

KINROSS

Fort Knox

Fort Knox Mine

Solid Waste Management Plan

August 2019

**Fort Knox Mine
Fairbanks, Alaska**

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**Fort Knox Mine
Fairbanks, Alaska
Solid Waste Management Plan**

1.0 Introduction

This solid waste management plan is part of the overall environmental management system developed by Fairbanks Gold Mining Inc. (FGMI) for the Fort Knox Mine. The *Fort Knox Mine Spill Reporting Procedures & Waste Disposal* booklet is the other component to this specific management plan. The booklet is issued to all employees and contractors. This plan and booklet address construction and operation phases of the mine, and both will be updated when necessary as the project continues to develop.

2.0 Applicable Jurisdictions

The Fort Knox Mine is located within the Fairbanks North Star Borough in the State of Alaska. Solid waste disposal is regulated by federal and state requirements. The Fairbanks North Star Borough adopted all state requirements by reference in the Conditional Use Permit issued to FGMI on March 1, 1994.

Permits required for operation of the on-site landfill are as follows:

- Alaska Dept. of Environmental Conservation – Waste Management Permit 2014DB0002 Modification #2
- Alaska Dept. of Natural Resources, Division of Forestry – Burn Permit
- Fairbanks North Star Borough – Conditional Use Permit
- Fairbanks North Star Borough – Zoning Permit

All solid waste put into the Fort Knox landfill will be generated by construction, operation, and closure of the Fort Knox Mine.

3.0 Types of Waste

Waste materials from the Fort Knox Mine will be handled as described in the following sections.

3.1 Recyclable Materials

FGMI's waste reduction strategy includes reuse and recycling of as many materials as possible. Tailings water is reused. Vehicle and heavy equipment batteries, rechargeable radio batteries, used oil and grease, ethylene and propylene glycol, and scrap metal are all materials that are recycled.

Assay sample reject rock will be collected in a steel bin along with other assay and refining residuals from the laboratory. Periodically these materials will be mixed with mill feed and recycled through the milling process.

3.2 Non-Putrescible Waste

Inert office refuse and non-recyclable, non-putrescible items such as cardboard boxes, packaging materials, wooden shipping materials, plastic sample bottles and containers, non-recyclable metal materials, tires, and steel drums will be handled, depending on the nature of the material, in one of the following three ways.

1. **Direct Burial:** Items such as clean, non-recyclable metals, synthetic liners, and other inert materials that would not benefit from burning will be placed directly into the landfill trenches. Non-recyclable empty drums will be drained, flushed if necessary, crushed, and disposed of in the Crushed Barrel Trench. All non-recyclable scrap vehicle parts and machinery will be drained of all petroleum products prior to direct burial. Tires will be placed along the base of the Yellow Pup Waste Rock Dump where they will be covered by the next lift or material.
2. **Open Burning:** The designated open burning area (burn pit) will be located away from the solid waste disposal site. Pallets, shipping crates, cardboard, brush, and paper are the only materials to be disposed of in the burn pit. All employees and contractors are instructed in waste disposal practices and issued the Fort Knox Mine Spill Reporting Procedures & Waste Disposal booklet to minimize disposal of non-combustible material and other wastes in the burn pit. The burn pits will be placed and burned in such a way as to minimize black smoke.
3. **Smart Ash Burners:** These will be used to burn oily rags, absorbent pads and materials contaminated with petroleum hydrocarbons and coolant. Operating instructions are located at Mobile Maintenance, Mill Maintenance, and Appendix C of this plan. Ash from the incinerators will be left in barrels and disposed of in the Smart Ash Burner Trench, which is separate from the Crushed Barrel Trench and the Burn Pit. The burners will comply with the visible emissions standard of 18 AAC 50.050(a) and all other applicable standards

3.3 Putrescible Waste

Putrescible waste will be placed in covered dumpsters located behind the Administration building and Mill building and hauled to the Fairbanks North Star Borough Landfill.

3.4 Oily Solid Waste

Used oil filters will be crushed or hot drained for 12 hours, then landfilled. Oily rags and used absorbent materials will be incinerated in Smart Ash Burners.

3.5 Hazardous Waste and Liquid Waste

Neither hazardous nor liquid wastes will be disposed of within the on-site landfill. Septage or other semi-solid wastes from a wastewater treatment process or portable

toilets will be periodically removed by a commercial pumping service and disposed of in accordance with the commercial pumping services and DEC approved procedures.

All hazardous wastes will be handled in accordance with the Resource Conservation and Recovery Act (RCRA) requirements. Materials not designated for disposal onsite will be sorted and shipped offsite for recycling or disposal. All materials will be handled in accordance with applicable regulations.

4.0 Location, Design, and Construction

The area's permitted for active landfills are the Barnes Creek Waste Rock Dump, Fish Creek East Waste Rock Dump, and the Yellow Pup Waste Rock Dump.

All trenches will be located at least 100 feet from any surface water body and more than 200 feet from any drinking water source. Trench bottoms will be more than 10 feet above any existing or expected future groundwater table. The main landfill trench locations on the Upper Barnes Creek Waste Rock Dump and the Yellow Pup Waste Rock Dump are located well above the groundwater tables.

Except for the landfills in the vicinity of the tailing dam, which are intended for use only during the construction and closure phases of the dam, the landfill areas will be located below planned diversion ditches. This means that all surface water from the landfill areas will flow into the tailings impoundment.

Excavators and dozers construct the trenches. Landfill trenches are approximately 20 feet wide, 10 feet deep, and 150 feet long. Other designs may be used if approved by the State of Alaska DEC. Separate trenches will be used for crushed drums and Smart Ash Burner ash barrels. Each of the trenches will have protective berms around them to allow vehicles to safely back up to the trench for unloading. The berms also serve to divert surface runoff away from the trench.

Signs are in place indicating conditions of use and what types of waste are acceptable for the placement in the landfill. Scavenging or salvage of waste materials from landfill trenches is prohibited to protect the health and safety of employees. Human access to the landfill is limited to project vehicles and personnel by the mine security system, which includes fencing, a security gate, and limited access to the mine. Animal access to the landfill is controlled by refraining from disposing of anything that will attract animals.

5.0 Operation

The main mine landfill disposal area has a trench for inert solid waste, a trench for crushed drums, a trench for Smart Ash Burner barrels containing ashes, and an open burn pit/trench area that are active simultaneously. When one trench becomes full a new one will be surveyed and put into service.

Pallets, shipping crates, cardboard, brush, and paper are the only materials to be disposed of in the burn pit. Burning is conducted to minimize black smoke. Open burning is conducted in accordance with the laws and regulations of the State of Alaska Department of Natural Resources, Division of Forestry.

In the event of a fire, FGMI's employees have access to hand held fire extinguishers. In addition four track dozers, two rubber tire dozers, three motor graders, and two 9,000-gallon water trucks are available for use in fire suppression.

Solid waste is compacted in approximately two-foot lifts by excavators to maximize the life of each landfill trench and minimize possible settlement of the trench after closure. Six to twelve inches of cover will be placed on the active area of the trench in the spring (just after snowmelt) and fall (just before snowfall) to minimize potential leachate or when necessary to control windblown litter. When a trench is filled to within four feet of the surface, a cover layer of soil or rock will be placed on top. Appendix A shows the locations of closed trenches in the mine area.

Any litter, windblown or otherwise, in the areas around the landfill and office/mill complex will be picked up after spring break up and monthly thereafter during the summer months.

All incidents involving accidental fires at the landfill trench, wildlife problems, litter or other unusual activities at the disposal sites are to be reported to Safety/Security and the Environmental Department. The appropriate supervisor will respond depending on the incident.

6.0 Closure

At closure of an individual trench (or temporary closure of a trench) a minimum of two feet of cover (rock or soil material) will be placed over it within 60 days of the last solid waste being placed in the trench. This cover will be sloped to deter infiltration and cause surface water to drain away from the area over the trench.

Final closure of landfill trenches require trenches to be covered with two feet of cover material, and the area sloped to cause water to runoff away from the trench to minimize infiltration. Growth media will be applied if applicable to promote natural re-invasion by native vegetation. Application depth for growth media will be determined on a site-specific basis. The seedbed will be prepared and fertilized as necessary using rates and mixes determined from information acquired during concurrent reclamation activities at the mine site.

At closure of the mine, landfill surface reclamation will be performed in conformance with the Fort Knox Reclamation and Closure Plan.

7.0 Monitoring and Recordkeeping

The main landfill areas used over the mine life are located in the Barnes Creek, Fish Creek East Waste Rock Dump, and Yellow Pup Waste Rock areas. Other historic landfill trenches are located in the waste rock dump areas adjacent to the mine pit and mill site. All trenches are above groundwater and will be protected from storm water run-off. All surface and subsurface drainage from these landfill areas will flow into the fully contained tailings basin. No special groundwater or surface water monitoring is planned for these landfill areas.

