SUMMARY OF OPERATIONS AND MAINTENANCE PROCEDURES FOR DRINKING WATER, SEWAGE, SOLID WASTE DISPOSAL AND WASTE TREATMENT FACILITIES

— Eureka High Arctic Weather Station —

In support of the Nunavut Water Board

License **No. 8AC-EUR2331**

Version 8

June 2025

Control Page

On receipt of revisions and/or amendments, this control page will be updated to ensure that the Summary of Operations and Maintenance Procedures for Sewage, Solid Waste Disposal and Treatment Facilities is current and reflects the operations and activities occurring at the Eureka High Arctic Weather Station (HAWS; the Site).

Version	Date in Force	Expiry date	Description / Purpose
1	November 23, 2007	November 22, 2008	Original Summary
2	March 3, 2009	March 3, 2010	Eureka Water License, II. General Considerations, ss. D(ii) Water License Inspection, Nov. 27, 2007 Station Program Manager Review
3	February 16, 2010	February 16, 2011	Update Hazardous Waste Disposal Update Appendices to reflect current practice
4	January 2011	June 2021	Updates required for License renewal as per NWB
5	June 2021	None	Updates to Hazardous waste disposal,

			solid waste disposal, and Appendices to reflect current practices
6	June 2022	None	Update to include Exfiltration Trench
7	April 2025	None	General update and inclusion of the new Wastewater Treatment Plant
8	June 2025	None	Corrections and update section 3.2

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Acronyms and Symbols

BOD_5	Biochemical oxygen demand
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
DND	Department of National Defence
ECCC	Environ ment and Climate Change Canada
HAWS	High Arctic Weather station
L	Litre
M	Metre
M_3	Cubic metre
MSDS	Material Safety Data Sheet
N	North
PCB	Polychlorinated biphenyl
PEARL	Polar Environ ment Atmosph eric Research Laboratory
pH	Measure of acidity or alkalinity
UV	Ultraviolet
W	West

1. Introduction

This document has been produced to satisfy the requirement of the Nunavut Water Board (NWB) for the terms of water license number 8AC-EUR2331, Part F, Item 2

“The Licensee shall, at least sixty (60) days prior to commissioning the Wastewater Treatment Plant, submit to the Board for review updated Summary of Operations and Maintenance Procedures for Drinking Water, Sewage, Solid Waste Disposal and WasteTreatment Facilities dated June 2021 that was previously approved by the Board.’’

The Eureka High Arctic Weather Station (HAWS; the Site) is located on the north side of Slidre Fjord, at the northwestern tip of Fosheum Peninsula on Ellesmere Island, Nunavut (Appendix 1). Since 1947, Environ ment & Climate Change Canada (ECCC) has owned and managed the overall operations and maintenance of the site under Land Reserve #1021.

The Eureka HAWS is an operational weather monitoring facility as well as a hub of activity for the Department of National Defence (DND), the Polar Continental Shelf Project and the Polar Environment Atmospheric Research Laboratory (PEARL). Additional sites at Eureka are operated by the Canadian Network for the Detection of Atmospheric Change including the PEARL and the Surface and Atmospheric Flux, Irradiance and Radiation Extension and Zero Altitude PEARL Auxiliary Laboratory (Arcadis 2018).

Most of the work is carried out in the short Arctic summer during the months of June, July, and August. The n umber of people located on Site varies between eight and 40 (inclusive of DND staff).

2. Operation Practices for Drinking Water

At Eureka HAWS, drinking water is obtained from the Freshwater Lagoon located near Station Creek. Station Creek is located immediately to the west of the main Station that carries melt water from ice and snow in the Arctic spring (May and June). No inhabitants reside in the Station Creek watershed.

On average, Station Creek flows for approximately three to four months a year. The Water Lagoon is filled by pumping water from Station Creek, after the spring runoff has slowed down and the water is running clear of suspended solids. The volume of the water in the Water Lagoon must be sufficient to supply the Eureka HAWS needs for the year. The Water Lagoon holds approximately 12,000 m^3 of water. Daily consumption of water at Eureka HAWS has been estimated to be 290 L per person per day (Smith and Nahir, 2000). The volumes of water used in 2021 to 2024 by the Eureka HAWS are shown in Table 1.

Table 1. Volume of water used by Eureka HAWS from 2021 to 2024

Month	Volume (m^3)			
	2021	**2022**	**2023**	**2024**
January	104,6	112,8	100,2	77,1
February	89,7	90,4	50,8	71,5
March	97,5	78,2	89,5	89,2
April	87,2	102,6	100,2	100,6
May	103,8	167,0	75,8	137,0
June	238,5	198,8	278,1	275,2
July	319,1	349,6	327,7	387,0
August	304,4	340,7	285,2	306,2
September	209,3	187,1	159,8	173,7
October	100,2	112,5	109,5	70,1
November	165,5	95,5	105,7	80,7
December	75,9	104,5	86,5	0,0*
Annual Total	**1895.7**	**1939.7**	**1769**	**1768.3**

*Meter was not working in December 2024, thus no data was recorded for that month.

Annual and monthly analysis of water samples collected from the Water Lagoon, holding tanks and from inside the Eureka HAWS indicate that the chlorination, filtration, ultraviolet (U V) and reverse-osmosis treatments of the raw water provides good quality water to the Site.

Monthly drinking water sampling and analysis is conducted to assess the acceptance of the treated water and to ensure no threat to the staff's health. The testing procedure and results analysis is further described in Appendix A of the Quality Assurance (QA) and Quality Control (QC) Program document supplied separately to the NWB. Water usage is monitored and recorded during any water pumping processes and the monthly/yearly water usage is calculated and recorded.

A daily visual inspection is performed of the drinking water system which includes verification of water levels in the holding tanks, chlorinator fluid levels, water filter conditions, as well as the proper operation of all related pumping, piping, and water delivery systems. Visual inspections are also performed on the Water Lagoon containment structure and fencing.

