

## **BLUING AND PARKERIZING**

1. Version, Date. 1, 6 June 2012

2. Purpose. This Environmental Standard Operating Procedure (ESOP) summarizes the procedures implemented for minimizing the use of hazardous materials, managing the storage of hazardous materials/wastes, and disposal of hazardous waste associated with any bluing or Parkerizing operations that are conducted aboard Marine Corps Base, Quantico (MCBQ). These procedures are implemented to minimize the potential impact to the environment and reduce risk to personnel involved in bluing or Parkerizing.

3. Applicability

a. Audience. This ESOP is directed towards individuals who perform any of the operations described herein. All personnel aboard MCBQ shall take responsibility to follow the procedures contained within this ESOP.

b. Scope. These procedures apply to the bluing and Parkerizing of USMC-owned weapons aboard MCBQ. Related procedures are provided as separate ESOPs for: Hazardous Material Storage (ESOP #3); Degreasing Solvent (Parts Washing) (ESOP #7), and; Hazardous Waste Storage (ESOP #28). Weapons Training Battalion (WTBN) also maintains separate procedures for operation of this practice, included as Attachment 34-1 (Metal Refinishing Operation [MRO] Wastewater Discharge Standard Operating Procedure [SOP]).

4. Definitions. The following definitions are provided to support this procedure:

a. Bluing. A chemical method of protecting steel parts from corrosion. Through either a cold or hot process, surface iron molecules are replaced with magnetite. Chemicals utilized during bluing depend on the process, but may include potassium nitrate, sodium hydroxide, hydrochloric acid, selenium dioxide among others.

b. Parkerizing. A chemical process of protecting metals through the application of a phosphate conversion coating. Key chemical components in the process include zinc, manganese, nitrates, chlorates, and copper.

c. Personal Protective Equipment (PPE). Equipment provided to shield or isolate a person from chemical, physical, and thermal hazards that can be encountered when using hazardous materials.

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d. Material Safety Data Sheet (MSDS). A form, provided by manufacturers and compounders (blenders) of chemicals, containing information about chemical composition, physical and chemical properties, health and safety hazards, emergency response and waste disposal of the material.

5. Responsible Parties. Personnel listed below are responsible for implementing the procedures described in this ESOP:

a. Weapons Training Battalion (WTBN), Precision Weapons Section (PWS) Officer in Charge (OIC).

b. WTBN Command Environmental Coordinator (EC).

c. G-5, Natural Resources and Environmental Affairs (NREA) Branch, Environmental Compliance Section.

6. Procedures for Bluing and Parkerizing. Procedures below provide a general summary of bluing and Parkerizing operations. PWS maintains a Policy Letter which specifically addresses all aspects of the bluing and Parkerizing process.

a. Before conducting bluing or Parkerizing operations, ensure the following conditions are met:

(1) Applicable MSDS must be maintained and posted for all hazardous materials; signage must also be posted that describes dangerous conditions and prohibits smoking/open flames.

(2) All hazardous materials and wastes must be stored in approved, appropriately labeled containers.

(3) Appropriate response material (e.g., fire extinguisher, spill kit, eye wash) must be maintained and available in the event of an emergency.

(4) Appropriate PPE (e.g., safety glasses, rubber gloves, long sleeve shirt or full length rubber gloves, and a protective apron) must be available and correctly worn when conducting bluing and Parkerizing operations.

b. Perform the following steps when preparing a weapon for the bluing or Parkerizing process:

(1) Thoroughly clean the weapon. Ensure all oil, grease, rust, and dirt has been removed. Sandblast parts that will be refinished to attain a matte finish.

(2) Soak parts in cleaner/degreaser solution. After parts have been cleaned, rinse them thoroughly in warm water (refer to the Degreasing Solvent [Parts Washer] ESOP (ESOP #7) for parts washing procedures).

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c. To conduct Parkerizing, place weapon parts in Parkerizing solution. Once parts have reached the desired color, remove them and place them in a cold water rinse; ensure continuous scrubbing to remove Parkerizing residue. Place parts in the water dispersing oil. Parkerizing must not be conducted on aluminum parts; it will contaminate the Parkerizing solution.

d. To conduct bluing, consider the material of the weapon to be refinished.

(1) When bluing carbon steel, use solution made from approved salts. Submerge parts and agitate them occasionally to ensure circulation of salts. Once parts have reached a desired color, remove them from the bluing solution and place them in a cold water rinse, followed by a warm water rinse. Place parts in the water displacing oil tank; remove after 10 minutes and let the parts cure for 24 hours.

