FESHM 8026: SURFACE WATER PROTECTION

Revision History

Author	Description of Change	Revision Date
J. D. Cossairt, M. Quinn, C. Greer, E. Mieland, and E. Korzeniowski	• Revised references to radioactivity in water with respect to the FRCM. • Editorial changes as needed.	February 2020
Katie Swanson	Added applicability statement of leased spaces	January 2018
Katie Kosirog	Initial release Chapter 8026 New chapter to describe management of surface water.	December 2014

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1.0 INTRODUCTION

Fermilab has a vast network of surface water that is an asset to the laboratory. It serves both as a cooling water supply to support operations and as habitat for a diverse range of wildlife.
Discharges to the surface waters that ultimately leave Fermilab are regulated by the Illinois Environmental Protection Agency (IEPA). Because virtually all of the surface water can be connected and may eventually run off site via ditches or creeks, all processes and activities that can potentially discharge to surface water must be assessed to ensure compliance with regulations.

Responsibility for managing surface water is shared by the ES&H Section and FESS. ES&H is responsible for ensuring that Fermilab remains in compliance with the National Pollutant Discharge Elimination System (NPDES) site-wide permits. FESS is responsible for managing water on the site to deliver cooling capacity to the physics program and ensuring the discharge at delegated outfalls meets the criteria of the permits. FESS manages water movement on and through Fermilab via its Surface Water Management Program (SWaMP).

This FESHM chapter is limited to the regulatory aspects of management and the organizational responsibilities for Fermilab's surface water program. Additionally, DOE Order 458.1 applies to management of radioactivity in surface waters at Fermilab and specifics Derived Concentration Standards for this pollutant. See FRCM Chapter 11, 1106 for more details.

This chapter only applies to the Fermilab site. Leased spaces will follow the rules and regulations set forth by the partnering institute and/or state or local codes and standards.

2.0 DEFINITIONS

Effluent: Any wastewater discharged, directly or indirectly, to the waters of the State (e.g., via a storm sewer, hydrant, sump or a pipe).

ICW: Industrial Cooling Water or ICW includes a complex system involving ponds, ditches, and underground piping that holds and transports water used to cool equipment and buildings as well as supply water for fire protection.

NPDES: National Pollutant Discharge Elimination System (NPDES) is a United States Environmental Protection Agency (U.S. EPA) permit program under the Clean Water Act that controls water pollution by regulating sources that discharge pollutants into waters of the United States. The IEPA has been granted authority by the U.S. EPA to implement this program in Illinois.

Outfall: An IEPA designated location where measurements and monitoring of surface water occur to ensure permit compliance. See Section 6.0, Map of Outfall Locations.

Pollutant: Any substance introduced into the environment that adversely affects the usefulness of the resource.

Storm water runoff: Rain or snowmelt that flows over land or impervious surfaces and does not percolate into the ground.

Surface water: Any lake, pond, river, stream, creek, or ditch containing water.

SWPPP: A Storm Water Pollution Prevention Plan (SWPPP) is a requirement through the NPDES program describing activities to prevent storm water contamination and to control sedimentation and erosion.

Wastewater: The spent or used water from any domestic or process use that contains dissolved or suspended matter.

Waters of the U.S./ Waters of the State/ Navigable waters: See 33 Code of Federal Regulations (CFR) 328.3 for expanded definition of Waters of the U.S. and Title 35 of the Illinois Administrative Code (IAC) 301.440 for Waters of the State. These waters include interstate waters, interstate lakes, rivers, and streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and their tributaries to these waters, which are utilized by interstate travelers for recreational or other purposes. E.g. At Fermilab, these waters include Indian Creek, Kress Creek, and Ferry Creek.

Wetland: Lands that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. See 33 CFR 328.3.