The chlorination system consists of an LMI Milton Roy Series P7 chlorinator including an electronic metering pump and dispenser which introduces chlorine (a 12% sodium hypochlorite solution) from the chlorine holding tank into the domestic water intake line. The chlorine holding tank is filled using 5 L containers of chlorine, which are appropriately labelled and stored on elevated shelving within the Powerhouse. The 5 L containers are stored away from any potential water or other chemical sources. As required, chlorine is dispensed from the 5 L containers into the chlorine holding tank. The use of the small 5 L containers eliminates the potential of a large spill and facilitates handling and storage. Proper personal protective equipment is supplied for use when the transfer of chlorine is required. Should a spill occur, a combination of the cement floor and the contents within the spill kit, which is located within the Powerhouse, will be able to appropriately contain and clean up the spill. The Material Safety Data Sheet (MSDS) for this product is stored within the Powerhouse and a mobile eyewash station is also located within the room.

A schematic of the water distribution system is shown in Figure 1.

2.1 Quarry Mobile Wash-car and Temporary Work Camp

A delivery truck obtains water from the Freshwater Lagoon and is delivered to the mobile wash-car and temporary work camp. The water delivered to these locations is included in the total water usage reported for the Site.

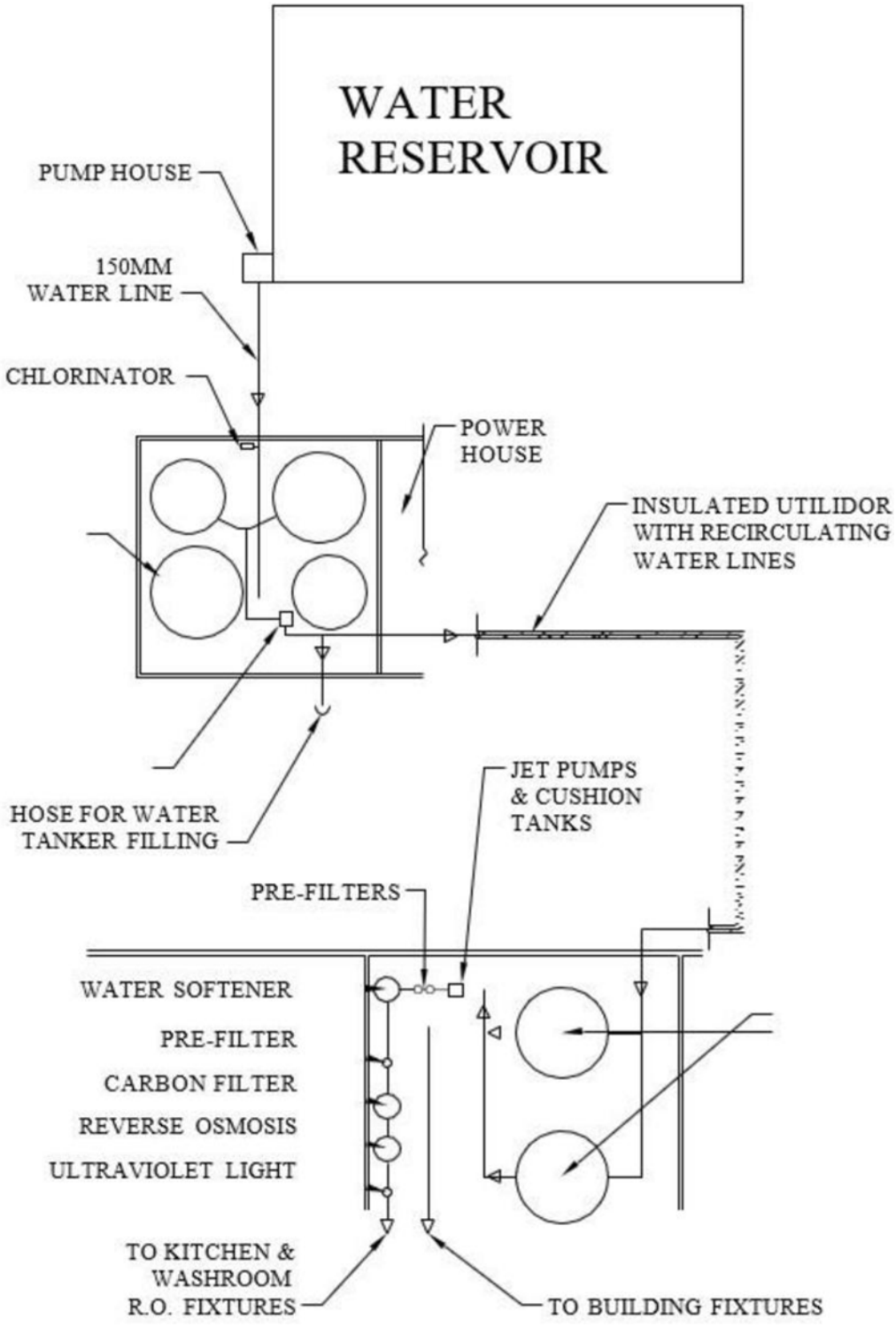


Figure 1. Water distribution system at Eureka HAWS

3. Management of Wastewater

The following section describes the management of wastewater at Eureka HAWS

3.1 General Description of the System

The wastewater collection system at the Eureka HAWS is for the most a gravity piped system collecting wastewater from the station. This wastewater enters the treatment system lift station, consisting of storage tank and two transfer pumps. The wastewater is then pumped into a mechanical/biological treatment facility for treatment prior to discharge. Treated wastewater undergoes ultraviolet disinfection (UV) prior to discharge to a retention pond located near in the place of the old sewage lagoon. The lagoon has been cleaned out and expanded so that it can provide a location for winter storage, prior to discharge to the ocean in warm weather periods.

3.2 Final Discharge to the Fiord

Once treatment is complete, pumps will convey the treated water to winter retention pond.

The winter retention pond sizing is given in Table 2 below.

Table 2: Estimation of volume of the Lagoon

Volume = Length x Width x Depth
= 94 m x 10 m x 1.2 m
= 1128 m_3
= 1.128×10^6 L

Maximum Daily Flow Rate (to fill the lagoon) = $\frac{\text{Volume}}{365 \text{ days}}$

$= \frac{1.128 \times 10^6 \text{L}}{270 \text{ winter days}}$

= 4,178 L/day

It is estimated that a person will use 290 L of water per day and therefore:

$\frac{4178 \text{ L/day}}{290 \text{ L/day}}$

= 14 people capacity for winter storage.