Since the landfill trenches in the vicinity of the tailing dam were limited to inert waste suitable for direct burial or open burning followed by direct burial, no special groundwater or surface water monitoring is planned for these landfills.

Overall surface water and groundwater monitoring for the project area are described in the Fort Knox Gold Mine Monitoring Plan, dated August 2019.

Weekly inspections are performed by environmental personnel to ensure that the active landfills are being operated properly and in compliance with the DEC Waste Management Permit. Non-permitted waste discovered in the landfill trenches during routine inspections will be removed and disposed of properly. The Environmental Department will determine the responsible department and notify the proper manager to inform employees of proper waste disposal procedures.

All inspection and location records are maintained by the Environmental Department.

8.0 Financial Assurance

Financial assurance for landfill operation and closure is identified in the financial assurance and bonding for the Fort Knox Mine Waste Management Permit 2014DB0002 Modification #2.

APPENDIX A
Current Landfill Map

APPENDIX B
Fort Knox Mine Spill Reporting Procedures
& Waste Disposal Booklet

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SPILL REPORTING PROCEDURES

&

WASTE DISPOSAL

Updated August 2019

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1.0 REPORTABLE SPILLS

ONLY ENVIRONMENTAL DEPARTMENT NOTIFIES AGENCIES

**TABLE 1
SPILL REPORTING QUANTITIES**

<u>Agency</u>	<u>Spill Size</u>	<u>Verbal Report</u>	<u>Phone Number</u>	<u>Spill Report Form Submittal</u>
Alaska Department of Environmental Conservation	<u>Land</u> <1 gallon	No spill report required	N/A	Not required if spill is less than 1 gallon.
National Response Center	<u>Any discharge to water</u> All spilled substances hazardous, non-hazardous and all petroleum products	Immediately	1-800-424-8802	As required by EPA
Alaska Department of Environmental Conservation	<u>To Waters</u> Any Discharge to water of hazardous or petroleum substances	Immediately	Regular Business Hours 907-451-2121 24 Hour Hotline 800-478-9300	Within 48 Hours
Alaska Department of Environmental Conservation	<u>To Land</u> >55-gallon	Immediately	800-478-9300	Within 48 Hours
Alaska Department of Environmental Conservation	<u>To Land</u> 10 to 55-gallon	48 Hours	800-478-9300	Within 48 Hours
Alaska Department of Environmental Conservation	<u>To Land</u> 1 to 10-gallon	Include In Monthly Report	800-478-9300	Monthly Report
Alaska Department of Environmental Conservation	<u>To Land or Water</u> All hazardous substance spills	Immediately	800-478-9300	Within 48 Hours
Alaska Department of Environmental Conservation	<u>To Secondary Containment</u> In excess of 55 gallons for petroleum products. All	Within 48 Hours	800-478-9300	Within 48 Hours

	other spills report immediately.			
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1.1 Hazardous Substance Releases

Any release of a hazardous substance *must be reported* as soon as the person has knowledge of the discharge.

1.2 Oil/Petroleum Releases

To Waters of the U.S.: Any release of oil to waters of the U.S. *must be reported* to the Environmental Department immediately. The Environmental Department will then report the spill to the Alaska Department of Conservation (ADEC) and the National Response Center (NRC) as soon as the person has knowledge of the discharge.

To Land: Any release of oil in *excess of 55 gallons* must be reported to the Environmental Department as soon as the person has knowledge of the discharge. The Environmental Department will then notify the ADEC. Any release that enters waters of the US and/or wetlands must be immediately reported to the NRC by the Environmental Department. Any release of oil in *excess of 10 gallons but less than 55 gallons* must be reported within 48 hours after the person has knowledge of the discharge. A person in charge of a facility or operation shall maintain, and provide to the Department on a monthly basis, a written record of any discharge of oil *from 1 to 10 gallons*.

To Impermeable Secondary Containment Areas: Any release of oil *in excess of 55 gallons* must be reported within 48 hours after the person has knowledge of the discharge.

1.3 Process Solution

Any spill resulting in process solution with WAD cyanide level at or greater than >0.20 mg/l escaping from the secondary containment systems will be reported immediately.

1.4 Reportable Quantities

**TABLE 2
REPORTABLE QUANTITIES**

		Alaska
Chemical	EPA RQ (lbs.)	Reportable
Oil Products	Any release in water or wetlands	≥ 1 gallon

Gasoline	Any release in water or wetlands	Any Quantity
Ammonium Bisulfite	5,000	Any Quantity
Maleic Acid (Anti-Scalant)	5,000	Any Quantity
Calcium Oxide (Lime)	Non-Hazardous	
Caustic Soda Liquid (Sodium Hydroxide)	1,000	Any Quantity
Cupric Sulfate	10	Any Quantity
Cyanide (Soluble Salts and Complexes)	10	Any Quantity
Ethylene Glycol	5,000	Any Quantity
Hydrochloric Acid (Muriatic Acid)	5,000	Any Quantity
Propylene Glycol		Any Quantity
Sodium Bisulphite	5,000	Any Quantity

2.0

SPILL

RESPONSE PROCEDURES

RESPOND- Respond immediately to stop and contain the spill only if safe to do so.

NOTIFY SUPERVISOR- Immediately Notify Supervisor. All petroleum, oils, and lubricant spills (1 gallon or greater) and cyanide spills that are not in secondary contaminant and have a confirmed contaminant level of 0.2 mg/L must be reported to Security. Supervisors must call the Security Department. **Security can be reached at extension 6175 or Emergency at extension 3333.** Security will notify the Environmental Department who will notify the appropriate agency.

REPORT- The Spill Report must be completed by the Supervisor and submitted to Security before the end of shift. Security will submit the completed form to the Environmental Department who will make the submittal to the appropriate agency.

2.1 Response Procedures

STOP LEAK ONLY IF SAFE TO DO SO!

STOP leak if possible

PREVENT spill from reaching drains or open water

PREVENT spill from entering confined spaces

PREVENT spill from reaching wetlands which are considered waters of U.S.

PREVENT unauthorized persons from entering the spill area

Eliminate Risk

1. Eliminate all ignition sources and open flames.
2. Shut down operating equipment if equipment has a leak.
3. Disconnect electrical power to facility if electrical sources pose a risk.
4. Stop unauthorized persons from entering the spill area
5. Notify appropriate personnel that a spill is occurring.
6. Gather personal protection equipment (as necessary).

7. Gather appropriate spill response equipment.

Containment and Assessment

1. Contain spill with sorbent booms or pads or berms.
2. Assess site for safety issues before beginning cleanup.
3. *CLEAN up free oils.*
4. *CLEAN up contaminated soil.*

Communicate

1. Notify supervisors, security department, and the environmental department.
2. Consult and notify emergency personnel ONLY if a danger is present.

2.2 Notification for Supervisors

Spill Reporting Requirements

Reporting spills is a crucial step in the spill response process. Spill reporting is mandated by state and federal statutes and regulations. Supervisors are responsible for ensuring that all spill reporting requirements are appropriately implemented.

State, local, and federal laws and regulations require spillers to report petroleum and hazardous material spills. Spill Report forms must be completed by the Supervisor. The Spill Report forms are located on the Fort Knox M drive at M:\Forms-Policies\Environmental\FK Spill Form.

2.3 Reporting Procedures

Contact appropriate Personnel

1. Stop and contain the spill. ONLY IF SAFE TO DO SO.
2. Immediately call your supervisor in the event of discovering a spill.
3. Contact the Security Department.

Provide Documentation

1. Complete the Spill Report Form to the best of your ability.
2. Turn the form into the Environmental Department.

3.0 FACILITY CONTACTS

**TABLE 3
FACILITY CONTACTS**

TITLE	OFFICE PHONE	CELL PHONE
Environmental Superintendent	907-490-2287	907-460-4303
Environmental Coordinator	907-490-2238	907-699-3211
Senior Environmental Engineer	907-490-2237	907-460-2208
Security (24/7)	907-490-6175	907-590-1005

Environmental Manager	907-490-2207	907-460-4972

4.0 WASTE DISPOSAL

Fairbanks Gold Mining, Inc.'s (FGMI) main goal for the Fort Knox Mine is "to be the model for environmental excellence." At Fort Knox, environmental compliance and protection is second only to human safety. This portion of the manual provides a definition of waste materials at Fort Knox, and correct disposal procedures for each.

Supervisors are responsible for informing employees of any changes implemented in the disposal of waste materials. Questions concerning waste disposal or this procedure manual should be directed to the Facility Contacts listed in Table 2.

