspection of the bunds/pallets must be undertaken. The integrity of the bunds/pallets, water or waste hydrocarbons within the bunds decanted or pumped into 205 L drums and sealed and the volumes of water and/or hydrocarbons must be recorded on the daily log sheet.

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5. Daily Log Sheets will be reviewed weekly by the Maintenance Supervisor Mechanical (South) to identify possible losses of hydrocarbon to the environment. Losses will be reported and investigated via an Environmental Incident report.

4 Oil Separator

4.1 Objective

To comply with Tiwest's environmental obligations for handling of waste hydrocarbons. To detail the operating & maintenance procedure for the Walker Oil Separator that collects & treats any spillage of fuel or oil at the bulk fuel installation located at the north mine concentrator stockpile. This procedure applies to all personnel who as a part of their duties are required to operate or maintain the Walker oil separator at the north mine.

4.2 Background

Compliance with all MSDS procedures when handling hydrocarbon products is obligatory. Failure of the oil separator, allowing hydrocarbons to be released into the surrounding environment activates an environmental incident investigation. The North Production Supervisor will initiate an Environmental Incident Investigation and follow through with immediate appropriate cleanup.

4.3 Responsibilities

North Production Superintendent

- Compliance with statutory environmental obligations
- Regular review of procedures for the oil separator operation.
- Regular inspection procedures

North Production – Support Services

- Daily inspections of the fuel bund & oil separator unit
- Reporting & works order for any substandard conditions
- Cleanup of any contaminated waters or soils

Maintenance Supervisor Mechanical (North)

- Regular reviews of maintenance procedures
- Regular maintenance of oil separator components – ELLIPSE
- Regular mechanical & electrical inspections – ELLIPSE
- Daily inspections of the fuel bund and oil separator unit
- Reporting & works order for any substandard conditions
- Mechanical & electrical repairs

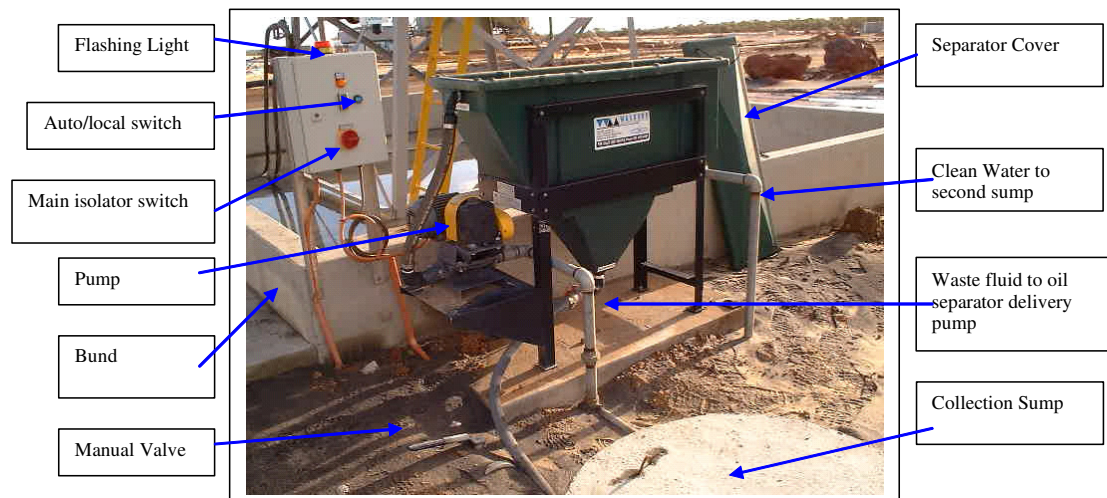
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4.4 Required Equipment & Tools

- Danger Tags
- Gloves
- Operating & Maintenance instruction for the Walker oil Separator. Volume 1 of the HBH North Mine Operating Manuals

4.5 Procedure

The system consists of a secure concrete bund that drains to a concrete collection sump outside the bund, via a pipe that is controlled by a manual valve. The fluid level in the collection sump is monitored electrically and the pump starts when a predetermined level in the sump is reached. The pump delivers the fluid to the oil separator and the unit produces two products. The waste hydrocarbon is delivered to a 20 litre drum that is inside the bund. The water gravitates to a second sump outside the bund and drains into the ground by natural means. The 20 litre drum is removed as necessary and pumped into the bulk hydrocarbon waste tank at the main workshop.