Since winter operation is closer to 10 staff, the 14 people capacity meets requirements. In spring the retention pond will be sampled to ensure the effluents meet criteria from the water license. Laboratory results will be shared with CIRNAC inspector and permission to discharge will be requested. The same process will be repeated just

before freezing to ensure sufficient capacity for winter months. No discharge shall occur without compliant lab results and CIRNAC authorization.

Furthermore, the discharge location is now located 31 meters away from the high-water mark.

The photos provided below shows storage cell prior to cleaning and reshaping that is occurring in the Summer of 2025.

Figure 2. Wastewater Sewage Lagoon at Eureka HAWS

3.3 Collection into the System

Due to the closed nature of the system, it is expected that the volume of wastewater produced will be virtually the same as the volume of the water used.

The collection of the wastewater throughout the main complex occurs by gravity. All piping is located within warm portions of the main complex. The wastewater is then collected in a storage tank in a separate building at the northeast corner of the main complex. The collected wastewater is intermittently pumped to the Sewage Lagoon when the volume of the liquid in the holding tank reaches the preset level.

3.4 Treatment and Discharge of the system

The mechanical/biological treatment plant includes processes such as preaeration and screening for pretreatment and then biological treatment with a process known as a moving bed bioreactor (MBBR) for the main component of treatment and a clarifier to remove the accumumulated sludge from the now treated wastewater. The residual sludge is treated through 30 days of aeration prior to dewatering with polymer chemical and a drying bag, prior to disposal. Chemical feeds are provided to the process to help control foaming at startup, and to provide some additional phosphorus and nitrogen components at low flows when the system is preparing for much higher spring/summer usage. Prior to discharge to the effluent undergoes UV disinfection. Overall, the effluent requirements are intended to meet limits of:

- BOD5 – less than 25 mg/L
- TSS – less than 25 mg/L
- Unionized ammonia – less than 1.25 mg/L as N
- Total Coliform – less than 1500 cfu per 100ml
- Fecal Coliform – less than 200 cfu per 100ml

Samples can be collected at the effluent tank in the mechanical treatment plant but they can also be collected the discharge to the winter storage retention pond.

The samples are analyzed for biochemical oxygen demand (BOD_5), total suspended solids, hardness, nitrate-nitrite, alkalinity, ammonia, fecal coliforms, pH, conductivity, metals, major cations, sulphates, oil and grease and total phenols.

3.5 Inspection and Monitoring of the System

A daily walk through and check will be required at the wastewater treatment plant. Daily activities will be required such as checking the amount of screenings collected, operation of the pumps and that the system is functional. There are duty standby systems for most pumps to mitigate the impact of clogging. A computer screen will als be provided that shows the full treatment plant, key process parameters and any alarm that may occur. Operation will include both physical checking and review of computer data.

See appendix 3 for the map illustrating Site components of the system.

3.6 Quarry Mobile Wash-car and Temporary Work Camp Wastewater

The temporary Work Camp uses an approved exfiltration trench for its grey waters (well away from the 31 high water mark) as long as weather conditions permit. i.e. ground is not frozen. Otherwise, grey waters are hauled to the lagoon but that happens occasionally early in the season only. Finally, black waters are incinerated.

3.7 Grey Water Exfiltration Trench at the Temporary Work Camp

There is an approved seasonal grey water exfiltration trench (trench) at the temporary work camp for use during warm weather months starting in 2022. It is located at the camp itself, south of the runway and well away from the 31 meters high water mark. Also, the exfiltration trench is used for greywater only.

The estimated daily flow is:

- 50 people x 100 litres/capita = 5,000 litres per day (June to August)

The grey water from the camp drains to a 4,500 litre, dual compartment tank. Solids and grease collect on one side of the tank while the overflow is pumped to the grey water field through a 75 mm HDPE conveyance pipe. The trench is constructed of 30 m of 50 mm perforated distribution pipe inside a trenched area with a 1.5 m width and 0.6 m depth, that is slightly mounded.

On a normal basis the grey water trench will operate with little attention:

- A pump will convey water from the collection tank to the trench for natural soil treatment and to soak into the surrounding soil for disposal.
- Periodically the operator will need to confirm that the pump is operational and that the trench is functional.
- Machine and human activity should be kept away from the trench to minimize disturbance.
- At the end of the year the grey water will be pumped down to minimal levels in the tank, the pump will be removed, and the pipe will be disconnected.
- The piping is HDPE and can freeze in place if there is liquid remaining in the line.
- Sludge from the tank will be decanted and placed in polyethylene barrels lined with a cloth filter bag to allow freeze thaw for thickening.
- Over the winter the solids will consolidate, and the operator can decant the liquid back into the grey water system, leaving the solids in the barrels.
- Polyethylene barrels can store liquid over the winter without breaking. In the following summer the solids in the barrel will either be fed into the incinerator toilet for disposal or stored and hauled off site.
- In spring once the components have thawed, the pipe and pump can be reconnected for continued use.

4. Management of Solid Waste

4.1 Introduction

4.1.1 Purpose

This manual has been produced to assist Eureka HAWS personnel with the proper operation and maintenance of the site waste disposal facilities.

4.1.2 Site Setting

The Eureka HAWS is in the Eureka Hills Eco-region, within the Northern Arctic Eco-zone and the topography of the area is rolling and ridged, reaching altitudes of no more than 1000 m above sea level. Soils are primarily a sand/gravel fill underlain by silty, sandy clays. Permafrost is present with an active layer ranging between 0.6 and 1.2 m in thickness. The climate is cold and dry and mean annual temperatures range from - 30.5^{o}C in winter to 0.5^{o}C in summer. Annual precipitation ranges between 50 to 75 mm. The prevailing winds are from the west.

The main complex of the Site occupies an area immediately east of Station Creek and contains approximately 22 buildings with associated infrastructure. An airstrip is located approximately 1.5 km northeast of the main complex. The Site is located on a hillside sloping down from the airstrip, levelling out where most facilities are located before sloping down further to the ocean. A 20 km road to the north connects the Site with an experimental facility, the former ASTRO Lab, now known as the PEARL Facility.

The total area of the occupied Site is approximately 2.23 hectares and is held under INAC (now CIRNAC) Land Use Permit N2024N0003. The permit was initially established in 1955.

4.1.3 Population Projection

While the population varies, particularly in the summer, the average population is 10 and is not expected to change in the foreseeable future.