5.0 WASTE INVENTORY AND DISPOSAL PROCEDURES

1. **ANTI-FREEZE/COOLANT:** All used Ethylene or Propylene Glycol will be taken to the Environmental Staging Area for recycling. Separate containers must be used for Ethylene and Propylene Glycol.

2. **BATTERIES:**

Alkaline

May be disposed of in the FGMI Landfill or sent to the FNSB Landfill.

Lithium/Cadmium (Rechargeable)

Dispose of these batteries in the warehouse for recycle. Used batteries will be accumulated in a labeled container before being sent offsite for recycle.

Lead Acid (Vehicle)

Take to the battery storage area between the warehouse and the ambulance bay until arrangements are made for returning the batteries to the vendor for recycle.

Lead Acid (Computer Back-up)

Take to the battery storage area between the warehouse and the ambulance bay until arrangements are made for returning the batteries to the vendor for recycle.

3. **BRAKE FLUID:** Dispose into used oil storage tank.

4. **CARBON FINES:** Collect in a properly labeled container in the Process Area. When full, containers will be sealed and placed on the concrete storage pad located just east of the refinery building. Containers will be transported offsite for further processing.

5. **CAUSTIC AND ACID SPILLS:** Such spills need to be handled with a chemical spill kit. All spill material should only be handled if it is safe to do so. All

contaminated material must be stored in the container provided with the spill kit and disposed of offsite.

6. **COMPRESSED GAS CYLINDERS:** All gas cylinders are recycled. Containers of ether and propane with the valve inside the top fitting must be purged of their contents at the ProSolv cylinder recycling apparatus located in the PM bay of the truck shop. The purged cylinders can be recycled as scrap steel.
7. **COMPUTER RECYCLING:** All computers are recycled through Dell Asset Recovery Service. Please see the IT Department for further details. For computer back-up batteries, see Batteries (item 2).
8. **CYANIDE BAGS:** Bags must be rinsed with fresh water three (3) times for a minimum of thirty (30) seconds, allowed to drain, and disposed of in the landfill.
9. **CYANIDE CONTAMINATED SOIL:** Cyanide spills must be reported to your supervisor and the Environmental Department. The contaminated soil must be reintroduced into the appropriate process stream or disposed of within the tailing storage facility. Try to get the entire spill without taking too much uncontaminated soil. Soil samples must be taken to verify that no cyanide has been left. The ADEC regulatory clean up level for WAD CN is 0.2 mg/L. .
10. **DESICCANT:** Oil contaminated desiccant must be placed in drums with the appropriate NFPA label and sealed to prevent leakage and contamination. Full drum are taken to the drum storage yard. Notify the Environmental Department.
11. **DRY CHEMICALS (LAB AND PROCESS):**

The following items must go to the FGMI landfill, dumpster, or tailing impoundment:

Borax (lab)

Silica Sand (lab)

Soda Ash (lab)

The following are oxidizers and/or require special handling: Handle with care. Do not mix with other materials. Place in separate container and make all possible efforts to return to the appropriate process. If not possible or you have any questions, call the Environmental Department.

Sodium Nitrate (refinery and lab)

Ammonium Bisulfite (detox)

Ammonium Nitrate (mine)

Cupric Sulfate (detox and lab)

12. **EMPTY DRUMS (PLASTIC AND METAL):** 55-gallon drums are considered empty when they contain less than 1" or 3% of volume of material. Once empty, the drum is to be crushed and transferred to the Crushed Drum Trench. Returnable drums (less than 1% residue) can be taken to the designated Drum Handling Facility (warehouse) for vendor pick up.
13. **EMPTY OIL CANS (LESS THAN 15-GALLON CAPACITY):** All oil or petroleum product containers (less than 1" or 3% of volume), can be disposed in the landfill.
14. **FIBERGLASS INSULATION:** Must go to the landfill.
15. **FLOOR SWEEP/FLOOR DRY AND ABSORBENT SOCKS, BOOMS, ETC.:** Petroleum contaminated material must be placed in NFPA labeled drums and sealed. Full drums are to be taken to the drum storage yard. Hazardous materials (acid, cyanide solution, etc.) soaked into absorbent materials must be disposed of per the hazardous material classification. Notify the Environmental Department.
16. **GLOVES:** Gloves are washed and re-used when possible. Neoprene gloves will be disposed after each use. Oil-soaked or grease covered gloves requiring disposal, as well as oil and grease contaminated rags and pads shall be stored in covered 55-gallon drums and burned onsite in the smart ash burners.
17. **GREASE:** Used grease will be placed in a labeled drum then sealed. When the drums have reached their capacity notify the Environmental Department.

Keep trash, spare parts, gloves, rags, etc. out of waste grease drums. Grease buckets and other containers with less than 1" or 3% contents are considered empty and can go to the FGMI landfill.
18. **HOSES:** All hoses must be drained prior to being disposed of in the FGMI landfill. Hoses containing cyanide or acids must be rinsed (for at least 30 seconds) and allowed to drain prior to being placed in the landfill.
19. **LABORATORY ACID WASTE:** Must be neutralized prior to being pumped into the Process Plant.
20. **LABORATORY CRUCIBLES, CUPELS, BRICK, FLUX, AND SLAG:** Laboratory crucibles, cupels, flux, slag, and assay furnace brick are recycled through the mill.
21. **LABORATORY CYANIDE WASTE:** Waste will be poured into any lab sump where it will go to the Process Plant.
22. **LABORATORY DI-ISOBUTYL KETONE (DIBK):** Must be placed into Hazardous Waste labeled accumulation container (HDPE 5-gallon drum) located in the wet lab. Notify the Environmental Department as soon as drum is full.

23. **LABORATORY SAMPLE WASTE:** Return sample prep waste to process.

24. **LIGHT BULBS:**

Fluorescent

Store used light tubes in original containers appropriately labeled. There is a used light bulb accumulation site located in the Mill MCC Room. All used light bulbs on the facility are packaged for recycling.

Sodium/Metal Halide and Incandescent Lamps

All light bulbs are recycled. Store used bulb in the manufacturer's container and place in the accumulation site that is located in the Mill MCC Room.

25. **LIME PEBBLES:** All spilled lime must be cleaned up and put back into the process at the designated area of the coarse ore stockpile.

26. **LUNCH TRASH:** Place in appropriate container for disposal into dumpsters located behind admin and mill buildings. Do not place in landfill.

27. **MORTALITIES (ANIMALS AND BIRDS):** Do not bury, take to landfill, or move dead wildlife species or domestic animals. Leave them where you find them, and immediately notify Security.

28. **OIL BASE PAINT: Small amounts** can be put into aerosol can aspirator drums located in MEM shop and carbon area of Mill. For large amounts a properly labeled drum will be used to consolidate all paint. The drum will be stored in Hazardous Waste Connex for shipment off site.

29. **OIL FILTERS:** The filter anti-drain back valve or the filter dome must be punctured and the filters must be crushed, or any equivalent hot-draining method, prior to going to the FGMI onsite landfill.

30. **PARTS WASHER SLUDGE:** Sludge from parts washers must be sampled and characterized to determine if it is hazardous waste. Notify the Environmental Department prior to sludge removal from parts washers.

31. **PETROLEUM CONTAMINATED Rock and Soil:**

Contaminated Rock and Soil, located inside the pit areas

To remain in compliance with the ADEC approved clean up alternative only the following locations may dispose of their contaminated material at the waste rock dumps:

- Mine pit;

- Waste rock dumps;
- In-pit haul roads;
- Ore stockpile locations; and
- Tailings Storage Facility (TSF) Dam portions.

Contaminated Soil, and rock smaller than 2 inches, located outside the Pit Area:
Store in properly labeled container. This material will be shipped to an authorized facility for thermal remediation.

32. **PLASTIC:** Plastic that is not contaminated with unacceptable material, but cannot be recycled, must go to the landfill.
33. **POP CANS (ALUMINUM):** Empty pop cans are to be deposited in the recycle bins located in the office, mine operations, mill operations, and mill maintenance lunchrooms.
34. **PRODUCT CONTAINERS:** Any container must be disposed of according to its contents and disposal instructions of the Safety Data Sheet (SDS). Petroleum containers are discussed separately. Hazardous material containers should be recycled with the vendor (if not, they can be triple rinsed and then placed in the landfill.)

Non-hazardous liquid containers must contain less than 1" or 3% of volume prior to transporting to the landfill. Large containers (over five gallons) must be crushed before being buried in the landfill. If you are not sure what is to be done with the container, call the Environmental Department.

