Storm Water Pollution Prevention Plan
Argonne National Laboratory

Revised November 12, 2020
Approved by the Environment, Safety, and Health Core Process Owner
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NPDES Permit Special Condition 9 requires that the plan shall include the signature and title of the person responsible for preparation of the plan and the date of initial preparation and of each amendment. This information is presented below:

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1 INTRODUCTION

This Storm Water Pollution Prevention Plan (SWPPP) fulfills Special Condition 9 of Argonne National Laboratory’s National Pollutant Discharge Elimination System (NPDES) Permit Number IL0034592, dated August 5, 2011. Special Condition 9 defines what is needed to fulfill the requirements for a SWPPP.

The SWPPP must describe ways the Laboratory will prevent storm water pollution in outfalls that receive water from industrial activity. The plan is organized by Argonne outfalls and their watersheds. Each outfall’s watershed contains buildings and areas where industrial activity occurs, and industrial activities that could affect storm water runoff are specifically addressed in Section 5. Best management practices (BMPs) used by the Laboratory to reduce the industrial pollution of outfall watersheds are described in Section 6.

Special Condition 9 and Illinois Environmental Protection Agency (IEPA) storm water regulations also require that Argonne develop SWPPPs for all construction projects larger than one acre in size. Projects smaller than one acre in size must use an erosion control plan to keep pollutants from leaving the construction site, but do not require a separate SWPPP. Each construction site’s active SWPPP is listed in Appendix I. When a project is complete, this site-wide SWPPP is updated to include the completed project’s provisions, as applicable.

Implementation of the SWPPP appears in Section 7. This section also includes employee training and ways to include storm water pollution prevention in standard operating procedures. Section 7.3 describes how the Laboratory evaluates compliance with the SWPPP and its effectiveness through annual evaluations, records, and plan revisions. Section 7.4 contains general requirements, such as scheduling for development and implementation, required signatures, and information on plan location and how to view the plan.

Briefly Speaking…

What is an SWPPP?

A SWPPP is a site-specific, written document that:

- Identifies potential sources of storm water pollution at the facility;
- Describes how storm water is managed around the site; and
- Describes storm water control measures that are used to reduce or eliminate pollutants in storm water discharges from the facility.

Argonne’s SWPPP is a requirement of the site’s National Pollutant Discharge Elimination System Permit. It regulates industrial and storm water discharges from Argonne activities. Argonne is required to maintain and implement a SWPPP to address conditions inherent to the site and is required to keep it up-to-date to reflect changes at the site. This report is made available for review by both the Illinois and United States Environmental Protection Agencies.

Outfall L03, north of Building 401 (Advanced Photon Source)
2 Facility Description

2.1 Operational Areas

Argonne is a multi-program laboratory operated by UChicago Argonne, LLC, for the United States Department of Energy (DOE). Argonne occupies 1,500 acres in DuPage County, Illinois, and is located 27 miles southwest of downtown Chicago. Argonne borders the Waterfall Glen Forest Preserve property on the north, south, and west. Cass Avenue serves as the east boundary and is a buffer between the site and other forest preserve property.

The land around Argonne is gently rolling and partly wooded, made up of former prairie and farmland. The property contains some small ponds and streams. Sawmill Creek is the largest stream and runs south through the property. It enters the Des Plaines River approximately 1 mile southeast of the property’s center. The land surrounding the Laboratory is drained primarily by Sawmill Creek, and the extreme southern portion drains directly into the Des Plaines River, which flows along Waterfall Glen.

Argonne has over 100 permanent buildings, most of them built in the 1950s and 60s. Buildings are identified by the area where they are located: East Area, 100 Area, 200 Area, 300 Area, 360 Area, 400 Area, 500 Area, 600 Area, and 800 Area (see Figure 2.3).

Area Descriptions

The East Area is home to the Transportation and Grounds Facility (Building 46). Here, vehicle refueling, facility maintenance support services, and shipping/receiving take place. A 10-kilowatt wind turbine is located south of Building 46 and provides power for building operations.

The 100 Area contains the Boiler House (Building 108), which produces steam for heating. Boilers in this building are fired by natural gas. This area also contains one diesel fuel storage tank for an emergency generator.