4.1.4 Contact List

Name	Role	Responsibility	Authority	Contact Information
Greg Stansfield/ Renee Cossitt/ Don Lavallee	Eureka HAWS Station Program Manager (three-month rotation)	Eureka Real Property	ECCC	ec.gps-eureka-spm.ec@canada.ca (613) 945-3145 ext. 4460

4.2 Background

4.2.1 Context

- Management of solid waste at the Eureka HAWS is challenging for the following reasons:
    - Extreme cold
    - Isolation
    - High cost of transportation, and
    - Small population

The Eureka HAWS is located at 79°59'41"N and 85°48'48"W with a population of approximately 10 people. The Site is only accessible by air and sea. Personnel, mail, freight, and food are flown into Site monthly. Once a year, a Canadian Coast Guard ice breaker brings supplies in late August. Any materials sent out from the Site for disposal or recycling on the return trip of the Coast Guard must remain in the Arctic port of Nan isivik for one year before it can be sent south.

Notwithstanding the constraints that the above place on normal waste management practices, Eureka HAWS is committed to practices of procurement of green products, diversion from waste disposal sites, reuse, and recycling.

4.2.2 Solid Waste Generation Types

- Organic kitchen wastes.
- Non-combustible waste, including mixed metals and bulk garbage.
- Metal drums.
- Uncontaminated wood wastes.
- Used motor oil filtered for particulates.
- Ozone depleting substances.
- Miscellaneous chemicals such as solvents and glycols.
- Old batteries.
- Other hazardous wastes including:
    - Asbestos
    - Lead (paint and lead-containing materials)
    - Mercury, radioactive and ozone depleting substances
    - Polychlorinated biphenyl (PCB) items
    - Petroleum/Cleaning products
- Creosote treated timbers. Characterization to be completed to determine whether hazardous or not.

A map showing location of waste disposal areas is provided in Appendix 3

4.3 Waste Disposal Facility Locations and Purpose

4.3.1 East Landfill

This landfill is used to contain non-organic/non-hazardous waste that cannot be incinerated and is located at the east end of the landing strip (79º 59.484'N and 85º 46.335'W). Non-hazardous ash from the incinerator is disposed of at this landfill.

4.3.5 Drum Crushing site

This site is located south of the runway (79º 59.374'N and 85º 55.586'W) and west of the East Landfill. This is a lined area used for crushing of drums prior to disposal.

4.3.6 History of Existing Landfills

An extensive, but unsuccessful, effort was undertaken to locate historical plans and drawings of the landfills at Eureka HAWS.

4.4 Operation and Maintenance of Solid Waste

4.4.1 Site Description

The waste disposal facilities are located immediately south of the east end of the airstrip, approximately 1.3 km from the Fjord. As the drainage from the above disposal grounds flows in the direction of the Fjord, there has been historic concern that the surface runoff and leachate could reach the Fjord. As required by the Surveillance Monitoring Program, pursuant to Eureka's Water License, runoff during periods of flow is monitored and samples are analyzed as per the parameters listed in the License program monitoring requirements.

4.4.2 Waste Separation

Site waste is separated into organic (kitchen waste), non -organic (cans, bottles, old vehicles, etc.), construction and demolition (wood, mixed metals asbestos, etc.), and hazardous (waste oil, hydraulic fluids, batteries, oxygen depleting substances, old window and door frames with lead paint, etc.). It should be noted that Eureka HAWS uses green products (non-hazardous and biodegradable), when possible.

4.4.3 Temporary Construction Worker Camp Solid Waste Handling, Incineration and Disposal

The temporary construction worker camp follows the same Standard operating procedures as the Eureka HAWS related to kitchen food and waste handling/storage, solid waste segregation and disposal, and waste incineration

4.5 Disposal Procedures

4.5.1 Organic Waste

Organic and burnable waste is disposed of in an incinerator or within an open burn bin. Materials burned in the open burn bin exclude materials listed under Part D, Item 3 of

license No. 8AC-EUR2331**.** On average, the heavy equipment operator incinerates 1012 bags two to three times a week, which includes food cans. Ash generated by the incineration is packaged in clean 205 L barrels (approximately 24/year) and is transported via heavy equipment to the Station Drum Cache area. In the summer months, the ash (excluding the barrels) is deposited in a cell of the East Landfill and is capped with 0.3 m of gravel capping material at a 3:1 slope.

4.5.2 Non-Organic, Non-Hazardous Waste

Non -organic and non -hazardous waste that cannot be incinerated or burned in open burn bin is deposited in the East Landfill. The waste deposited in this landfill includes tires, construction materials (drywall, siding, wood, steel, tin, ash from incinerator), old vehicles and equipment (drained of flu ids and batteries removed), wire, cable, tin, steel, copper, aluminum, empty compressed gas cylinders, plastics. Capping consists of 0.3 m of compacted native soils scraped from the surrounding gully.

4.5.3 Asbestos Waste

Previously, the limited amount of asbestos generated was double-bagged, placed in the Asbestos Landfill and covered with 1.5 m of gravel capping material and its location recorded so that subsurface soils will not be disturbed in the future. Currently, asbestos waste is containerized and shipped off Site for disposal.

4.5.4 Empty Metal Drums

Any remaining liquid in empty drums is collected as hazardous material; the drums are then crushed at the drum crushing site (a lined area), and then transported off Site for disposal or disposed of in an engineered landfill on Site.

4.5.5 Hazardous Waste

- Secondary containment of hazardous materials awaiting disposal is provided in the form of salvage drums, crates, constructed with plastic lining or secondary containment pallets and stored in the Station Drum Cache area (see Appendix 3). Used oil is stored in empty drums in the Station Drum Cache area (see Appendix 3) and is shipped as retrograde cargo on the annual sea lift to a certified recycling depot in the south.
- Used jet fuel is stored in empty drums in the Station Drum Cache area (see Appendix 3) and is shipped as retrograde cargo on the annual sea lift to a certified recycling depot in the south. ECCC is currently seeking a waste fuel burner which can burn fuel that contains water.
- When sufficient batteries are collected (approximately 2-3 pallets), they are packed with vermiculite and are stored in wooden crates in the “deadline” area behind the main complex adjacent to the Station Drum Cache area (see Appendix 3). The pallets are shipped as retrograde cargo on the annual sea lift to a certified recycling depot in the south.
- Waste glycol is stored in empty drums in the Station Drum Cache area (see Appendix 3) and is shipped out on sealifts or flights of “opportunity” to a

government-approved Hazardous Waste Management company for proper disposal.