35. **RADIOACTIVE SOURCE:** The Radiation Safety officer (wearing a radiation detection badge) will dispose of all radioactive sources. Contact the Radiation Safety Officer (#2256) or the Safety Department (#2215) for instructions and proper personal protection equipment, if necessary.
36. **REFINERY SLAG:** Refiners collect the slag in metal bins. Material ultimately is reprocessed.
37. **RUBBER:** Rubber products should go to the landfill unless contaminated with some other product. Contact the Environmental Department if you have any questions.
38. **SAMPLE PREP BAGHOUSE FILTERS:** Place in proper trash container for disposal in FGMI landfill.
39. **SCRAP METAL:** All scrap metal must go to the C&R scrap metal bins located east of the Mill Complex and by the MEM Shop.

40. **SOLVENT:** All solvent will be placed into a properly labeled container and taken to the drum storage area for proper disposal.
41. **SPRAY CANS:** All aerosol cans (any containers under pressure) must be punctured and drained in the aerosol can puncturing device. The puncturing devices are located in the MEM Shop, ALPM Shop, and carbon area of mill. All aerosol cans must be punctured prior to disposal in the FGMI onsite landfill. Contact the Environmental Department when the puncturing device collection drum (liquid) is 80% full.
42. **STYROFOAM PRODUCTS:** All Styrofoam products must either be returned to the warehouse for re-use or taken to the FGMI onsite landfill or dumpster. Styrofoam peanuts and other small pieces that must be disposed of should be put in boxes or bags to assure confinement to the landfill or dumpster.
43. **TIRE WEIGHTS:** All used tire weights will be contained at the tire shop in a properly labeled container. When full, the Environmental Department will arrange for transport and recycling.
44. **TIRES:** Unusable small vehicle tires can be disposed of in the solid waste landfill trench or Yellow Pup Waste Rock Dump. All large loader and truck tires must be buried in the Yellow Pup Waste Rock Dump.
45. **USED OIL:** Recyclable used oil and diesel fuel will be taken to the MEM or ALPM Shops to be pumped into the used oil storage tanks. **Do not put antifreeze or grease in the used oil tank.**
46. **USED RAGS AND ABSORBENT PADS:** Oil and grease contaminated rags and pads must be stored in labeled 55-gallon drums and incinerated in the smart ash burners.
47. **WASH BAY SOLIDS:** Solids from the wash bay will be taken to an active waste dump.
48. **WELDING RODS:** All used welding rods must go to an appropriate scrap steel bin (not to landfill). Welding rods have the characteristic metals that classify them as a hazardous waste. Any welding rods requiring disposal will need to be taken to the Environmental Departments hazardous waste connex.
49. **PAPER PRODUCTS:** Place in proper trash container for disposal in the FGMI onsite landfill or dumpster.
50. **WOODEN BAG BOXES AND CARDBOARD FROM BLASTING SUPPLIES:** All wood from cyanide bag boxes, pallets, and cardboard containers from blasting supplies go in the burn pit. The Environmental Department is responsible for burning this debris.

51. **CARBON REGENERATION KILN HEPA FILTERS:**

Spent HEPA filters generated from the Carbon Regeneration Kiln HEPA unit will be properly containerized at time of change out. The container will be properly labeled with "Hazardous Waste" label. The containerized spent HEPA filters will be transported to the waste disposal area managed by the Environmental Department.

52. **CARBON REGENERATION KILN UHF FILTER MEDIA:**

Spent roll filter media generated from the Carbon Regeneration Kiln UHF filtration unit will be properly containerized at time of roll change out. The container will be properly labeled with "Hazardous Waste" label. The containerized spent roll filter media will be transported to the waste disposal area managed by the Environmental Department.

53. **CARBON REGENERATION KILN AND REFINERY SCRUBBER CARBON:**

Carbon removed from either carbon scrubber will be properly containerized and managed in accordance with the Environmental Department and regulatory requirements for continual use as a product, recycling, reclaiming, and waste management. If the carbon is managed as a waste material, containerized spent carbon will be transported to the waste disposal area managed by the Environmental Department. The containers will be properly labeled as determined by the Environmental Department.

6.0 DEFINITIONS (listed in alphabetic order)

DRUM STORAGE YARD: Storage areas for drums awaiting disposal (new drums are available through the warehouse).

HAZARDOUS WASTES: Wastes that exhibit one or more of the following criteria:

- Toxicity
- Ignitability
- Reactivity
- Corrosivity
- Characteristic 8 RCRA Metals

HOUSEKEEPING: Good housekeeping means having all waste materials properly contained and labeled. Good housekeeping is both a permit requirement and a MSHA regulation. This encompasses the mine access road to the main gate and the Millsite Permit/Project area.

PROPER LABELING: All containers must be clearly labeled with National Fire Protection Association (NFPA) labels or Hazardous Waste labels identifying their contents. Please contact the Environmental Department if you have any questions.

REPORTABLE SPILL: All petroleum spills of one gallon or greater and any amount of a hazardous material. Please refer to Table 2

SATELLITE ACCUMULATION AREA: An area in an individual laboratory, shop, or other facility designated by the generator for the accumulation of hazardous waste. Must not exceed 55 gallons of hazardous waste. Must be correctly labeled and comply with storage time limits.

SEALED CONTAINER: For this manual, sealed means closed to the extent incidental contamination will not occur and tipping will not cause leakage.

SECONDARY CONTAINMENT: A container designed to hold one or more containers for the collection of liquid waste in a laboratory or shop area. Examples of secondary containment include plastic tubs or buckets, and pail skids.

SEGREGATION: The practice of not placing chemically unrelated or incompatible materials in the same container.

SEPARATION: The practice of keeping containers of incompatible wastes apart physically. Example is not placing chemically covered shop towels into trash containers.

SPILLS:

Hazardous Substance Releases

Any release of a hazardous substance *must be reported* as soon as the person has knowledge of the discharge.

Oil/ Petroleum Releases

To Water: Any release of oil to water *must be reported* as soon as the person has knowledge of the discharge.

To Land: Any release of oil in *excess of 55 gallons* must be reported as soon as the person has knowledge of the discharge. Any release of oil in *excess of 10 gallons but less than 55 gallons* must be reported within 48 hours after the person has knowledge of the discharge. A person in charge of a facility or operation shall maintain, and provide to the Department on a monthly basis, a written record of any discharges of oil *from 1 to 10 gallons*.

To Impermeable Secondary Containment Areas: Any release of oil *in excess of 55 gallons* must be reported within 48 hours after the person has knowledge of the discharge.

WASTE: Something that no longer has beneficial use and should be discarded.

SATELLITE ACCUMULATION AREA (SAA): An officially designated area for the accumulation and storage of hazardous waste. Specific regulations apply to SAAs,

including security, labeling and signage, contingency plans, and emergency equipment. Satellite Accumulation Areas cannot exceed quantities > 55 gal.

APPENDIX C
Smart Ash Burner Operating Instructions



SmartAsh Cyclonic Barrel Burner

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Elastec, Inc warrants these products against defects in material and workmanship under normal use and service for a period of **Six Months**.

Elastec Inc.'s obligation under this warranty is limited solely to repairing or replacing parts, which in its judgment are defective in material and/or workmanship.

We shall not be liable for expenses incurred in repairs or alterations made outside our factory in Carmi, Illinois or licensed dealer locations, without our prior authorization, nor shall we be responsible for the performance of this product to which any revisions or alterations have been made by others.

We shall not be, in any event, liable for damages or delays, nor for any consequential, special, or contingent damages for breach of warranty.

CONTACT INFORMATION

Elastec/American Marine
1309 West Main Street
Carmi, IL 62821
USA

Telephone: +1 (618) 382-2525
Fax: +1 (618) 382-3610
E-mail: elastec@elastec.com
Website: www.elastec.com

This manual contains information on the operation and maintenance of the SmartAsh Cyclonic Barrel Burner manufactured by Elastec / American Marine. All data in this publication is based on the latest product information.

Elastec / American Marine reserves the right to make changes at any time without notice and without incurring any obligations.

If a problem is encountered, or if you have questions about your Elastec / American Marine equipment, please call one of our consultants at **(618) 382-2525**.

Elastec / American Marine products are designed to provide safe and dependable service when operated according to instructions. It is important to read and understand this manual before operating this system. Failure to do so may result in personal injury or equipment damage.

Your Serial Number is _____

✦ SERIAL NUMBER MUST BE INCLUDED WHEN ORDERING PARTS.

WARNING: Not for use with materials containing liquids such as gasoline or paint thinners. All materials must have a flash point higher than 100 degrees Fahrenheit (38 degrees Celsius)!

The air powered SmartAsh uses no external fuel. Simply load a 55 gallon (208 liter), open head steel drum, light the load, and clamp on the lid. A whirlwind of fire and intense heat is created inside the drum, burning your refuse with no smoke and no smell. Thousands of satisfied customers are currently using SmartAsh around the world to eliminate a wide variety of burnable waste materials. Combustion is complete, leaving ash equal to 3% by volume of the original load.