The 200 Area contains research laboratory and office buildings, the cafeteria, the Argonne Information Center, and a credit union. One building, Building 240 (Theory and Computing Science), is owned and operated by a third party and leased to Argonne. Some buildings have transformers mounted on concrete pads, emergency generators, and above-ground and underground storage tanks for diesel fuel.

The 300 Area contains buildings from the early 1950s built for housing nuclear reactors and accelerators used in research. This area also includes the fire station, an out-of-service gas station, and waste management buildings. Some of these buildings also have transformers mounted on concrete pads, emergency generators, and tanks for storing diesel fuel.

The 360 Area contains a multi-building complex built in the 1960s to support the Zero Gradient Synchrotron and its research. Since 1979, other research activities take place there, including diesel engine testing, electric vehicle research, and sustainable energy research. Some buildings have transformers mounted on concrete pads, emergency generators, and tanks for storing diesel fuel. In addition, the Central Chiller Plant and cooling towers are located just south of the buildings in this area. A 109 kW solar array is located in the northwestern part of this area and provides power to Argonne’s Emergency Operations Center in Building 372.

The 400 Area is home to the Advanced Photon Source (APS). The APS has three emergency generators with both indoor and outdoor diesel fuel storage tanks. The APS has many transformers located outdoors in the courtyard area, which is surrounded by the APS “ring” building. Five transformers contain mineral oil.

The 500 Area buildings support sanitary and laboratory wastewater treatment facilities.

The 600 Area contains housing for Argonne visitors, including students and researchers.

The 800 Area contains a closed landfill that was used for the disposal of nonhazardous solid waste, and contains clay and topsoil stockpiles, and dumpsters for asphalt and concrete recycling.
2.2 Site Drainage

The Argonne site is located in the Des Plaines watershed, with Sawmill Creek being the principal subwatershed of the Des Plaines River in the Argonne vicinity. Sawmill Creek flows through the eastern portion of the site. This stream begins north of the site, flows through Argonne in a southerly direction, and empties into the Des Plaines River about one mile south of the site. At Argonne, the Freund Brook system is the principle drainage way for Sawmill Creek and consists of a drainage way that begins on site (Upper Freund Brook) and another just off site (Lower Freund Brook), combining at Lower Freund Pond and then emptying into Sawmill Creek.

At the scale of the Argonne site, there are 69 drainage areas that receive storm water runoff from building areas, parking lots, roadways, lawns, and natural areas, discharging this water into site drainage ways. The two branches of Freund Brook flow from west to east and drain the interior portion of the Argonne site, and then empty into Sawmill Creek. The larger south branch begins in a marsh near Argonne’s western boundary. It crosses wooded land for a distance of 1.5 mi before emptying into Lower Freund Pond. The Upper Freund Brook branch begins in the center of the site and also empties into Lower Freund Pond.

Storm water that is not stored as ground water is carried to the nearest natural drainage feature, including creeks and wetlands. Run-off from buildings adds to the volume of natural flow, cuts away natural features, and often causes eroded materials to be deposited in downstream wetlands.

briefly speaking...
argonne drainage areas

A watershed is an area of land that contributes storm water runoff to a lake, stream, wetland, or river. The Argonne site is located in the Des Plaines River watershed and contains about 69 distinct drainage areas, each of which receive storm water runoff from buildings, paved areas, and lawn areas. These drainage areas discharge into natural drainage ways present on the Argonne site and eventually discharge into Sawmill Creek, a subwatershed of the Des Plaines River, or into the Des Plaines River itself.

where ground water absorption can be improved, the added volume can be decreased. Otherwise, storm water flows through the drainage areas (most are in the Sawmill Creek subwatershed) or along the southern part of the site, which is in the Des Plaines River watershed. All site storm water eventually reaches the Des Plaines River via Sawmill or unnamed southern tributaries of the Des Plaines River.