- Ozone depleting substances (e.g., un-serviceable refrigerant containing machinery) are not disposed of on Site; rather, are shipped to recovery facilities located in the south .

4.6 Maintenance and Inspection

Inspections of the landfill sites are performed on a daily or weekly basis depending on weather conditions. During runoff periods, samples of runoff are collected and analyzed according to the parameters listed on the license requirements for the monitoring program.

Windblown debris is not a Site issue as most material subject to being carried by the wind is incinerated ash, sealed barrels, buried and capped, or it is fully covered in the summer.

Appropriate signage is posted.

Odor control is not an issue as all organic waste is incinerated.

Open burning is conducted within a burn bin, which excludes materials listed under Part D, Item 3 of license No. 8AC-EUR2331.

4.7 Records

- Quantities of garbage generated are recorded monthly.
  MSDS are readily available to Site personnel.
- Maintenance of waste disposal facilities are recorded and described under Progressive Reclamation Work Undertaken in Eureka's Annual Report to the NWB. Manifests are obtained and recorded for shipments of hazardous material.
- Annual inspections by CIRNAC are recorded and a response is forwarded to CIRNAC and the NWB.

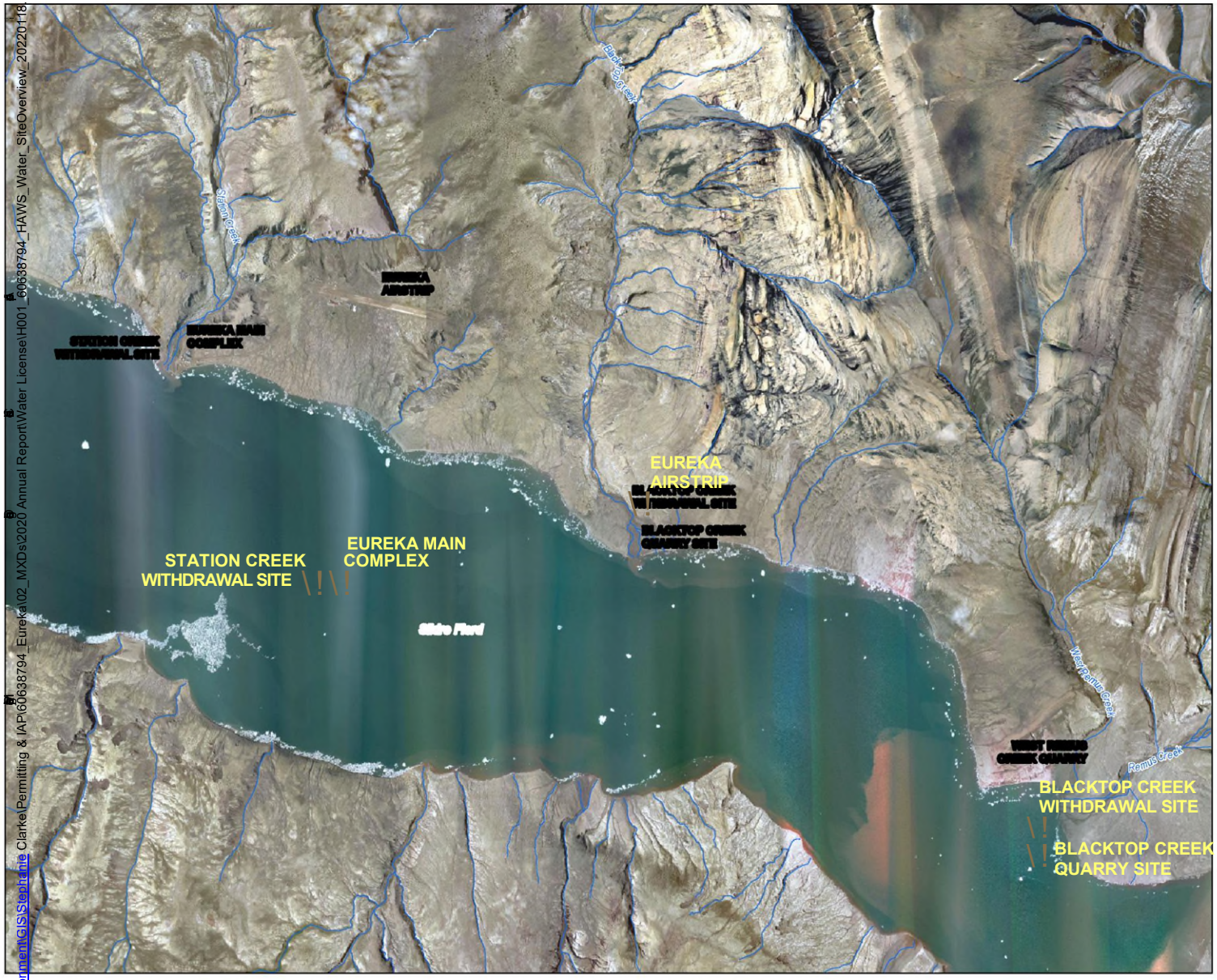
References

Duong, D. and R. Kent (1996). *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories*. Govern ment of the Northwest Territories, Municipal and Commun ity Affairs Commun ity Development.

Environmental Services, Public Works and Government Services Canada (Western and North ern Region) (1998). *Waste Management Plan for Eureka High Arctic Weather Station*. A report prepared for Atmospheric Environ ment Services, Environment Canada, Prairie and Northern Region.

Smith, D.W. and M. Nahir (2000). *Study of the Wastewater and Water Supply systems at the Eureka Weather Station*. A report prepared for Atmospheric Services, Environment Canada by Public Works and Government Services Canada, Western Region.