Refer to Components Identification found on Page #5 to identify the major components to be discussed in this manual. Listed below are some of those components:

- Blowers: Two blowers behind the motor cover draw air into the plenum. The air feeds to the drum through the air hose and lid.
- Spark Screen and Spark Deflector: The lid has two elements to block emissions of burning material: the spark screen on top and the internal spark deflector which can be seen beneath the exhaust vent in the lid.
- Clamps: Four clamps hold the lid in place during burning.
- Port Hole and Port Hole Cover: The porthole can be found on the lid and can be closed by rotating the cover back into place.

CAUTION: If unit has been in operation, the porthole cover will be hot. Use the end of the stir rod to close to avoid injury.

- Air Shutter Control: Regulates air flow and controls the blower output.
- Saf-Start Unit: Safety device that prevents SmartAsh from restarting automatically after a power disturbance or interruption even if the switch is left in the "On" position.

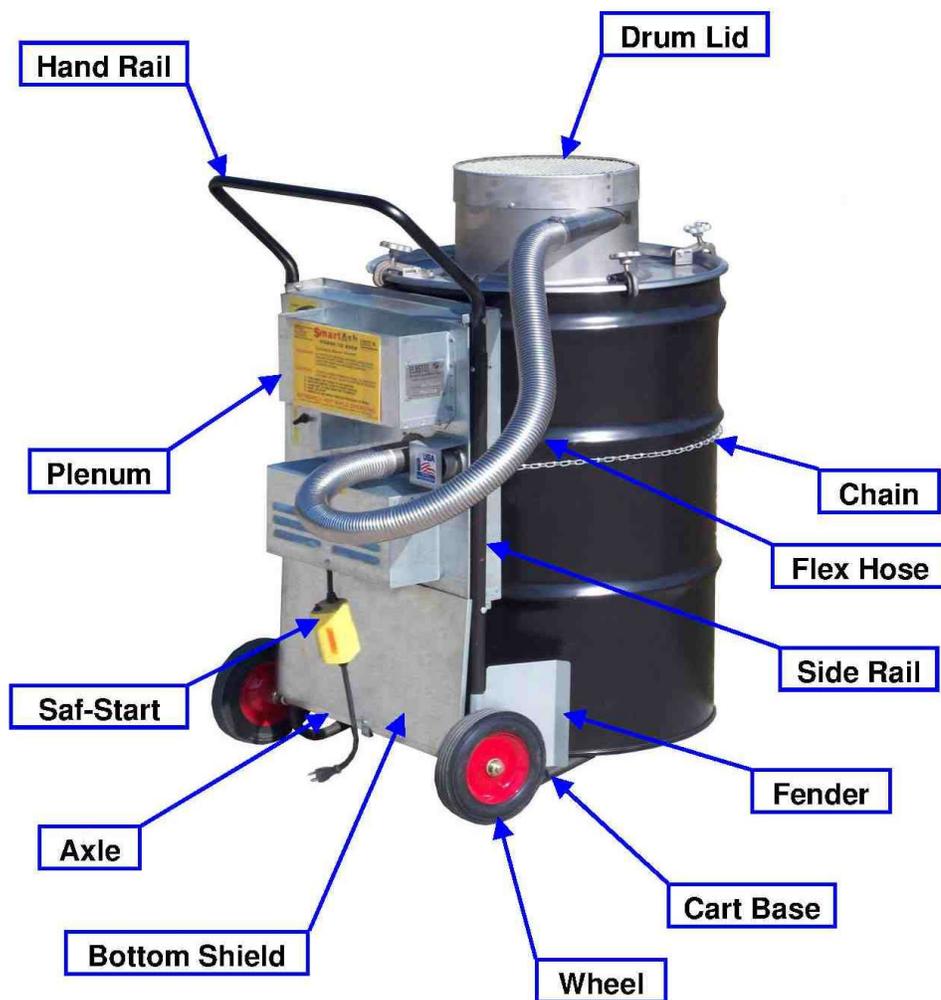
Before the first burn, the operator should practice mounting the lid on the drum and securing it with the clamps. It is also a good idea to walk through the ignition procedure a few times prior to the first burn to become acquainted with the operation of the system.

To avoid accident or injury, please follow these safety precautions:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Care should be taken to ensure this product is disconnected from the power source when there is a chance water may come in contact with the electrical connection.
4. Operator must ensure the SmartAsh is on stable ground and in no danger of falling or tipping.
5. Operator must wear safety glasses and gloves at all times during operation.
6. The combustion system must stand free and clear of surrounding buildings, vegetation, or other combustible material. Please allow 10 feet (3 meters) of space. Care should be taken to ensure that no flammable items are above the emission screen.
7. Never touch the combustion chamber (steel drum) or lid while incinerating refuse.
8. Refer servicing to qualified personnel under the following conditions:
 - The power supply cord is frayed or damaged.
 - Liquid has been in contact with the electrical system.
 - The product has been damaged and exhibits a distinct change in performance.
9. Do not operate this product in the vicinity of flammable gases.
10. Aerosol or pressurized cans cannot be incinerated in this system.
11. If the operator is unsure if certain items can be safely incinerated, consult the manufacturer for details and instructions. Please refer to Page #1 for contact information.
12. Use only outdoor three-wire electric cord connected to a grounded outlet. Do not run cord over wet ground. Keep cord away from drum. If cord becomes damaged, replace immediately.
13. Ensure no aerosol cans are in the load.
14. Ensure clothing does not come into contact with drum or lid during burning.

Tools Required: Hammer, Phillips Screwdriver, Adjustable Wrench (or 7/16" and 3/8" Sockets)

Components: Assembly Kit (2 Wheels, 2 Fenders, Chain, Fasteners), Plenum, Drum Lid, Flex Hose, Cord Lock, 2 Side Rails, Cart Base, Hand Rail, Bottom Shield, Axle, and Stir Rod (in 2 parts)





1. Place cart base on work surface.



2. Mount wheel and push nut onto wheel. Wheel has step shoulder on one side. Ensure shoulder is facing in toward axle.



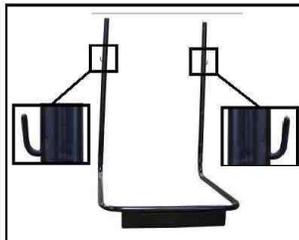
3. Use hammer to drive on push nut.



4. Repeat Steps #2 and 3 for second wheel to complete axle assembly.



5. Place axle assembly near open side of cart base. Ensure axle tabs are on the inside.



6. Ensure chain hooks are on the outside.



7. Ensure mounting holes are lined up in lower portion of side rail.



8. Line up axle tab mounting holes with side rail mounting holes.



9. Using (2) 1/4" bolts on each side, mount axle tabs to side rails.



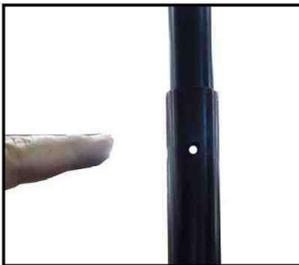
10. Install fender to side rail with 1-1/2 long screw using the top hole only. Fender flare is to the outside.



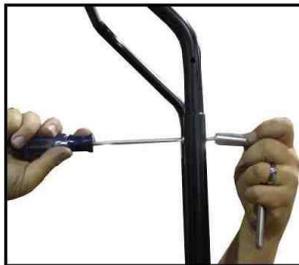
11. Repeat Step#7 for second fender.



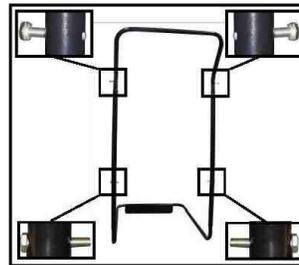
12. Insert cart handle into side rails.



13. Ensure mounting holes are lined up in upper portion of side rail.



14. Use 1/4" screws and nuts to attach handle to side rails and tighten.



15. Install 1/4" bolts into side rails as shown. Lower bolts should be screwed in all the way; upper bolts through side rails only.



16. Slide bottom shield onto plenum as shown.



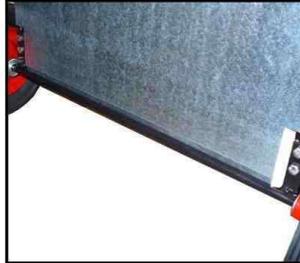
17. Ensure mounting holes are lined up and attach plenum to bottom shield using 2 screws.