(2) When bluing stainless steel, first soak the parts in an approved activator. Rinse the parts after they have sat in activating solution for an appropriate amount of time. Place rinsed parts in bluing solution made from approved salts; agitate occasionally to ensure circulation of salts. Once parts have reached desired color, remove them from the bluing solution and place them in a cold water rinse followed by warm water rinse. Place in the water displacing oil tank; remove after 10 minutes and let parts cure for 24 hours.

(3) Do not attempt to blue aluminum parts; it will contaminate the bluing solutions.

e. Bluing and Parkerizing equipment must be operated by the following protocols to ensure there are no discharges of hazardous substances.

(1) Activate ventilation system in the refinishing room. Turn the main gas valve on and activate tank burners in accordance with PWS Policy Letter 1-10.

(2) Activate pH monitoring/treatment system for wastewater discharge (refer to the MRO Wastewater Discharge SOP [Attachment 34-1] for detailed instructions). The pH monitoring/treatment system ensures all processing effluent is discharged to the sanitary sewer system at pH levels in compliance with WTBN's wastewater discharge permit.

(3) Allow solution tanks to reach appropriate temperature; based on the procedure being conducted, this temperature may vary. Refer to the PWS Policy Letter 1-10 for the required temperature for each operation. If proper temperature is not attained, add either salts or water as documented in the PWS Policy Letter 1-10. Sprinkle salts gently over the length of tank and/or utilize a ladle for water. This ensures no spills of chemicals occur.

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(4) Once bluing and/or Parkerizing has been completed, shut down the burners and drain the rinse tanks as described in the PWS Policy Letter 1-10.

### 7. Inspection and Corrective Action

a. PWS personnel who use the bluing and Parkerizing equipment conduct checks of solution/rinse tanks prior to and during operations. Any potential issues are inspected and repaired by PWS personnel.

b. The pH monitoring and treatment system is maintained on a service contract. This ensures regular maintenance (e.g., calibrations, inspections, etc.) are conducted as described in the manufacturer's user manual. If PWS personnel notice a problem with the pH monitoring and treatment system, it is their responsibility to shut down operations and contact the vendor for assistance.

### 8. Internal Communication

a. Report non-compliance with posted SOPs to the PWS Bluing Noncommissioned Officer (NCO), PWS Officer in Charge (OIC), or WTBN EC.

b. Maintain a log of all bluing and Parkerizing operations as well as regular/irregular service visits, sampling events, and other information outlined in the MRO Wastewater Discharge SOP (Attachment 34-1).

c. If there is a discharge of untreated rinse water, notify the WTBN EC and the NREA Branch, Compliance Section. Report spills of hazardous materials in accordance with paragraph 10 of this ESOP.

d. The WTBN EC or PWS Bluing OIC will discuss and review the ESOP with shop personnel. Obtain, disseminate, and review updates to the ESOP as necessary.

### 9. Training/Awareness

a. Based on the Training Needs Analysis, the Comprehensive Environmental Training and Education Program (CETEP) Coordinator and WTBN EC will identify personnel who require training based on their job duties and potential to contact hazardous materials/wastes.

b. The CETEP Coordinator may also provide additional training upon request.

c. Personnel conducting bluing and Parkerizing procedures will receive training on applicable provisions of this ESOP.

d. MSDS and awareness documentation will be maintained onsite.

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10. Emergency Preparedness and Response. Personnel will immediately inform their manager of a spill or other emergency and then notify the MCBQ Fire Department (911), followed by NREA (784-4030) in accordance with the MCBQ Integrated Spill Management Plan. For discharges of hazardous substances, complete the Spill Reporting Form (Attachment 34-2) following cleanup of the discharge. Route it through the chain of command to NREA within five days of the spill.

11. References and Related Documents

- a. MCBQ Integrated Spill Management Plan.
- b. ESOP #3, Hazardous Material Storage Area - Hazardous Materials Management.
- c. ESOP #7, Degreasing Solvent (Parts Washing).
- d. ESOP #28, Hazardous Waste - Satellite Accumulation Areas.
- e. MRO Wastewater Discharge SOP for PWS, WTBN.
- f. WTBN PWS Policy Letter 1-10.

12. Document Revision History

The following provides a history of revisions of this ESOP:

Revision Number	Date	Revision Made By	Section	Page	Summary of Change and Reason	Signature

13. Document Owner. This document has been reviewed and approved by the practice owners. Should the practice change, resulting in a need to modify this ESOP, practice owners will notify the NREA Branch, Environmental Management System Section at 432-0525.