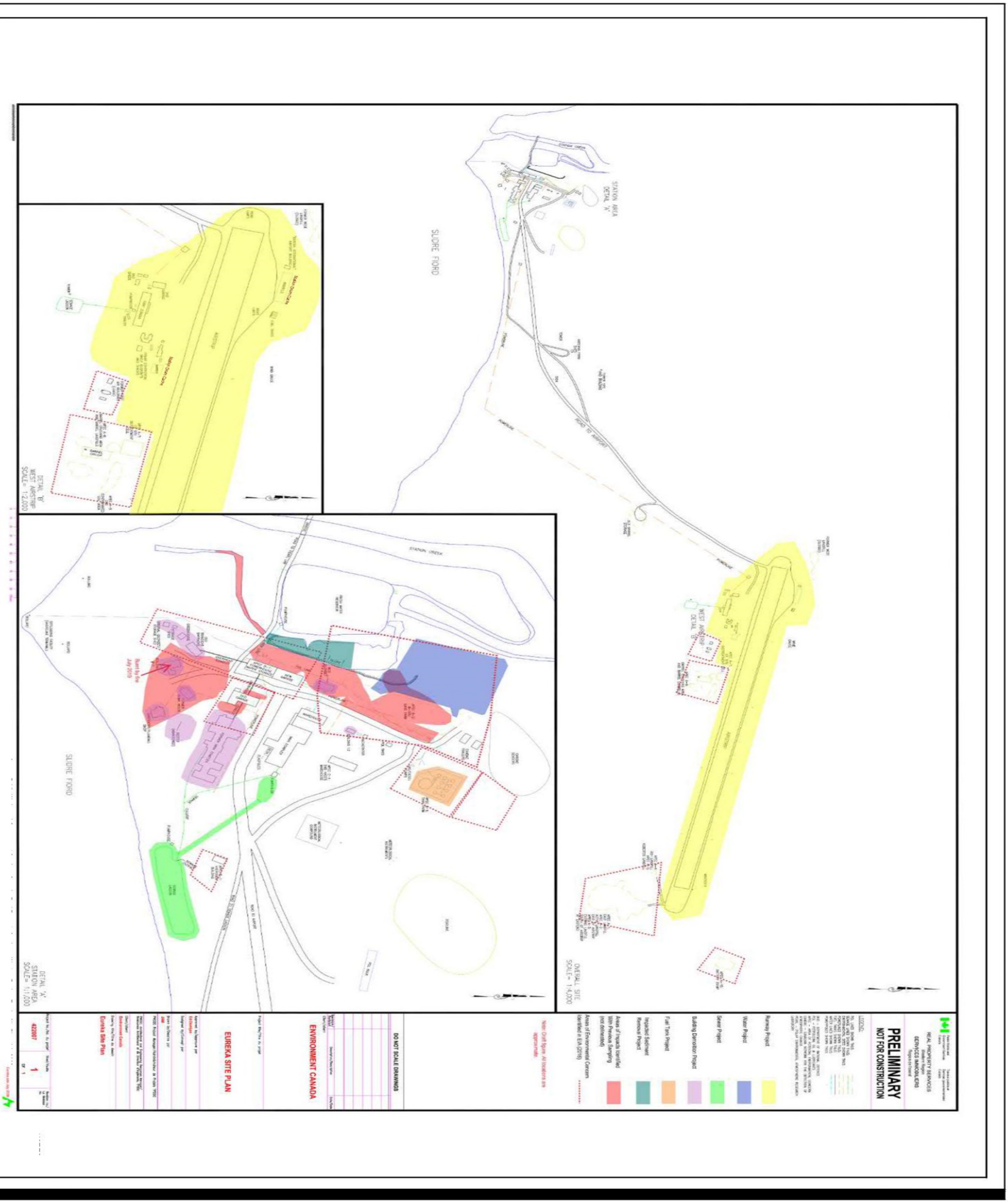
Appendix 1: Eureka High Arctic Weather Station Site Overview



Slidre Fiord

Appendix 2: Waste and Storage Facilities on the Main Complex of the Eureka High Arctic Weather Station

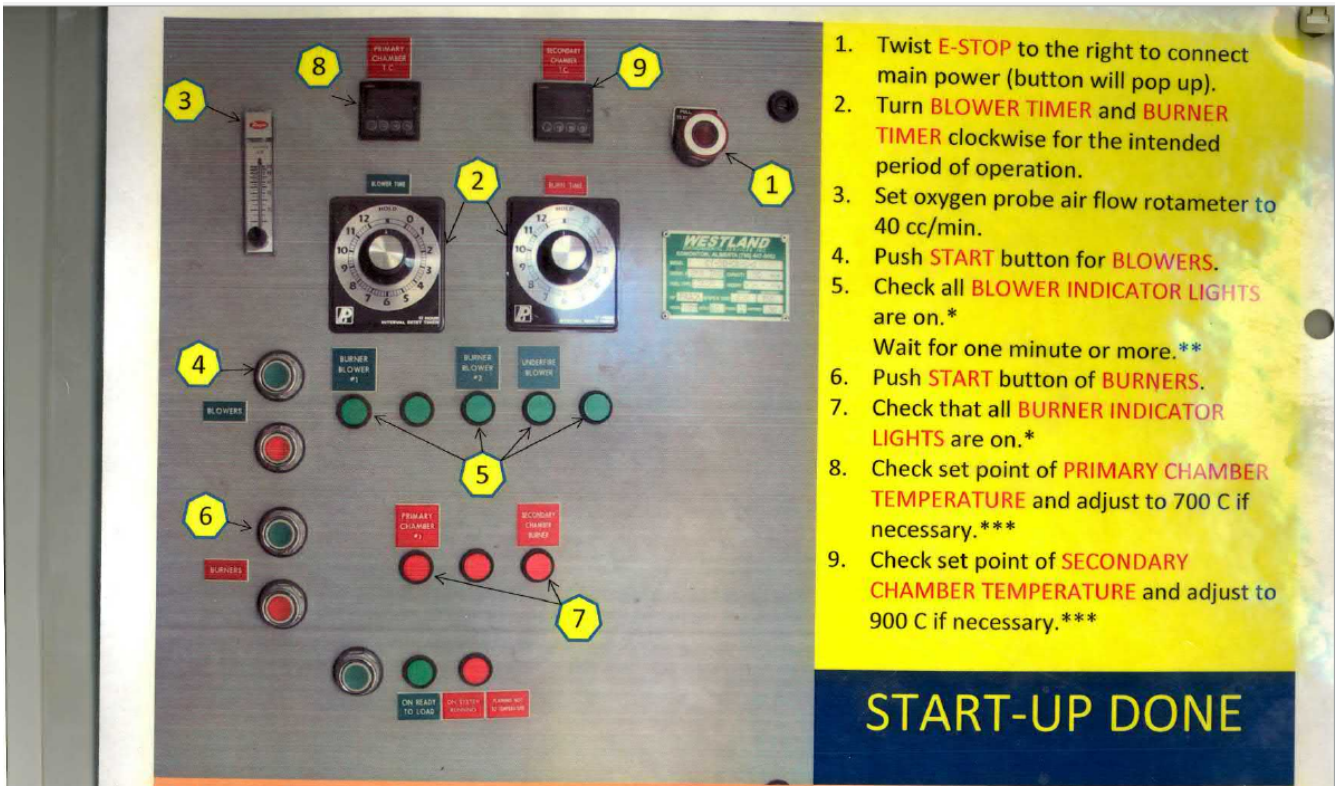
Appendix 3: Site Plan and Potential Environmental Areas of Concern