18. Place plenum between side rails. This is a tight fit.



19. Plenum should rest on screws in lower side rails as shown.



20. Ensure bottom shield in front of axle.



21. Install 1/4" bolt into uppermost portion in each side rail. Ensure bolt goes through plenum mounting hole.



22. Tighten bolt.



23. Repeat Steps #22 and #23 on other side.



24. Set open head drum onto cart.



25. Attach chain to hook as shown.



26. Wrap chain around barrel. Pull tight to remove any slack and attach to second hook.



27. Set drum lid on drum.



28. Rotate clamps into position and tighten by turning knob.



29. Slide flex hose over snap button on 2 inch outlet on plenum.



30. Slide flex hose over snap button on 2 inch inlet on drum lid.



31. Install plug in cord lock.



32. Assemble stir rod by inserting upset end over straight end and push together.



33. See above for assembled unit.

The first step in getting your SmartAsh ready is to determine the electrical power required for your particular unit (110 volt or 220 volt). You will then need to choose the correct electrical outlet for the unit. **NOTE: Choose an outlet with a 20 amp breaker or greater.** Due to the high amperage draw of the SmartAsh, it should be the only appliance on the circuit when possible. The 110-volt unit draws 27 amps at start-up and 14 amps during operation. The 220-volt unit draws 9 amps at start-up and 7 amps during operation.

Saf-Start mechanisms are installed on SmartAsh units to guard against improper restart of the unit after a power interruption has stopped the airflow.

Saf-Start is a very sensitive electrical control device. It will disengage when there is a power interruption or fluctuation in the power supply that is below recommended levels. It will even detect a split second fluctuation that is below the recommended levels.

In some instances, the power supply switch is turned on and the Saf-Start disengages due to an overloaded circuit. The operator may need to reduce the number of appliances on the circuit, use an outlet on a different circuit, or reduce the length of the extension cord used.

NOTE: The Saf-Start must be reset each time the unit is plugged in.

SELECTING A DRUM

- Use a standard open head 55 gallon drum in good condition.
- The lip must not be damaged.
- The drum lid will not fit a “de-headed” oil or chemical drum.
- Do not pierce holes in the drum.
- If the lid does not fit, the drum may be out of round. Check the drum and correct as follows:
 1. Measure across top of drum in several directions. If there is a difference of more than 1/4 inch (6 millimeters) in measurements, the drum is out of round and needs adjustment.
 2. To correct, place drum on its side with the “long” measurement vertical. Lean on the drum rim and use body weight to depress the rim.
 3. Re-measure the drum and repeat the process until correction is made.

NOTE: If the drum is painted, it may smoke when used for the first time.

REQUIRED ACCESSORIES

Three-wire, Outdoor Electrical Extension Cord
 Under 25 feet (15 meters) = No lighter than 18 ga
 Over 50 feet (30 meters) = No Lighter than 16 ga
Safety Glasses
Gloves (appropriate for hot surfaces)
Several Sections of Newspaper or Cardboard
Matches or Lighter

PREPARING TO BURN

1. Select a site at least 10 feet / 3 meters from buildings, hedges, and trees. Place SmartAsh on bare ground, gravel, or concrete. Do not burn on asphalt surfaces, lawn or ground with dry vegetation as drum bottom becomes very hot.
2. Position SmartAsh so cart, air supply, and operator are upwind and drum is downwind.
3. Connect SmartAsh plug to extension cord and cord to grounded electrical outlet. Depress the reset button on Saf-Start plug.

WARNING: To prevent accidental interruption of burning, install cord lock and arrange slack in cord beneath plug-in.

NOTE: If there is a power interruption during the operation of your SmartAsh unit, follow the steps below for restart:

1. Turn toggle switch to OFF position.
2. Move air control latch to start position.
3. Allow unit to cool down for 10 minutes.
4. Reset Saf-Start.
5. Remove lid and repeat ignition procedure as normal.

WARNING: Failure to observe these cautions may result in rapid internal combustion when air returns. This could cause damage to the drum lid or lip and could cause possible personal injury.

CAUTION: Operator must wear safety glasses and gloves at all times during operation.

1. When burning oil-soaked absorbents, place a layer of unused absorbents in the drum first. This will absorb free liquids that drain from oily materials during burn. Load the oily materials. Note: The drum has expanded rings that encircle it. These are called rolling hoops. Do not put load material above the top hoop. Ample space over the load encourages good start-up and efficient burn.
2. Prepare the load for ignition by adding a top layer of paper or cardboard. The paper supplies a fast, easy initial fuel source for start-up. If load appears difficult to ignite, lay a section of newspaper on top of the load with one corner in forward area. **WARNING: DO NOT USE GASOLINE TO START THE BURN.**
3. Place lid on drum with inlet pipe pointing to rear and the clamps resting on top of the lid. Lift lid and slide it to the rear between arms of cart handle, leaving front part of drum uncovered.
4. Insert air hose in lid.
5. Light prepared segment of paper. Turn on power.
6. When fire is established, grasp front and back lid handles and place lid on the drum.
7. Apply clamps as follows:
 - Lower all clamps to rim of lid.
 - Push all clamps inward toward drum. If clamp encounters resistance, it is because screw attached to hand wheel is sticking out below clamp and obstructing clamp movement. Correct by spinning hand wheel counterclockwise to retract screw.
 - When clamps are in position against drum, tighten all clamps evenly so that lid fits properly. This will ensure a good seal.
 - Clamps are in the correct position when the back end of the clamp is flush with back end of clamp mounting bracket.
 - When applying clamps, walk to the back of the unit from clamp to clamp to avoid the exhaust stream.

NOTE: Unit may briefly smoke until it reaches the operating temperature.

8. Take position behind the cart. Turn control latch slowly from “Start” to “Run” until visible and audible signs indicate fire is burning vigorously.

CAUTION: Operator must wear safety glasses and gloves at all times during operation.

The air control setting should be checked periodically during burn.

Advance control latch as far as possible without causing gusting or turbulence. If unstable conditions arise, turn control latch back slowly to "Start" position.

Optimum control latch setting produces vigorous yet smooth combustion.

TERMINATING BURN

1. Progress of the burn near termination can be judged by observation through the porthole or by insertion of the manufacturer-supplied Stir Rod into the porthole.

CAUTION: Stir Rod is specially designed to prevent flame from traveling through rod during stirring. Do not use anything other than this rod to stir contents of burner during operation.

2. If drum interior is completely dark, or if the Stir Rod reaches the bottom of the drum without obstruction, the burn is usually complete.
3. Termination of burn is frequently indicated by a dusting or smoking episode.
4. If observation through the porthole reveals that fire is still present but only in part of the drum, the termination of the burn can be expedited by breaking up remaining clots of flame with stir rod.
5. When the burn is complete, the unit should be allowed to cool for several minutes. Avoid touching the clamps or porthole until unit has cooled. Be sure to wear gloves when removing the lid.

DO NOT BURN ABSORBENTS THAT CONTAIN VOLATILE LIQUIDS SUCH AS GASOLINE.

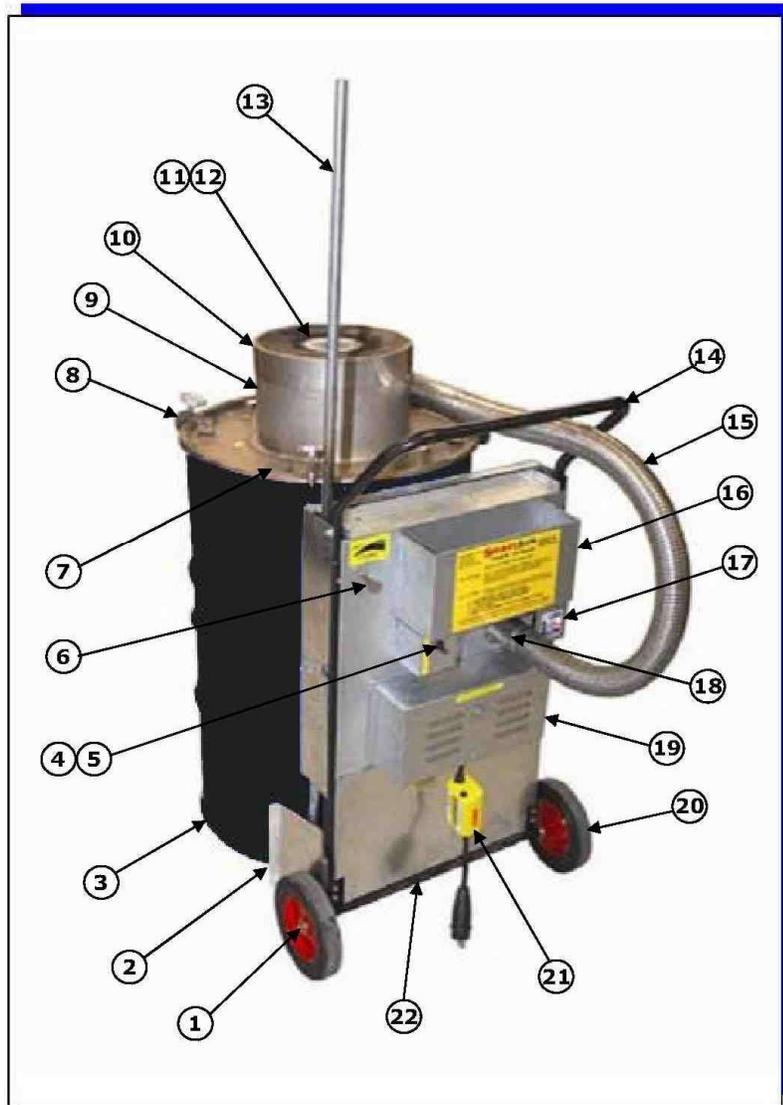
DO NOT BURN MATERIALS WITH A FLASH POINT LOWER THAN 100 DEGREES FAHRENHEIT (38 DEGREES CELSIUS).