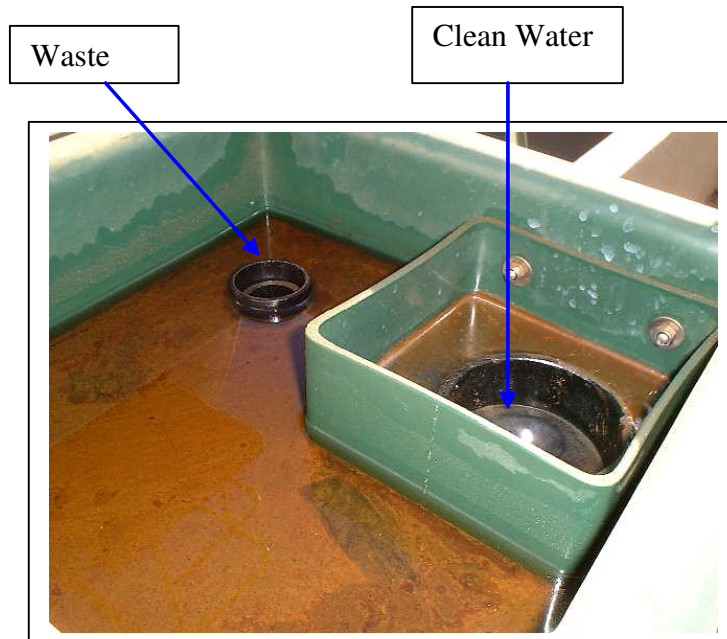


Actions

- In the event of a catastrophic failure of the fuel tank do not attempt to operate the oil separator until the bulk of the fuel has either been recovered by the service truck or disposed to the main waste oil tanks.
- Check the 20 litre drum is inside the bund and that the oil delivery hose from the separator is inserted into the drum. The 20 litre drum must always be inside the bund.
- Pull out the isolator switch and switch the local start switch to auto.

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- If the pump starts immediately, the collection sump may be holding some storm water that will need to be evacuated before treating any of the fluid from the bund. In auto, the pump will start and continue running until the low level in the collection sump is reached. The pump then shuts down. The red light on the main isolator box will flash while the pump operates.
- When a low level in the collection sump is established (pump Stops), the manual valve into the sump from the bund can be opened and the pump will start when the level probe identifies a high fluid level. The pump must be in auto for this sequence to occur.
- The pump will continue running until all the fluids have been treated and the bund empties out. Close the manual valve from the bund when the pump is not running.
- Removing the top cover of the oil separator and observing the flow of the clean water will confirm proper operation of the unit. Any oil present indicates unit malfunction. Shut down the unit immediately, and report, if oil is present.



In the event where a large amount of water has accumulated in the bund it may be necessary to close the manual valve off before the collection sump fills ie; the bund is holding more than the collection sump capacity.

- If the 20 litre drum reaches full capacity, shut down the separator, screw on the drum cap & dispose of the recovered oil at the main waste oil facility (main workshop). Replace the drum inside the bund & restart the separator in auto mode.
- When the bund empties out, the pump stops due to low collection sump level, the pump should be isolated at the stop/start switch until further use. Close the manual valve from the bund.

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Servicing / Cleaning of Plates

Reference – Operating & Maintenance instruction for the Walker oil separator.
Volume 1 of HBH North Mine Operating Manuals.