Figure 2.1 Lower Freund Pond wetland

Along the southern portion of the site, the land slopes south and forms forested bluffs. These bluffs are crossed by ravines containing intermittent streams that empty some water into the Des Plaines River. In addition to streams, there are various ponds and wetlands on site. A network of ditches and culverts carries surface water toward the smaller streams.
2.3 Site Maps

Special Condition 9(E) requires maps identifying the operational areas and topography. Figure 2.3 (Site Map), shows surface water features, buildings/structures, roads, parking lots, roofs, and sidewalks. Argonne encompasses 1,500 acres, about 12% of which is impervious surface. Figure 2.3 shows the areas that have a higher risk of contaminated storm water, such as erosion areas, vehicle maintenance areas, and storage areas. Figure 2.4 is a topographic map of Argonne and includes contours that extend beyond the Argonne property boundary.

Figure 2.5 is a map of topographic watersheds and the corresponding Argonne outfalls. This map is used during spill events to help determine which outfalls might be affected by a spill event. In some areas, runoff from buildings is directed through storm sewer lines to an adjacent drainage area (described in Section 5).

Appendix III is a map showing the layout of the site storm sewer system.

Figure 2.2 Prairie restoration area in East Area, adjacent to Sawmill Creek
Figure 2.3 Site Map

Figure 2.4 Topographic Map
Figure 2.5  NPDES-Permitted Outfalls and Topographic Watersheds (Drainage Areas)
3 ANALYSIS OF POTENTIAL POLLUTION SOURCES

Before storm water pollution can be prevented, potential pollution sources must be identified and analyzed to see if they will contaminate storm water runoff. This section describes the potential pollution sources of general site-wide operations and facilities and their pollution prevention methods. For potential pollution sources by watershed, see Section 5, and for their best management practices, see Section 6.

3.1 Material Inventory

Materials needed for Laboratory operations are housed on site and are discussed below. These materials, or their storage systems, are exposed to storm water and could be potential pollution sources.

3.1.1 Oil and Fuel Storage

Diesel fuel and gasoline are stored in underground storage tanks and in above-ground tanks and containers at several locations on site. At Building 46, the gasoline underground storage tanks and loading and dispensing systems meet federal underground storage tank regulations and Clean Air Act requirements. The Building 46 fueling area is paved and, while uncovered, slopes toward a storm water drain that contains a sluice gate valve that acts as another water collection area when the valve is closed. The valve is normally open to allow storm water to drain, but it is closed to contain leaks or spills during tank loading. Runoff containment is described in Section 5.19.

![Double-walled diesel fuel storage tank at Building 376](image)

Diesel fuel is also stored at outdoor diesel generator locations. In most cases, the tanks are located directly underneath the generator. Other tanks are stand-alone units and serve as bulk fuel storage. All above-ground storage tanks are either double-walled or have some form of secondary containment. Runoff containment for above-ground fuel storage tanks is described in the outfall-specific subsections in Section 5.

Oil is stored indoors in 55-gallon drums and totes at several locations across the site and is used for different purposes. Oil and related products are stored in the largest quantities in Building 46 and in the Building 369 Annex. Oil at these locations is used for vehicle maintenance purposes and accelerator science operations of the APS facility, respectively. The Engine Research Facility, located in Building 371, stores high purity gasoline and diesel fuel in 55-gallon drums and totes in two covered storage areas east of Building 371. Finally, smaller quantities of oil are stored indoors in

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several research buildings across Argonne and consist of maintenance oils and waste oils. In all cases, oil is managed indoors and its management is subject to requirements contained in Argonne's SPCC Plan. The risk of storm water contact with these materials can be considered very low and would likely result from spillage during container delivery and handling and material transfer activities from oil containers to their areas of use.

3.1.2 Used and Excess Machinery and Equipment

Argonne stores used and excess equipment and machinery in several outdoor areas, with the 800 and East Areas as the main storage areas. The Laboratory is actively reducing the amount of material held in these areas. These areas are noted in the sections describing their respective watersheds.

3.1.3 Water Treatment Chemicals

Water treatment chemicals are used in the boilers at the 100 Area, in site-wide cooling towers, and at the Canal Water Treatment Plant. Boiler chemicals are stored inside Building 108 in 100 to 1,000 gallon tanks, and use secondary containment to prevent spills and leaks.