- a. Document Owner. NREA Branch, Environmental Compliance Section.
- b. Document Approval. Chair, E<sup>2</sup>MS Implementation Team.

# Metal Refinishing Operations Wastewater Discharge SOP

## Weapons Training Battalion, Bldg 27250 Harlee Hall

### 1.0 PURPOSE

This Standard Operating Procedure (SOP) details the methods that will be used to measure and record the pH and flow of wastewater discharged from the Metal Refinishing Operations (MRO) of Precision Weapons System (PWS), Building 27250 at Weapons Training Battalion (WTBn). This SOP also details the sampling procedures that will be used to conduct periodic sampling of the discharge from the MRO for regulatory compliance.

This SOP will be used to ensure compliance with the Stafford County Significant Industrial User Permit (Categorical), Permit No. STFRD-002, dated April 11, 2010 (See Appendix A). The reference permit authorizes MCB Quantico, Camp Barrett, Building 27250, MRO to discharge industrial wastewater into the sanitary collection system in accordance with effluent limitations, monitoring requirements and other conditions set for in Part I, II, and III of the referenced permit.

### 2.0 SCOPE

This procedure applies to MRO occurring in Building 27250. The pH batch treatment system was installed in 2010 and became operational March 24, 2010.

### 3.0 RESPONSIBILITIES

The following staff will be responsible for ensuring that all required tasks are performed in accordance with this SOP and Permit No. STFRD-002:

- WTBn will be responsible for implementation of this SOP and will maintain the logbook documenting each MRO event.
- WTBn and Natural Resources and Environmental Affairs (NREA) will be responsible for ensuring all required quarterly sampling of the discharge from the metal refinishing is conducted in accordance with this SOP and Permit No. STFRD-002.
- NREA will maintain the composite automatic sampler, including decontamination and battery charging. The sampler will be stored in the MRO room.
- NREA will maintain and store the loaner laptop until a dedicated unit is obtained and maintained by WTBn.
- NREA will receive; review, and file lab data obtained as a result of the implementation of this SOP.
- NREA will submit all required Discharge Monitoring Reports (DMRs) to Stafford County, Department of Utilities by the 10<sup>th</sup> of the months of January, April, July, and October for the previous three month period.
- NREA will maintain compliance file of DMRs and provide electronic copies to the PWS Commanding Officer.
- WTBn will maintain support documentation (logbook, etc.) for all MRO events and service/repair events.
- Public Works Branch (PWB) will maintain a service contract to perform monthly and annual calibration, inspection and maintenance per the Operations and Maintenance (O&M) Manual as provided by the manufacturer, and provide treatment chemicals.

**Attachment 34-1:**  
**WTBN Metal Refinishing Operations Wastewater Discharge SOP**

#### 4.0 REFERENCES

Stafford County, Virginia Significant Industrial User Permit (Categorical) Permit No. STFRD-002

Code of Federal Regulations, Title 40: Protections of Environment, Part 433 – Metal Finishing Point Source Category, Subpart A – Metal Finishing Subcategory

Code of Federal Regulations, Title 40: Protection of Environmental, Part 403 – General Pretreatment Regulations for Existing and New Sources of Pollution

Industrial Waste Survey Finding and Recommendations Report, Camp Barrett Industrial Waste Management Plan, Marine Corps Base, Quantico, July 2002

#### 5.0 EQUIPMENT PREP PROCEDURES

##### 5.1 Check System

Each time the MRO systems are used, the flow and pH of the wastewater discharge must be monitored and recorded via the data logger.

Prior to the start of any MRO, the following will be performed by PWS staff:

- 5.1.1 The chemical drums levels will be checked to ensure adequate treatment chemicals are available for treatment operations. One spare 55-gallon drum of each chemical will be maintained in the PWS chemical storage shed.
- 5.1.2 The power panel will be checked and verified all systems are powers and operating ( pump station and treatment system)
- 5.1.3 The data logger panel will be checked and verified powered up. The error message will be present when there is no flow between batches.
- 5.1.4 Discharge pipe will be checked that it is positioned properly over the floor drain.
- 5.1.5 Water to the rinse tanks will be turned on. The flow and pH meters are calibrated on a quarterly basis by the manufacture representative per manufacturer guidelines.
- 5.1.6 Periodically check system during MRO event for alarms and leaks.