Before loading oily absorbents, load drum with a layer of new absorbent material. They should cover the bottom of the drum and be approximately one to three inches deep.

Do not burn absorbents that are over saturated with oil. Allow them to drain. If oil liquids are present, add more absorbent material.

Do not attempt to burn absorbents that are water-soaked, even if they are mostly soaked with oil. Allow the water to drain away.

An ample amount of paper or cardboard must be used as starter fuel to generate the heat required to sustain a fast quality burn.



110v Parts List		
Item#	Part #	Description
1	4AXLENU010	Axle Push Nut
2	4FENDCA010	Fender
3	4DRUMOP012	Open Head Drum (Optional)
4	4SWITTO010	Toggle Switch 110v
5	4BOOTTO001	Toggle Switch Boot
6	4LATCAI010C	Air Shutter Control
7	4COVEST010	Stir Port Cover
8	0KIT-LI510	Lid Clamp Assembly
9	4LID-DR010	Drum Lid Assembly
10	4BANDTO001C	Top Band S/S
11	4SPACSC010	Screen Spacer
12	4SCRESP010	Spark Screen
13	4ROD-ST000	Stir Rod
14	4CARTSM010C	Cart SmartAsh Assembly
15	4HOSEFL708	Flex Hose S/S 45"
16	4PLEN--110C	Plenum Box Assembly
17	4COVEAI010	Air Port Cover
18	4AIRP-036C	Air Port 2-1/4"
19	4COVEBL010	Blower Cover
20	4WHEECA010	Cart Whee
21	0KIT-SA110	Saf-Start Kit
22	4AXLECA080	Axle
23*	4LOCCO010	Cord Lock (Not Shown)
24*	4SHIEBO010	Bottom Guard (Not Shown)

220v Parts List		
Item#	Part #	Description
1	4AXLENU010	Axle Push Nut
2	4FENDCA010	Fender
3	4DRUMOP012	Open Head Drum (Optional)
4	4SWITTO010	Toggle Switch 110v
5	4BOOTTO001	Toggle Switch Boot
6	4LATCAI010C	Air Shutter Control
7	4COVEST010	Stir Port Cover
8	0KIT-LI510	Lid Clamp Assembly
9	4LID-DR010	Drum Lid Assembly
10	4BANDTO001C	Top Band S/S
11	4SPACSC010	Screen Spacer
12	4SCRESP010	Spark Screen
13	4ROD-ST000	Stir Rod
14	4CARTSM010C	Cart SmartAsh Assembly
15	4HOSEFL708	Flex Hose S/S 45"
16	4PLEN--220C	Plenum Box Assembly
17	4COVEAI010	Air Port Cover
18	4AIRP-036C	Air Port 2-1/4"
19	4COVEBL010	Blower Cover
20	4WHEECA010	Cart Wheel
21	0KIT-SA220	Saf-Start Kit
22	4AXLECA080	Axle
23*	4LOCCO010	Cord Lock (Not Shown)
24*	4SHIEBO010	Bottom Guard (Not Shown)

In this version of the SmartAsh Cyclonic Barrel Burner, the plenum has been designed to allow the unit to be wall-mounted. This eliminates the need for the cart assembly. The length of the flex hose that connects the plenum assembly to the drum top has been increased as well. If you plan to use the SmartAsh Cyclonic Barrel Burner in one fixed location, this would be a good choice.

Parts List		
Item#	Part #	Description
3	4DRUMOP012	Open Head Drum (Optional)
4	4SWITTO010	Toggle Switch 110v
5	4BOOTTO001	Toggle Switch Boot
6	4LATCAI010C	Air Shutter Control
7	4COVEST010	Stir Port Cover
8	0KIT-LI510	Lid Clamp Assembly
9	4LID-DR010	Drum Lid Assembly
10	4BANDTO001C	Top Band S/S
11	4SPACSC010	Screen Spacer
12	4SCRESP010	Spark Screen
13	4ROD-ST000	Stir Rod
15	4HOSEFL716	Flex Hose S/S 96"
16	4PLENSP110C	Plenum Special Assembly
17	4COVEAI010	Air Port Cover
18	4AIRP-036C	Air Port 2-1/4"
19	4COVEBL010	Blower Cover
21	0KIT-SA110	Saf-Start Kit
23*	4LOCCO010	Cord Lock (Not Shown)

In this version of the SmartAsh Cyclonic Barrel Burner, the plenum has been designed to allow the unit to be wall-mounted. This eliminates the need for the cart assembly. The length of the flex hose that connects the plenum assembly to the drum top has been increased as well. If you plan to use the SmartAsh Cyclonic Barrel Burner in one fixed location, this would be a good choice.

Parts List		
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5	4BOOTTO001	Toggle Switch Boot
6	4LATCAI010C	Air Shutter Control
7	4COVEST010	Stir Port Cover
8	0KIT-LI510	Lid Clamp Assembly
9	4LID-DR010	Drum Lid Assembly
10	4BANDTO001C	Top Band S/S
11	4SPACSC010	Screen Spacer
12	4SCRESP010	Spark Screen
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18	4AIRP-036C	Air Port 2-1/4"
19	4COVEBL010	Blower Cover
21	0KIT-SA110	Saf-Start Kit
23*	4LOCCO010	Cord Lock (Not Shown)

Parts List	
Part #	Description
0KIT-SP110	Spare Parts Kit (For 110V)
0KIT-SP220	Spare Parts Kit (For 220V)
4SCRESP010	Spark Screen
0KIT-MO010	Replacement Motor (For 110v Version)
0KIT-MO020	Replacement Motor (For 220v Version)
0KIT-AI820	Air Port Kit
4FILTHO010	Filter Holder
0KIT-FI072	Filter Kit
4KEEPPFI010	Filter Keeper
4AIRP-020	Air Port 1-1/4"
4BRACSW000	Switch Bracket
4DEFLSP010	Spark Deflector Assembly
4CAP-SM010	Cover Cap
0KIT-SN010	Snap Button Kit
4CHAIDO010	Double Loop Chain
4GRATSM010	Grate Complete (Optional)

WARNING: Unit must be disconnected from power source before performing any maintenance.

REMOVING MOTORS

1. Place air supply on flat surface with the motor side facing up. Remove motor cover.
2. Unscrew nuts holding switch in place and drop switch back through mounting hole into air supply interior.
3. Remove screws holding motor mounting plate in place on air supply. Remove motor assembly which consists of the motor plate, two motors, switch, and wiring.
4. Remove long screw from motor plate that supports motor cover. To do so, hold nut on screw with needle nose pliers or 3/8 inch open wrench. Loosen screw with screwdriver and turn nut off screw with fingers. Remove screw from motor plate and attach nut to screw.

AIR FILTERS

Check conditions of air filters located on motors frequently.

1. Remove motor cover on back of air supply by removing wing nut .
2. Pry retaining harness off pegs and lift out filter.
3. Clean air filter by using the unit's air hose. Hold clean side of filter to the air hose and blow dirt away. Replace if blocked or damaged.

EXTERNAL SPARK SCREEN

1. Tap center of screen to remove encrusted ash.
2. To replace spark screen, remove three screws holding screen housing to top of lid and remove inner parts.

INTERNAL SPARK DEFLECTOR

The deflector is held in position by tabs on two of its legs that trap the inner edge the drum lid and a cotter pin that attaches the third leg to the drum lid.

To remove the deflector, pry points of cotter pin up straight, hold them together with pliers and tap pin down through the deflector leg. Pull pin free with pliers.

When not in use, SmartAsh should be covered and stored indoors. Insert stir rod through porthole in drum. Store chain in accessories tray.

Load drum at burning site rather than wheel a loaded drum to the site.