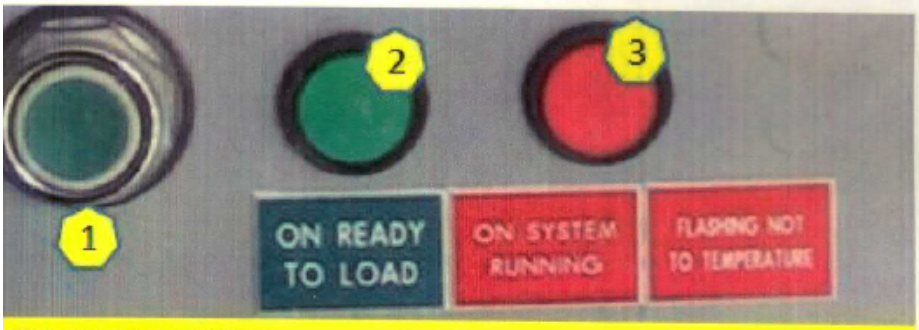


AECOM

Source: Public Works

Appendix 4: Incinerator Operations Procedures





PRE-CHARGING CHECKS

1. If Light Indicator 3 is flashing, the PLC is NOT ready. WAIT.
2. If Light Indicator 2 is on steady, then check that the temperatures in the Primary Chamber and Secondary Chamber are up to the set points.
   a) If 2 is not steady, wait until the chamber temperatures are at the set points.

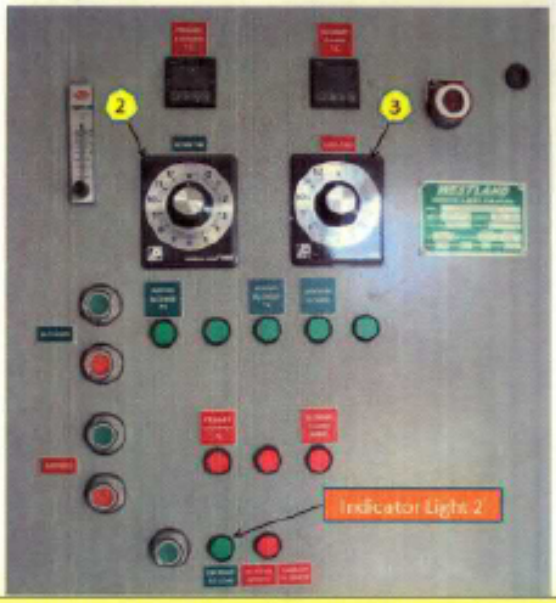
WASTE CHARGING

1. Confirm that Light Indicator 2 is on steady.
2. Open Charging Door, quickly load the batch and close door.**
3. ***IMMEDIATELY*** push Button 1. This activates the PLC.
4. Check that Light Indicator 2 is off.*
5. Wait until Light Indicator 2 is on again. This indicates that the system is ready for the next batch.***
6. Repeat STEPS 2 to 5 for three or four loads, then go to STEP 7.
7. Open Ash Door, rake the waste and close the door .
8. ***IMMEDIATELY*** push Button 1 and wait until Light Indicator 2 is off.***
9. Repeat STEPS 2 to 8 until the last waste batch is charged.

WASTE CHARGING DONE

Notes:
- * Report Error.
- ** This is very hazardous; see safety notes.
- *** The time varies.

4.8 Burn-Down: see Figure 15



When the LAST batch has been charged, and the indicator light 2 is ON (steady), indicating readiness for the non-existent batch:

1. **Rake primary chamber.**
2. **Turn BLOWER TIMER to ~ 3 hours ***
3. **Turn BURNER TIMER to 0.5 to 1 hour**
4. **Wait.**
5. **When burner time period has elapsed, then shut down fuel valve.**

BURN-DOWN DONE

Note: * : The actual time depends on how much and what kind of waste has been charged. The rule-of-thumb is:

Burn-Down Time (hours) = 1 + Waste Charging time (hours)/ 3

Figure 15 Procedure for Burn Down

4.9 Cool-down

There is nothing to be done here, except ensuring that the incinerator is sufficiently cooled (approximately 6 – 8 hours) for the scheduled ash removal for the next operation.

4.10 Maintenance and Inspection

In addition to the routine inspection and maintenance previously mentioned, only the burner(s) and the blower(s) require maintenance, which is quite minimal; see manuals in the binder. The following inspection steps are recommended:

When repairs to the incinerator's oxygen control system have been satisfactorily carried out, the flame-port butterfly valve and actuator can be reconnected, that is, the valve shaft can be tuned back to the 10% open position, and the wire reconnected to resume power to the actuator.

Adjustment Steps to Under-Fire (PC7) and Flame-Port (SC4) Butterfly Valves for Manual Mode Operation:

1. Press the Emergency Stop button on the control panel to disconnect power from the incinerator.
2. Remove actuator cover 1.
3. Remove actuator electronics cover 2.
4. Disconnect the black wire 3 and tape the exposed wire with a small piece of electrical tape.
5. Loosen the U-clamp nuts 4.
6. Use a flat-blade screwdriver to turn the shaft 5 to the desired setting: 10% open for PC7 and 100% open for SC4.
7. Tighten the U-camp nuts 4 to secure the valve shaft in place: DO NOT RE-CONNECT THE BLACK WIRE.
8. Replace covers.
9. Place a tag on the valve to indicate that it has been adjusted for manual mode operation.
10. Twist the Emergency Stop button on the control panel to re-connect power to the incinerator.