5 Disposal of Waste Hydrocarbons

Waste hydrocarbons at Cooljarloo are disposed off site via disposal contractors licensed by the DEC. Spilled hydrocarbons are either disposed off site via the above method, or if contained in soil material, on site at the designated hydrocarbon bioremediation facility.

1. Waste oil is collected in the waste oil tank at the Piacentini fuel farm and disposed of offsite by a licenced contractor (currently Wren oil).
2. Used oil filters and used spill clean-up materials will be stored separately within their blue and red disposal bins respectively, located in the concrete bund to the west of the stores area.
3. The Maintenance Supervisor Mechanical (South) will arrange for empty grease containers to be cleaned and the collected waste grease to be disposed off site by the licensed contractor. The empty grease drums will be disposed of to landfill via the general rubbish disposal method on site. The licensed contractor for waste hydrocarbon disposal is currently:

Nationwide Oil
80 Collingwood Street
Osborne Park, WA
Ph: 9446 1930
Fax: 9446 2096

4. All empty 205L drums will be stored temporarily within the designated portion of the Ruggies Recycling Yard prior to being transported off-site for re-treatment by Drum Services Pty Ltd.
5. The Maintenance Supervisor Mechanical (North) is responsible for ensuring that oil drums are fully drained and are fitted with sealed lids prior to storing them for disposal.
6. The Stores Supervisor will monitor the number of empty drums in the Salvage Yard and will arrange for the site waste oil disposal contractor to remove them periodically.
7. A single truck load is 132 drums, and a load for a truck and trailer is 228 drums. Remuneration from sale of used 205L drums may be donated to the Ruggies Recycling Foundation.
8. All empty steel containers must be taken to the Salvage Recycling Yard for recycling. Oil and grease must be removed from the containers prior to depositing them in the Salvage Recycling Yard. When empty, small plastic containers are deposited into the red hydrocarbon disposal bin, located in the concrete bund to the west of the stores area.

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6 Spill Response

6.1 Objective

To outline the requirements for dealing with hydrocarbon spills on the pond and on land. This procedure is related to Tiwest's Environmental Performance Standard section 11.4.7 Spill clean-up Equipment and section 11.5 Procedural Requirements (with regard to spill response).

6.2 Background

Spill kits are located on each dredge, on the south mine concentrator, at the Tiwest Light Vehicle workshop and at the north mine feed prep. Spill kits are identifiable as they are contained in the bright yellow 205 litre wheelie bins. All spill kit contents are available at the stores if replacement is required. The kits each contain:

- 8 x plastic bags
- 2 x sets of plastic gloves
- rope
- 4 x 4 m connectable booms
- 50 x absorbent pads
- 1 x swimming pool net

At each spill kit location is an empty 205L drum labelled "Waste Hydrocarbons". This drum is for the disposal of the used spill clean-up materials. PLEASE DO NOT PUT USED SPILL MATERIALS BACK INTO THE YELLOW WHEELIE BINS. Once the 205L drum is full, this is to be emptied into the red hydrocarbon disposal bin located in the concrete bund adjacent west of the stores area.

6.3 Procedure

6.3.1 Spill Response on the Pond

In the event of a spill greater than 20 litres on the pond, the following procedure should be followed:

PLEASE NOTE DUE TO THE RAPID DISPERSAL OF HYDROCARBONS ON WATER IT IS CRUCIAL THE PERSON WHO FIRST SITES THE SPILL ACTS TO CONTAIN IT.

1. Connect the booms and place in the pond around the perimeter of the spill. The booms are absorbent and will immediately begin absorbing the hydrocarbons. The clean up process can be accelerated with the use of the pads, once manoeuvred inside the bunded area they will absorb the spill. These are most useful for lighter hydrocarbons such as thinners and diesel. For the longer chain hydrocarbons such as oils and hydraulic fluids it is most effective to manoeuvre an additional boom inside the contained area. This will rapidly accelerate the absorption process. The booms and pads can be manoeuvred with the use of the swimming pool net provided in the kit.