##### 5.2 Manufacture System Check

Under a Public Works service contract a manufacture representative will perform the following quarterly per the operations and maintenance manual in Appendix B.

- 5.2.1 Collection Transfer Station: inspect the transfer pump and rebuild the transfer pump as necessary; inspect the transfer tank for residual build up on walls and bottom and clean as necessary; and inspect and clean flow switch to insure proper operation.
- 5.2.2 Treatment System: Inspect tank for residual build up on walls and bottom and clean as necessary; check the recirculation pump for leaks and repair when necessary; inspect, clean and calibrate pH probe with 7.00 and 10.00 buffers; check the metering pumps (Caustic & Acid) for leaks (confirm that the stroke length is set to 100% and confirm that the internal / external switch is in the external position); inspect the chemical injection valve for leaks and rebuild or replace the injection valve as necessary; inspect and clean the level switches as

**Attachment 34-1:  
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necessary; inspect and clean the flow switch. The contractor shall manually confirm the recirculation/discharge valve operation and rebuild when needed; and manually confirm the recirculation/discharge valve operation and rebuild when needed.

- 5.2.3 Effluent Monitoring System: inspect, clean and calibrate pH probe with 7.00 and 10.00 buffers and inspect and clean flow sensor to insure proper operation.

5.3 Chemical Supply

Chemical resupply will be requested to Public Works Operations and funded by facilities.

6.0 MONITORING AND SAMPLING PROCEDURES

6.1 Flow and pH Measurement and Monitoring

- 6.1.1 Down load from Data Logger (add later)
- 6.1.2 Shut Down
- Drain the rinse tanks and wash any remaining residue out.
  - Shut down the monitoring system by turning off the power at the main control panel (located next to treatment system in the machine shop).
  - Run the system once a month even if no MRO are being conducted to keep the probes and seals wet. **Very important** – If the pH probe is allowed to dry out; it will not work properly and will have to be replaced.

6.2 Quarterly Sampling

Once a quarter, samples of the wastewater from the MRO are collected from Building 27250. The wastewater samples will be analyzed for the following parameters:

Total Arsenic	Benzene	Total Cadmium
Total Chromium	Total Copper	Total Lead
Total Mercury	Total Nickel	Total Selenium
Total Silver	Toluene	Total Zinc
Total Cyanide	Total Toxic Organics	

6.2.1 Sampling Schedule

- Coordinate all quarterly MRO sampling with NREA. Contact NREA (703-784-4030) at least one week prior to any MRO.

6.2.2 Sample Type

- Two types of samples will be collected: Grab Samples and Composite Samples.
  1. Grab samples will be collected by filling sample bottles with wastewater from the discharge sample port located after the final pH effluent probe. The following parameters must be collected as grab samples:

**Attachment 34-1:**  
**WTBN Metal Refinishing Operations Wastewater Discharge SOP**

Benzene	Cyanide
Toluene	Total Toxic Organics

2. Composite samples will be collected using an automatic composite sampler located at the pump station in the MRO room (prior to pH treatment). The automatic composite sampler will collect a pre-determined number of sub-samples, depositing each sub-sample into the same container (creating a composite sample). The automatic sampler will collect time-weighted samples during equally spaced time increments throughout the MRO. This composite sample will be used to fill the sample containers for the following parameters that must be collected as composite samples:

Total Arsenic	Total Cadmium
Total Chromium	Total Copper
Total Lead	Total Mercury
Total Nickel	Total Selenium
Total Silver	Total Zinc

6.2.3 Sample Bottles

- NREA must coordinate with contract laboratory for sample bottles.

6.2.4 Composite Sampler Set Up

- Ensure that the Global Water WS300 Composite Sampler is configured for sample collection. Refer to the manual in Appendix C. The sampler is dedicated to the MRO in Building 27250.
- Charge the WS300 sampler battery at least 12 hours prior to use.
- Set proper automatic sampler aliquot size.
- Set correct sampler time interval.
- Insert stainless steel strainer and tubing into the sample collection tank without restricting flow.
- Start sampler at the beginning of the MRO and monitor the sampler operation to ensure that samples are collected at the appropriate intervals.
- At the end of the MRO ensure that the sampler has stopped and has collected enough water to fill the sample container. Using a clean pair of gloves, remove the sample container from the composite sampler and cap.

6.2.5 Sample Collection

(Refer to Appendix D for Sample Requirements)

- Grab samples will be collected from the collection container located after the flume.

Sample containers must be labeled with the correct date, time, location, and parameter(s). Additionally, add the initials of the person collecting the samples.