PROBLEM	PROBABLE CAUSE	SOLUTION
Excessive smoke	Poor start	Remove lid. If fire is smoldering or burning weakly, restart with newspaper on top of load.
	Unsuitable or wet material	Remove or dump material. Restart with proper, dry load.
	Too much free oil has leaked from sorbents	Stop burn and add new absorbent materials to soak up excess oil.
Lid leaks	Clamps loose or not properly seated	Re-seat clamps and tighten.
	Bent drum lip	If severe, replace drum. If bent only on the underside, rotate drum so clamps fasten on the unbent section. Drum should be replaced at earliest convenience.
	Lid warped from exposure to excessive temperatures	Leaking area can usually be sealed by a vise grip welding clamp Model 9R or equivalent available in hardware stores. Drum should be replaced at earliest convenience.
Weak air flow	Clogged air filters.	Clean or replace air filters. See Page #19 for instructions.
	Air control not working properly	Check air control latch for proper operation.
	Motor failure	Remove motor cover, filter harness, and filter to expose motor. If power is on and motor does not turn, it will have to be replaced.
Saf-Start disengages with power supply switched on	Circuit overload	Reduce the number of items on the circuit or use another outlet on a different circuit. Reduce the length of the extension cord.
Lid sticks on drum	Drum is out of round.	Pull upward on one lid handle while tapping side of drum immediately below with hammer. Proceed to next handle and repeat until lid pulls free. To correct drum condition, see "Selecting Drum".
Unit does not start.	Saf-Start has not been engaged.	Engage Saf-Start. See Page #11 for instructions.

Absorbents

1. Cellulose-base type: Good, clean burn resulting in very little ash.
2. Cotton: Good, clean burn as long as moisture content is low.
3. Polypropylene & Cotton Mix: Since this material is water-repellant, moisture content is not a problem. **WARNING: Some states only allow 20% by volume of poly products to be incinerated.**
4. Corn Cobs: Good burn as long as it is not overly saturated with fluid.
5. Saw Dust
6. Peat Moss: Hot, clean burn when it absorbs diesel or oil.

When burning these materials, it is helpful to line the drum with clean, dry absorbents. This will catch any fluids that leach out during operation of the unit. Always load the drum 2/3 full and add a proper amount (6-10 pages) of newspaper to start the incineration process. Light the newspaper, re-install the lid, and then adjust air flow to the "Run" position. The SmartAsh will incinerate approximately 50 pounds per hour. The burn time of the unit will depend on the absorbent type and volume loaded in the drum.

Hydrocarbons

1. All Types of Crude Oils: Extremely hot, clean burn when mixed with Cellulose, Cotton, Poly Cotton Mix, or Pete Moss absorbents. This can cause the lid assembly and drum to glow red from the extreme heat. Do not be alarmed as this is common with these types of fuels.
2. Used Motor and Waste Oils: Hot, clean burn when mixed with Cellulose, Cotton, or Poly Cotton Mix absorbents.
3. Transmission and Hydraulic Oils: Clean burn when mixed with Cellulose, Cotton, or Poly Cotton Mix.
4. Lubricating Greases: Best burn when mixed with Cellulose, Corn Cobs, or Saw Dust. The operator must thoroughly mix the absorbent with the grease. The bottom of the drum should be lined with clean, dry absorbents to catch any liquids formed while the unit is in operation.
5. Diesel Fuel #1, Diesel Fuel #2, and Kerosene: Very hot, clean burn when mixed with Cellulose, Cotton, Poly Cotton Mix, or Peat Moss absorbents.
6. Jet Fuels: These fuels burn with similar characteristics as Diesel Fuels and Kerosene and should be handled in the same manner.

The above fuels must be absorbed in a burnable type of absorbent. Materials to be incinerated must have a flash point higher than 100 degrees Fahrenheit (38 degrees Celsius). These fuels will burn very hot and typically very clean depending on the type and amount of absorbent used. To reduce the chance of smoking, the absorbent must not be overly saturated with fuels. To ensure a clean burn, work with the ratio of one pound of absorbent for each pound of fluid.

<p>Filters</p> <ol style="list-style-type: none"> 1. <u>Spin-on and Cartridge Oil Filters from Cars, Trucks, and Heavy Equipment:</u> Requires a fuel source to properly incinerate. Burning is best achieved by burning with a load of used oily absorbents or wood products. These products burn very hot and will achieve the best results. After the burn is complete, the steel canister is all that remains. It should be recycled or disposed of in a landfill. 2. <u>Air Filters of All Types:</u> Burns good because most of these are paper-based and can sustain a flame on their own. All that is required to start and sustain the burn process is an ample supply of newspapers. 3. <u>Poly & Fiberglass Ventilation Filters:</u> Incineration is similar to the above listing. The only difference is in the ash created from burning fiberglass filter. It will be fist-sized clumps instead of a powder. 4. <u>Natural Gas Pipeline Filters (Glycol Filters):</u> Burns very hot. The fibers in this type of filter are impregnated with natural gas. All that is required to start and sustain the incineration process is an ample supply of newspapers.
<p>Paper Products (An optional Document Burner is available for large amounts.)</p> <ol style="list-style-type: none"> 1. <u>Newspapers:</u> Burn best when shredded. This allows for more air flow. 2. <u>Office Waste:</u> Burns good since there is always ample paper in the waste to start the burn process. 3. <u>Cardboard:</u> Burns very hot and fast. Newspapers are helpful in starting the incineration process. 4. <u>Fast Food Paper Waste:</u> For proper burn, material must be dry. Once dry, the lighting of the waste is all that is required to start the incineration process. 5. <u>Computer Paper and Sensitive Documents:</u> Burns good when stacked in the drum with no obstructions. The air flow in the drum picks up each individual paper and burns it completely.
<p>Wood Products</p> <ol style="list-style-type: none"> 1. <u>Saw Dust:</u> Burns good and will incinerate on its own. The addition of diesel fuel or waste oil will speed up the burn process and eliminate the need for disposal. 2. <u>Construction Site Scrap and Shipping Pallets:</u> Burns very good. All that is required to start the incineration process is a small amount of oil or diesel (No gasoline or paint thinner.) and some newspaper. This will create a fast start with little smoke. 3. <u>Tree Limbs & Leaves:</u> When burning, these items should be mixed if possible. The leaves will ensure the proper incineration of the tree limbs. Any yard waste material to be burned should be dried because the high moisture content. Lighting of the leaves is all that is required to start the incineration process.

<p>Miscellaneous</p> <ol style="list-style-type: none"> 1. Clothing 2. Gloves 3. Oily Rags 4. Packaging Materials <p>These kinds of materials will burn very good. Moisture content must be low to ensure proper incineration. To start the process, it is necessary to add and light an amount of cardboard and newspapers to the top of the materials.</p>
<p>Plastics</p> <p>This unit will incinerate a variety of plastics. An oily absorbent and plenty of newspaper will be required to start the actual incineration of the plastic. The plastic will melt down to a molten state, and then will burn very hot. Although the unit will incinerate plastics with no smoke, emissions are often not acceptable with individual state's air quality standards. WARNING: Plastics should not be incinerated without approval from your state officials.</p>
<p>Use of Liquid Oils/Diesel Fuels/Fuel Oils (An optional OilAway Attachment is available for large amounts.)</p> <p>Successful testing has been completed for disposing of free oils containing no absorbent materials. Although care in loading the drum is needed, it is an alternative to mixing absorbent with the oil for disposal in SmartAsh.</p> <p>A maximum of 20 gallons of liquid per load is recommended. Some small pieces of wood material are required for the disposing of oils in this manner. Four to five pieces of 2"x4" material 6" in length is sufficient. The wood pieces are put into the unit and allowed to float on the oil and act as a wick to support the flame. The unit is ignited in the same fashion as other materials being disposed of in the unit.</p> <p>CAUTION: Do not overload the drum (20 gallon maximum)! If the drum is overloaded during the incineration process, the oil will become hot and boil over, causing severe damage to the unit components.</p>

APPENDIX D
Landfill Inspection Form

Solid Waste Landfill (Environmental)	Inspector Initials & Date:					
Hazardous material in landfill?						
Unacceptable material e.g. boxes, paper or crates that should be in the burn pit?						
Putrescible material in landfill (food etc)						
Surface settling of any historic pits?						
Erosion of any pits existing or historical?						
Water ponding in existing or historic landfills?						
Animals - any evidence of raven, fox, or bear etc						
Access Road Conditions						
Any litter blown out of the pit or not put in correctly?						
Supervisor/Manager Notified of Deficiency						
Crushed Drum Pit (Enviro)	Inspector Initials & Date:					
Any drums need crushed?						
Any uncrushed drums in pit?						
Supervisor/Manager Notified of Deficiency						
Burn Pit (Environmental)(Day of Burn)	Inspector Initials & Date:					
Borough contacted?						
DNR contacted?						
Unit 11 or 12 contacted?						
Time and date ignited						
Weather Conditions:						