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2. Once the spill is contained, the Production Supervisor should be advised by mine radio.
3. Follow steps 4 – 10 below.

6.3.2 Spill Response on Land

In the event of a spill greater than 20 litres on land, the following procedure should be followed:

4. Connect the booms and place around the perimeter of the spill. The booms are absorbent and will immediately begin absorbing the hydrocarbons. Place pads inside the bunded area to absorb the spill. Any contaminated soil should be removed and taken to the bioremediation area.
5. Once the spill is contained, the Production Supervisor should be advised by mine radio.
6. (For spills on the pond and on land). With the use of gloves, all waste hydrocarbons are to be placed into the plastic bags and put into the sealed 205L drum, labelled "Waste Hydrocarbons".
7. Following a spill all used items must be replaced. Booms and pads are available as stock items on Ellipse. Plastic bags can be obtained from the Electrical Department. The Shift Supervisor is responsible for replenishing used kits.
8. All waste hydrocarbons and soiled booms will be put into the sealed 205L drum and transported to the bund west of the stores area. The contents of the drum should be emptied into the 2.6m³ red hydrocarbon waste bin (which is labelled) for disposal offsite by a licensed contractor.
9. The empty 205L drum is then to be washed out and returned to its location.
10. The maintenance of the red hydrocarbon waste disposal bin is the responsibility of the Maintenance Supervisor (Mechanical) North Mine. The contents of the bin should be checked daily to ensure the right materials are being put in there, and to check that the bin is not full.
11. When the bin is full, the Maintenance Supervisor Mechanical (North) will arrange for a replacement bin through the licenced contractor (details already listed).
12. All spills require the submission of an Environmental Incident Report. On the report, and hinderance or recommendations for improved clean-up efficiencies should be clearly described. Remedial actions will be progressed through CATS.
13. Any spills greater than 250L will be reported to the regulatory authorities by the Group Leader Environment.

6.3.3 Hydrocarbon release within the bunded areas

1. All bunds are to be inspected daily for hydrocarbon releases.
2. Any hydrocarbon contaminated water is to be pumped into a 205 litre drum/s. Once full the drums are to be sealed and barged to shore.
3. The the water is contaminated with hydrocarbons, it is to be pumped into the oil recovery system next to the washbay.

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4. This quantity of contaminated water is to be recorded on the daily log sheets.

7 Bioremediation

7.1 Objective

To describe the management of the hydrocarbon bioremediation area.

7.2 Background

Bioremediation of hydrocarbon contaminated soil relies on the action of natural soil borne organisms and the physical and chemical properties of the soil to break down the long chain hydrocarbons into principally CO₂ and water. Microbial oxidation is generally responsible for up to 80% of this process, with photo-oxidation the remainder.

A Landfarm has been established at Cooljarloo for the bioremediation of soils contaminated with spilled hydrocarbons. The location of this facility an area adjacent to the Piacentini workshop area. This site has a sandy gravel soil over a layer of clays (brown/red-brown to grey), between 3 to 6m deep. This facility will be used to treat only **soils** contaminated with hydrocarbons. Waste oils, oily water, oil filters and waste grease will be disposed off site via licensed contractors.

The Landfarm consists of six cells, or bioremediation areas. Contaminated material will be added to a single area over a three month period. Each quarter of the year a different cell becomes the active cell for dumping of material while the other cells are treated.

Management of the Hydrocarbon Bioremediation Landfarm is the responsibility of the Maintenance Supervisor (North Mine) and the mechanical service personnel.