3.1.4 Salt and Calcium Chloride Storage and Use

In winter, the Laboratory’s roadways are cleared of snow and ice to keep them safe for drivers. Typical snow-removal practices such as plowing and salting are used. The salt is stored in a dome (Building 307) located east of Building 450. The salt storage dome prevents storm water from reaching the salt. Calcium chloride and a beet juice derivative are also used to enhance the melting capability of salt. These chemicals are stored in tanks next to the salt dome and in the East Area in bags and under a canopy. These facilities have no contact with storm water and are not mentioned again in this SWPPP.

3.2 Site–wide Activities and Storm Water Pollution Prevention Methods

Steam distribution and roadway systems as well as other activities at the Laboratory affect storm water runoff. The associated risks for the industrial activities at Argonne and best management practices (BMP) for pollution prevention are discussed below.

3.2.1 Steam Distribution System

The steam distribution system is an above-ground network of headers and pipes stretching across the Argonne site. The system carries steam from the 100 Area to all buildings requiring steam. Chemicals for steam treatment can leak from valves and other components and contribute to storm water pollution.

The Facilities Division (FAC) Utility Systems group controls and regularly inspects the steam distribution system. Records of these inspections are maintained by the group. Inspections note any leaking parts, which are scheduled for replacement as soon as possible. The BMPs for steam distribution are:

- Visual inspections
- Inspection by Quality Assurance and Service (QAS) Division - Environmental Protection (QAS-EP) personnel when a leak is reported through the Argonne 911 system
- Scheduled preventive maintenance for old, potentially leaking components
- Required maintenance on leaking components

3.2.2 Roadway System

Argonne's roads consist of gravel and asphalt roads. The system also includes paved concrete and asphalt sidewalks. FAC-Grounds maintains the roads.

As impervious surfaces, roads do not absorb appreciable amounts of rainwater. Instead, they carry storm water runoff polluted with dust and debris picked up from the road. On roads with no curbing, the water leaves the road in sheets. Where there is curbing, the
runoff is carried to storm sewers along the roadway and eventually discharges as surface water.

The Laboratory uses salt, calcium chloride, and beet juice derivatives to keep roadways free of ice. Salt is one source of dissolved solids in the runoff created when snow melts. In order to maintain safe roads, the Laboratory will continue to use salt for melting ice, but is committed to using less salt to reduce pollution. Non-salt alternatives, such as Eco-Traction (a volcanic-ash derivative) are being deployed in pedestrian areas near buildings; salt alternatives are continually being evaluated. To minimize dust and debris from construction, road sweeping is required by all building contracts.

The BMPs for roads include, but are not limited to, the following:

- Reduce the amount of salt. BMPs for using less salt are described in “Overview of FAC-Grounds Snow Command Operations,” available from FAC-Grounds. Road deicer BMPs are also described in Appendix IV, “Snow and Ice Control Procedure.”

- Control dust by sweeping and collecting accumulated dirt, dust, gravel, and waste from roadways leading to and from construction projects.

3.2.3 Construction Activities
Storm Water Pollution Prevention Methods

Construction activities present many situations that can affect storm water. This section covers specific aspects of construction projects where storm water pollution prevention will be used.

3.2.3.1 New Construction Planning

Planning for new construction at Argonne includes storm water pollution prevention. As much as possible, newly built facilities must alleviate potential storm water contamination during construction and after, when the facility is operational.

New construction must include control features that will prevent contaminants from entering storm water and be able to contain any contaminated storm water. Some examples of control features are:

- **Storm water trench valves** – Trenches and grates remove storm water from facilities such as loading docks. Isolation valves, present at buildings where chemicals are routinely transferred during deliveries or shipments, close off trenches during loading and unloading.

- **Piping wastewater-generating equipment to treatment system sewers** – Pipe minimally contaminated wastewater from equipment, such as air compressors or ventilation equipment condensation collectors, directly to the Laboratory wastewater sewer system.

- **Fire water systems inspection ports** – Discharge fire water should discharge easily to the wastewater sewer system, and not to the storm water sewer system or onto the ground surface. Special Condition No. 8 of the NPDES permit requires that “reasonable attempts” be made to prevent fire water from discharging through an outfall.

- **Cooling tower drainage and blowdown** – Never discharged cooling tower water to the ground, or to a creek or ditch. Since this water contains chemicals for treating water, pipe only to the sewer system.