3.0 RESPONSIBILITIES

3.1 Chief Safety Officer (CSO)

The Chief Safety Officer is responsible for:

- developing and implementing the site wide monitoring program of surface water,
- ensuring compliance in all matters relating to the administrative aspects of existing or pending site wide permits,
- communicating with DOE and relevant regulatory agencies,
- training all new employees on emergency response and storm water pollution prevention, as well as the ES&H Environmental Protection Group every two years on the specifics of the SWPPP.

3.2 Division/Section/Project Heads

Division/Section/Project Heads are responsible for:

- implementing this chapter (this includes consulting the ES&H Environmental Protection Group to provide advice on means and methods to remain in compliance with applicable standards and this chapter),
- having a good understanding of the infrastructure into which effluents from their areas are discharged; and with the assistance of the ES&H and FESS, characterizing waste streams (using sampling and analytical methods that conform to Standard Methods for the Examination of Water and Wastewater or an equivalent standard), and maintaining auditable records for all processes under their control,
- contacting the ES&H Section when a new process is designed to discharge effluent directly or indirectly (example: floor drain inside a building) to surface water,
- contacting FESS for permission to connect to the ICW for make-up cooling water, to inform them on the location of the discharge, how much water will be used and how the water will be reclaimed,
- preventing exceedances of permit discharge limits and unpermitted pollutants from being discharged either directly or indirectly and contacting the ES&H Section when permit discharge limits are expected to be exceeded,
- ensuring beam enclosure sump water discharges into the Fermilab pond system.

3.3 Facility Engineering Services Section (FESS)

FESS is responsible for:

- ICW system function and operation under site-wide NPDES permit requirements,
- Movement and flow of surface water on and off site,
- Managing any permit that is FESS specific such as construction SWPPPs and the NPDES pesticide application permit, including communicating with DOE and relevant regulatory agencies.

4.0 PROGRAM DESCRIPTION

The Clean Water Act (CWA) implements pollution control programs and sets wastewater standards for industry. The EPA's NPDES permit program controls discharges into waters of the U.S. The IEPA implements the CWA in IAC 35, Subtitle C. The NPDES program controls water pollution for pesticide applications, storm water at construction sites and industrial areas, and point discharges from industrial processes. The U.S. Army Corps of Engineers oversees and administers any permit that involves a wetland. Fermilab manages these types of permits for the DOE that are designed to protect surface water from pollution on and off site.

Fermilab operations require large amounts of non-contact cooling water. Fermilab's pond capacity of up to 170 million gallons of cooling water is used primarily to dissipate heat loads from equipment. Excess storm water runoff is discharged off site during periods of high precipitation. Surface waters on the site may contain other minor constituents such as building sump discharges, floor drains, air-conditioner condensate, and once-through chiller water. These are permitted if the discharge is non-process water and doesn't contain any pollutants. Process wastewater is prohibited from being

discharged directly or indirectly to the ground or surface water unless already permitted under a NPDES permit. As stated in Fermilab Radiological Control Manual (FRCM) Article 346 Control of Radioactive Cooling Water, discharges to surface waters from any sources other than storm or cooling systems or as specified in a NPDES permit are strictly prohibited. All beam enclosure sumps shall be routed to the Fermilab pond system. Sumps may not directly discharge into ditches that are downstream of an established NPDES outfall. (See Section 6.0, Map of Outfall Locations). The discharges of radionuclides to surface water systems are covered in detail in FRCM Chapter 11, Article 1106.

5.0 REFERENCES

33 CFR 328.3
35 IAC 301.440
FESHM 8025 Wastewater Discharge to Sanitary Sewers
FESHM 8031 Oil Pollution Prevention
FRCM Article 346
NPDES Permit IL0026123: Non-contact cooling water and storm water discharges
NPDES Permit ILG870484: Pesticide application point source discharges
NPDES Permit ILR10: Storm water discharges from construction site activities greater than 1 acre
Storm Water Pollution Prevention Plan for Fermilab
DOE Order 458.1.

6.0 Map of Outfall Locations