Adjustments for Manual Mode Done

Figure 17 Butterfly Valve Adjustment for Manual Mode Operation

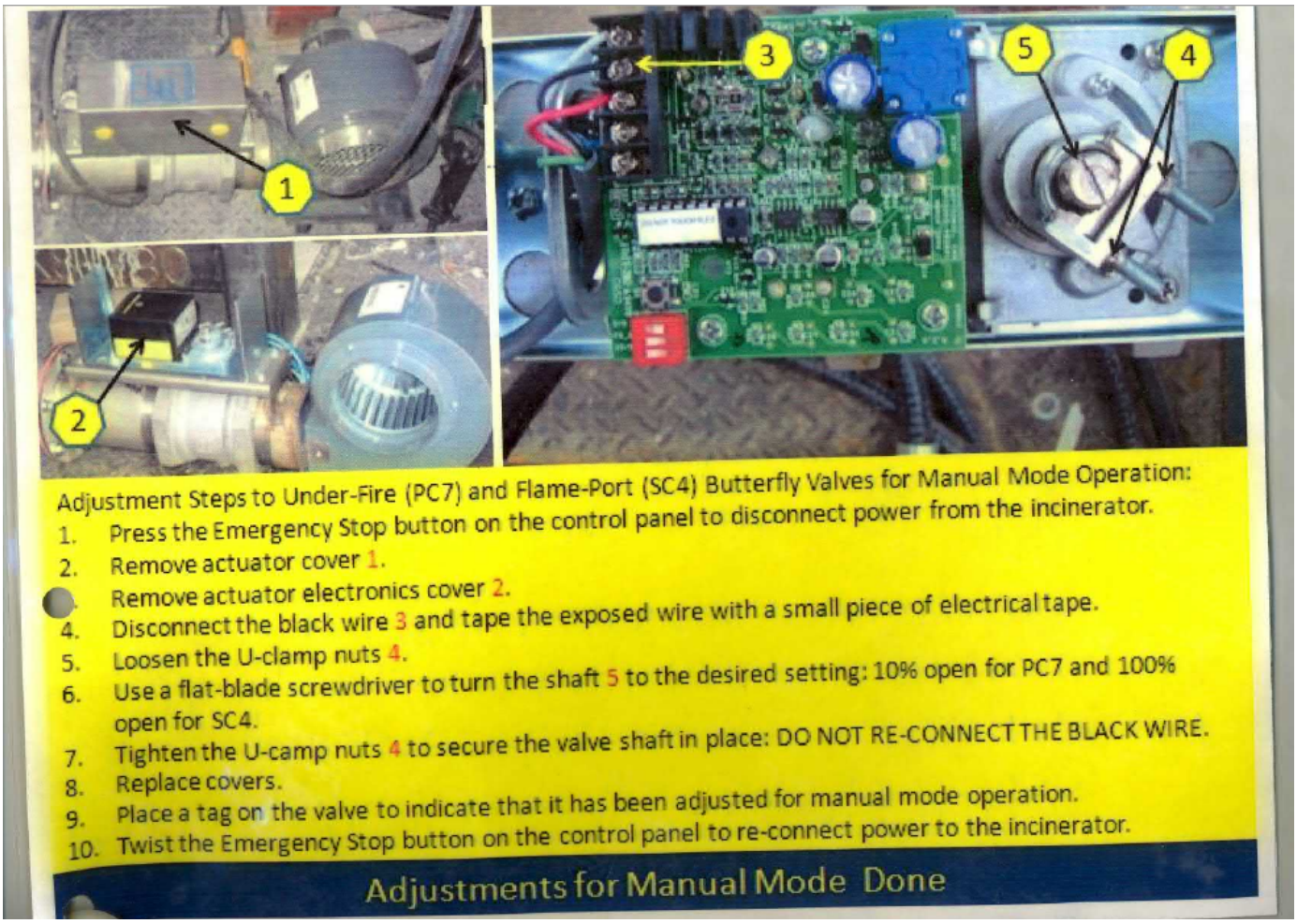
5.2 Modification to Operation during Manual Mode

During manual mode operation of the incineration system, there are some changes to the loading procedure when compared to normal operation with the oxygen control system in good working order. The Procedure for Startup as outlined in Figure 13 remains the same, but **the Procedure for Waste Charging as outlined in Figure 14 must be ignored.** When the Procedure for Startup has been completed, the procedure shown in Table 10 should be followed for waste charging. The Procedure for Burn Down as outlined in Figure 15 must still be followed during manual mode operations, though the reference to "Indicator Light 2" can be ignored.

Table 10 Waste Charging in Manual Mode

STEP	PROCEDURE
1	Confirm that the primary and secondary chambers are at their respective set points (see Figure 13).
2	Open the Charging Door, quickly load the batch and close the door.**
3	Wait approximately 10*** minutes and repeat Step 2.
4	Repeat Steps 2 and 3 for three or four loads, and then proceed to Step 5.
5	Open the Ash Door or the Charging Door, rake the waste, and then close the door.
6	Wait approximately 10 minutes for any unburned waste to be consumed.
7	Repeat Steps 2 to 6 until the last waste batch has been charged.
8	Follow the Burn Down Procedure outlined in Figure 15.
	WASTE CHARGING DONE

** This is very hazardous, see the safety notes following Figure 14.
*** The time varies depending on the waste being incinerated.



Adjustment Steps to Under-Fire (PC7) and Flame-Port (SC4) Butterfly Valves for Manual Mode Operation:

1. Press the Emergency Stop button on the control panel to disconnect power from the incinerator.
2. Remove actuator cover 1.
3. Remove actuator electronics cover 2.
4. Disconnect the black wire 3 and tape the exposed wire with a small piece of electrical tape.
5. Loosen the U-clamp nuts 4.
6. Use a flat-blade screwdriver to turn the shaft 5 to the desired setting: 10% open for PC7 and 100% open for SC4.
7. Tighten the U-camp nuts 4 to secure the valve shaft in place: DO NOT RE-CONNECT THE BLACK WIRE.
8. Replace covers.
9. Place a tag on the valve to indicate that it has been adjusted for manual mode operation.
10. Twist the Emergency Stop button on the control panel to re-connect power to the incinerator.

Adjustments for Manual Mode Done