- **Dikes for storage tanks** – A dike prevents chemical storage tanks from leaking into surface water. Diked enclosures with drain line valves remove uncontaminated storm water. Line dikes with corrosion-resistant material in case stored material is released from the tank and contacts the dike. As a substitute, a double-walled storage tank may be used.

- **Security for fuel/oil storage systems** – Secure fuel/oil storage tanks, generator systems, transformers, drums, and totes to prevent unauthorized access and release of contents. Security methods include, but are not limited to, locked fences, access ports, and control panels, or locations inside locked buildings.

Any wastewater that results from industrial activity is piped to the wastewater sewer. Storm water BMPs should be used to collect and transport storm water to surface water for ground absorption and evaporation of water through plants. These methods are not intended for disposal of uncontaminated wastewater from industrial processes. Working with the OAS Environmental Protection Department during project planning will ensure that the proper industrial and storm
water management practices are in place before the project begins.

### 3.2.3.2 Construction Activities

Projects that include construction and earth-moving activities must comply with the provisions in Section 4.1.4, Sediment and Erosion Control, and Appendix II. These SWPPP sections describe the methods a project must use to prevent contamination of any run-on or runoff caused by disturbed earth.

The project must also keep its work area clean and control all project equipment and materials. Examples of equipment control include preventing hydraulic leaks from heavy construction equipment and protecting storm water during field refueling of equipment. Each activity in a project must include storm water pollution prevention.

A project-specific, IEPA-approved SWPPP is required for any construction activity that disturbs land equal to or greater than one acre. The project’s SWPPP must be on file for review by the construction contractor(s), FAC project manager, QAS-EP water pollution SME, FAC project specialist, and the IEPA.

Currently, there are four construction projects at Argonne: the Materials Design Laboratory (MDL); Theory and Computing Science (TCS) Building West Addition and Truck Dock, Site Work, and Coal Yard-Lime Sludge Lagoon Restoration with dedicated SWPPPs approved by the IEPA. All are scheduled to be completed in FY2019.

### 3.2.4 General Building Industrial Activities

At Argonne, “industrial activities” are building features or nearby activities with the potential to pollute storm water. The Laboratory operates and manages more than 100 buildings on campus. Common industrial activities associated with these buildings include access roads and parking, loading docks and dumpsters, diesel generators, electrical transformers and various other maintenance activities. Methods of storm water pollution prevention for some of these are described below.

**Loading Docks** – Trucks are allowed to park at docks only when materials are being loaded or unloaded. Loading dock drives are usually lower than the surrounding surfaces because the docks are built at the same height as the floor they are serving. Storm water can collect in these areas, so a grate or a grated trench is used to drain the area.

**Parking Areas** – In most cases, runoff from these areas is collected in storm grates which allow water to flow into the storm sewer. Several newly designed parking lots on site use flush curbing and green infrastructure (bioswales and water-absorbing basins) to manage runoff.

**Dumpsters** – Most dumpsters are used to collect general waste from offices and laboratories, and recyclable material such as paper, cardboard, glass, and metal. Liquid waste, Illinois special waste, hazardous waste, and radioactive waste materials are collected separately and not allowed in dumpsters.

Dumpsters are covered and the areas around them are kept clean and free of debris. Some dumpsters are brought on site to collect waste designated for shipment off site (usually for a research or construction project). These are not included in the description of general dumpster use in this SWPPP.

Table 3.1 provides a summary of industrial activities Argonne and the associated risks that they pose to storm water pollution.
### Table 3.1 Argonne Industrial Activities Summary