The sampler must wear a clean pair of latex/nitrile gloves.

For each grab sample, remove the cap of the sample container. Do not set the

**Attachment 34-1:**  
**WTBN Metal Refinishing Operations Wastewater Discharge SOP**

cap on any surface. Fill the container to the neck and be careful not to let the bottle overflow. Remove the container from the water and carefully replace the cap. Grab samples for TTO and cyanide will have interference checks by the sampler per the laboratory procedures in Appendix D

For each volatile organic grab sample; use a glass 40 milliliter (ml) vial(s). Slowly fill the vial to the neck. Use the cap to add additional water until a meniscus is formed at the top of the vial. Slowly cap the vial and tighten the cap. Invert the vial and softly tap the inverted vial against the palm of your hand to check for air bubbles. There should be no air bubbles. If bubbles are present, remove the cap and repeat the final water addition method.

- Composite samples will be collected from the sample container in the composite sampler.

Sample containers must be labeled with the correct date, start and end times, location, and parameter(s). Additionally, add the initials of the person collecting the samples.

The sampler must wear a clean pair of latex/nitrile gloves.

For each composite sample, remove the cap of the sample container. Do not set cap on any surface. Fill the sample container to the neck. Do not overflow the container. Sample containers with acid preservatives (nitric acid or sulfuric acid) may fume during filling. Be careful to avoid breathing in the fumes. Replace the cap.

- All sample containers should be placed in a cooler of ice and transferred to the refrigerator at the Water Treatment Plan laboratory for courier pick up.
- Following sample collection ensure all sampling equipment is properly cleaned and placed into storage configuration. Turn off all sampling equipment and secure.

## 7.0 RECORDS

The following information should be included in the logbook:

- For each MRO, date and time (start and stop) of MRO so that records can be searched for easily in the data logger files.
- For each sample collected, date and time of sample collection for both grab and composite samples; and identify parameters for which samples were collected.
- Any inspection by the Stafford County Utilities or Department of Environmental Quality
- Document service performed to treatment system, including but not limited to calibration, cleaning, chemical tank change out or parts replacement.

Attachment 34-2:  
MCB Quantico Spill Reporting Form



UNITED STATES MARINE CORPS  
MARINE CORPS BASE QUANTICO,  
VIRGINIA 22134-5000

IN REPLY REFER TO:  
6280

From: \_\_\_\_\_  
To: Head, Natl. Resources & Environmental Affairs Branch, G-5 Installation & Environment Division  
Via: \_\_\_\_\_  
**Subj: HAZARDOUS MATERIAL/HAZARDOUS WASTE/PETROLEUM, OIL, LUBRICANT  
SPILL REPORT**  
Ref: MCBO 6280.1B

1. The following report of a hazardous substance spill is made, in compliance with the reference:

- a. Spill date: \_\_\_\_\_ Time of spill: \_\_\_\_\_
- b. Name of person reporting spill: \_\_\_\_\_  
Contact Number: \_\_\_\_\_ Grade/Position: \_\_\_\_\_
- c. Location of spill: \_\_\_\_\_
- d. Hazardous substance spilled: \_\_\_\_\_
- e. Quantity spilled (gallons): \_\_\_\_\_

2. Immediate containment actions taken: \_\_\_\_\_  
\_\_\_\_\_

3. Fire Department Response: Supervisor: \_\_\_\_\_

4. Notification:

	YES	NO	TIME	DATE
a. Fire Department 911 or 703-784-2636/7				
b. NREA Environmental Compliance Section (Working Hours – 703-784-4030)				
c. Bulk Fuel Farm Supervisor (if fuel): (Working Hours – 703-.432-0044)				
d. Command Duty Officer (Off-Duty Hours – 703784-2707/4096)				

5. Follow on actions required: \_\_\_\_\_

**Attachment 34-2:  
MCB Quantico Spill Reporting Form**

**Subj: HAZARDOUS MATERIAL/HAZARDOUS WASTE/PETROLEUM, OIL, LUBRICANT  
SPILL REPORT**

6. Additional Comments (cause of spill and description of environmental impact/physical damages: \_\_\_\_\_

\_\_\_\_\_

7. Submitted by: \_\_\_\_\_

(Print Name, Sign, and Date)

8. Supervisor: \_\_\_\_\_

Print Name, Sign, and Date

(\*This form may be faxed to NREA's Spill Prevention and Response Coordinator at [703] 784-4953.\*)