7.3 Procedure

7.3.1 Collection of Hydrocarbon Contaminated Material

1. Spilled hydrocarbons will be reported immediately to the relevant Maintenance Supervisor (South Mine/North Mine), who will arrange for service personnel to clean-up the spill. This is the responsibility of all personnel and contractors
2. Soils contaminated with fuels, hydraulic fluids, oils and greases will be collected by the responsible service personnel and deposited at the Landfarm in the position indicated by dumping signs.
3. Should service personnel identify a spill that requires earthmoving machinery for removal, they will report it to the relevant Production Services Supervisor and they will arrange for the material to be cleaned up and transported to the landfarm.
4. The volume, origin and known or likely contaminant material (eg. diesel, hydraulic fluid, sump oil) will be recorded by the responsible service person, prior

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to dumping, in the Hydrocarbon Landfarm Log Book located at the entrance to the facility.

5. The responsible service person will complete an Environmental Incident report with their supervisor and the Environmental Officer on completion of any immediate clean-up activities.

7.3.2 Landfarm Management

The Cooljarloo Landfarm will be managed by the Maintenance Supervisor Mechanical (North).

1. The Maintenance Supervisor Mechanical (North) will inspect the facility weekly, and arrange for any new material deposited at the site to be spread within the currently active cell. Contaminated soil will be spread at approximately 10 to 20 cm depth using a loader/grader within the active cell (marked by signs).
2. A log will be kept by the Maintenance Supervisor Mechanical (North) that identifies each active cell, the origin of the material, the likely contaminant load in the material and the times it was applied, as well as any sampling results during remediation (Log sheet attached).
3. The Maintenance Supervisor Mechanical (North) will submit a report to the Environmental Officer at the end of each quarter describing the materials added to each cell during that period.
4. At the end of each quarter, a new cell will be signposted for receiving contaminated material and a notice posted on the site notice boards informing personnel of the new dumping location. The full cell will continue to receive fertiliser and water applications, and will be tilled.
5. Additional applications of contaminated soil should not be made to full cells under remediation. Cells that have soils with average contamination levels equal or less than those listed in Table 2 will be regarded as having been satisfactorily remediated and suitable for disposal as clean landfill.
6. The Maintenance Supervisor Mechanical (North) will arrange for material within remediated cells to be removed and disposed of within overburden on the mine path.
7. The Environmental Group Leader will arrange for bioremediation bugs to be applied to the soil as required. These are available from Perth Petroleum Services with details of their application rates supplied.
8. The Maintenance Supervisor Mechanical (North) will ensure that active and remediating cells will be disc ploughed or harrowed (15 - 20 cm deep) every two weeks.
9. The Maintenance Supervisor Mechanical (North) will ensure that active and remediating cells will be watered to field capacity every second day in the early morning during dry months. This may be achieved using a water truck or using an irrigation system when this is available.
10. To determine if watering has been sufficient, scoop up a handful of the soil and squeeze it into a ball, the material should hold together without releasing any

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water. If loose water is present on the surface or is released when a handful is squeezed, the soil has been over watered and less should be applied to the next cell.

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7.3.3 Sampling Regime

Recommended soil properties for bioremediation include:

- Soil pH should be maintained at 7-8. If the pH falls below 7 the remediating strip should be amended with lime to raise the pH back to the optimum range.
- A carbon:nitrogen:phosphorus ratio of about 100:20:1 should be maintained within the remediating soil.

The sampling procedure is as follows:

1. The Environmental Officer will collect soil samples from the cells under remediation after they have been remediating for approximately 12 months. For example, the cell that receives contaminated material during quarter one of each year will be sampled at the end of quarter four to ensure that remediation is complete prior to re-application of contaminated material.
2. The Environmental Officer will organise for samples to be analysed by a NATA accredited laboratory according to the schedule contained in Table 1. Separate samples will be collected from each cell under remediation to ensure that individual fertiliser requirements can be tailored for each if necessary.
3. Samples will be collected with a trowel from the depths indicated in Table 1. The trowel will be washed with distilled water between samples to ensure that cross contamination does not occur.
4. A blank sample will be collected from an area adjacent to the remediation area at the time of sample collection. This blank sample will be dispatched to the laboratory with the other samples and will be given a sample number, but not labelled as a blank.
5. A chain of custody form (sample attached at the back of this module) will be completed by the Environmental Officer and sealed within the esky containing the samples and two freezer blocks). The samples will then be dispatched to the laboratory for analysis.
6. The laboratory will provide a report on sample results and recommended fertiliser applications to achieve optimum remediation performance via email with a hard copy posted to site.
7. The Environmental Officer will review the analysis results for errors or anomalies within 24 hours of their arrival on site and if necessary request that the laboratory repeat analyses on samples where unexpected results have been returned.
8. Sample analysis results will be entered into the site Excel spreadsheet at: H:environment\4.5 Checking and corrective action\4.5.1 Monitoring and measurement\Hydrocarbons
9. The Environmental Officer will provide advice to the Maintenance Supervisor – Mechanical North Mine to ensure the application of bugs is tailored to provide an optimum environment for microbial degradation of hydrocarbons.

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Table 1: Landfarm Sampling and Analysis Regime

Sampling frequency	Sampling method	Analyses	Comments
Landfarm Decommissioning or establishment	Soil collected from 0-30cm, 30-60cm and 60-100cm depths and sealed in 250 mL glass jar with teflon lined lid for organics. Four randomly chosen samples will be collected per cell	Total Petroleum Hydrocarbon (TPH) Oil and Grease BTEX PAHs	Lighter fraction hydrocarbons, diesel and lighter. heavier fraction hydrocarbons including hydraulic oils and lubricating oils Benzene, toluene, ethyl benzene and xylenes Polycyclic Aromatic Hydrocarbons
Quarterly Cell by cell basis	Soil collected from 0-30cm 250 mL glass jar with teflon lined lid for organics and heavy metals and sealable plastic bag to hold 1 kg of soil Two randomly chosen samples will be collected per cell	Total Petroleum Hydrocarbon (TPH) Oil and Grease BTEX PAHs pH Conductivity P, K, Ca, Mg, Na, Cu, Zn, Fe, Mn, Walkley Black, Kjeldahl N, Chloride, Al, Pb, Cd	Lighter fraction hydrocarbons, diesel and lighter. heavier fraction hydrocarbons including hydraulic oils and lubricating oils Benzene, toluene, ethyl benzene and xylenes Polycyclic Aromatic Hydrocarbons Nutrients and heavy metals analysis to aid in fertiliser application formulation

7.3.4 Landfarm Decommissioning

The following procedure addresses the requirement for disposal of the bioremediated material within the facility in an environmentally acceptable manner prior to mining.

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1. The Environmental Officer will sample all cells utilised within the Landfarm in accordance with the annual sampling regime described in Table 1.
2. Cells that have soils with average contamination levels equal or less than those listed in Table 2 will be regarded as having been satisfactorily remediated and suitable for disposal as clean landfill.
3. The Maintenance Supervisor Mechanical (North) will ensure that cells that have not achieved the levels of remediation shown in Table 2 will be removed to a new landfarm prior to disturbance for mining. The full depth of material that was added to each cell will be removed.
4. The Rehabilitation Officer will ensure that no topsoil is removed from the landfarm site for rehabilitation purposes and that all of the material is removed as overburden.

Table 2: Clean Landfill Assessment Criteria

Contaminant	Maximum Concentration (mg/kg)
Benzene	1
Ethylbenzene	5
Toluene	3
Xylene	5
PAH(total)	20
Total Petroleum Hydrocarbons (C ₀₋₉)	100
Total Petroleum Hydrocarbons (C ₁₀₋₁₄)	500
Total Petroleum Hydrocarbons (C ₁₅₋₃₆)	1000

(from Landfill Waste Classification and Waste Definitions 1996 - Published by the Chief Executive Officer, Department of Environmental Protection on 27 September 1996 pursuant to item 63, 64, 65 and 66 in Schedule 1, Part 1 of the Environmental Protection Amendment Regulations (No. 3, 1996))

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