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Description</th>
<th>Storm Water Pollution Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Roads</td>
<td>• Used to access buildings, docks.</td>
<td>• Spillage from delivery truck contents.</td>
</tr>
<tr>
<td></td>
<td>• Material delivery.</td>
<td>• Releases from car or truck fuel lines, hydraulic lines, etc.</td>
</tr>
<tr>
<td>Chemical Container Storage</td>
<td>• Above-ground storage tanks used to store various chemicals used by research programs and operations.</td>
<td>• Spillage during materials transfer from vendor vehicle to tank.</td>
</tr>
<tr>
<td></td>
<td>• Tanks are single-walled and double-walled.</td>
<td>• Releases from tank leaks.</td>
</tr>
<tr>
<td>Construction</td>
<td>• Activities associated with new building construction, building renovation, utility repair/upgrade, emergency utility repairs, routine building and equipment maintenance.</td>
<td>• Chemical/fuel spillage from portable containers, construction equipment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Storm water exposure of excavated contamination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improper draining of building HVAC equipment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uncontrolled erosion and storm water exposure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improper site restoration.</td>
</tr>
<tr>
<td>Cooling Towers</td>
<td>• Activities associated with filling, draining tower basins.</td>
<td>• Overfilling can cause water to overflow onto the ground surface, and then enter a storm sewer.</td>
</tr>
<tr>
<td>Diesel Generator</td>
<td>• Stand-alone emergency generators.</td>
<td>• Spillage during materials transfer from vendor vehicle to tank.</td>
</tr>
<tr>
<td></td>
<td>• Tank is either underneath generator (Genset), or is separate component, either above-ground or underground.</td>
<td>• Releases from tank leaks.</td>
</tr>
<tr>
<td>Electrical Transformer</td>
<td>• Minor transformers (&lt;13.2 kV).</td>
<td>• Spillage from leaks from transformer.</td>
</tr>
<tr>
<td></td>
<td>• Major transformers.</td>
<td>• Leaked material either migrates away from uncontained unit and is exposed to storm water, or enters secondary containment and can be accidentally released with accumulated storm water.</td>
</tr>
<tr>
<td></td>
<td>• Substations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Consist of oil-filled equipment (oil integral to unit’s operation).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Minor transformers on concrete pads, but not necessarily within secondary containment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Substation transformers within secondary containment.</td>
<td></td>
</tr>
<tr>
<td>Excess Inventory Storage</td>
<td>• Storage containers.</td>
<td>• Materials may contain fluids that can contact storm water in the event of a leak.</td>
</tr>
<tr>
<td></td>
<td>• Oversized building equipment awaiting installation.</td>
<td>• Chemicals containers may be damaged or otherwise develop leaks, resulting in contents contacting storm water.</td>
</tr>
<tr>
<td></td>
<td>• Experimental equipment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Programmatic and process raw materials, including containerized and bagged chemicals.</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.1  Argonne Industrial Activities Summary (continued)

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Description</th>
<th>Storm Water Pollution Risk</th>
</tr>
</thead>
</table>
| Fuel Storage Tanks          | • Stand-alone above-ground storage tanks for diesel generators (non-Gensets).  
• Above-ground storage tanks for engine research programs.  
• Underground storage tanks for vehicle fueling areas.  
• Stand-alone underground storage tanks for selected diesel generators.  
• Underground storage tanks for substation secondary containment systems. | • Contents from leaking ASTs could contact storm water or enter a nearby storm water drain.  
• Releases during tank filling could enter a nearby storm drain or otherwise contact storm water. |
| Landfill                    | • Closed sanitary landfill in 800 Area.  
• Closed radioactive waste landfills in the 319 and East-Northeast Areas. | • Engineered controls, including vegetative cover and combination membrane/vegetative cover (319 and ENE) could deteriorate, resulting in a release of leachate and possible contact with storm water or surface water. |
| Loading Docks               | • Receiving areas at the majority of programmatic buildings on site, and a smaller subset of non-programmatic buildings.  
• Most dock areas are sloping towards the building to allow for safe unloading of truck contents.  
• Some docks are not sloped and include building “high bay” areas.  
• Storm drains are present at the base of most docks. | • Hazardous materials could be released and enter storm drain systems during vehicle offloading activities, in the event of a spill or container breach.  
• Hydraulic systems on trucks loading or unloading in the dock area could malfunction, resulting in a leak of hazardous materials and potentially contacting storm water.  
• Hazardous materials, including chemicals that may be used inside the building, may be improperly stored at the dock following delivery. |
| Metals Reclaim Dumpsters    | • These are third-party roll off boxes or smaller dumpsters typically located in dock areas of building.  
• Used to manage metal from building demolition projects and routine maintenance activities.  
• Generally managed in a temporary, project-by-project basis.  
• Filled by trained personnel to allow for comingling of acceptable materials. | • Inadverted disposal of oil-filled equipment, pressurized containers, or other containers containing liquids.  
• Storm water could become contaminated in the event of a hazardous materials releasing from leaking or broken containers.  
• Most of these prohibited items have unique disposal requirements and cannot be commingled with reclaim metals. |
| Outdoor Chemical Storage    | • Outdoor storage of containers (drums, totes, tanks, smaller containers such as five or ten gallon containers, etc.). | • Improper container storage, including excessive container stacking, unsecured lids, etc., could result in storm water contamination from released material.  
• Poor container condition could result in container failure and release of contents to the environment. |
### Table 3.1  Argonne Industrial Activities Summary (continued)

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Description</th>
<th>Storm Water Pollution Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Materials Storage</td>
<td>• Outdoor storage or equipment and vehicles.</td>
<td>• Improper storage could result in fluid leaks from containers contacting storm water.</td>
</tr>
<tr>
<td></td>
<td>• Materials stored are typically items that due to their size inadequate indoor storage areas are available.</td>
<td>• Long-term outdoor storage could result in deterioration and leaks of hazardous fluids.</td>
</tr>
<tr>
<td></td>
<td>• Typical materials include grounds equipment (mowers, snowplows, plow blades, etc.).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Materials also include equipment awaiting installation (for example, HVAC equipment, and experimental equipment).</td>
<td></td>
</tr>
<tr>
<td>Paved Areas</td>
<td>• Paved areas include roads and parking lots serving buildings.</td>
<td>• Hazardous materials released from vehicles, including but not limited to gasoline oil, and hydraulic oil releases from equipment failure can pool on pavement and then flow towards and enter a storm drain, thereby contacting storm water.</td>
</tr>
<tr>
<td></td>
<td>• Paved areas typically are drained using storm drains and catch basin systems.</td>
<td>• Clogged storm drain systems can result in storm water flooding paved areas and mixing with contaminants on the pavement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Excessively applied deicer chemicals can result in salt compounds entering surface waters via the storm drain system.</td>
</tr>
<tr>
<td>Radioactive Waste</td>
<td>• Waste generated from research, decontamination and decommissioning (D&amp;D), and nuclear footprint reduction activities.</td>
<td>• Locations currently or formerly managing radioactive waste have an elevated risk of contamination.</td>
</tr>
<tr>
<td></td>
<td>• Activities take place largely indoors, but, waste managed if necessary outdoors, in approved containers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Also present in two landfills, within engineered barriers to prevent contact with environmental media.</td>
<td></td>
</tr>
<tr>
<td>Recycle Dumpsters</td>
<td>• Dumpsters located across Argonne at most buildings and used to collect paper for recycling.</td>
<td>• Inadvertent disposal of hazardous materials, in particular hazardous liquids, could release and contact storm water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Leakage of liquid hazardous materials from dumpsters could migrate to nearby storm drains.</td>
</tr>
<tr>
<td>Industrial Activity</td>
<td>Description</td>
<td>Storm Water Pollution Risk</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
<td>---------------------------</td>
</tr>
</tbody>
</table>
| Remediation         | • Cleanup and decommissioning of RCRA and D&D sites across Argonne.  
• Remediation may involve excavation of contaminated soils, in-situ or ex-situ treatment of contaminated soils or groundwater, removal of radioactive contamination from building surfaces, piping systems, etc., or, installation of engineered barriers to isolate contamination from the environment.  
• All work performed according to approved work plans. | • Contaminated soil, groundwater, or building materials may be exposed to storm water during remediation. |
| Solid Waste Dumpsters| • Dumpsters located across Argonne at most buildings and used to collect solid waste for off-site disposal. | • Storm water risk is identical to recycle dumpsters. |
| Wastewater Treatment| • Laboratory (industrial) and sanitary wastewater treated on-site at two wastewater treatment plants.  
• Sanitary wastewater treatment plant is largely outdoors and has two treatment “trains”, each containing open-air clarifiers and slow sand filter beds.  
• Treatment system includes parallel conveyance systems serving all areas of the Argonne site and several lift stations to carry wastewater over topographic divides. | • Excessive rainfall could result in wastewater entering each plant in excess of their designed storage and designed treatment capacities.  
• Equipment malfunctions at lift stations could result in wastewater overflows and contact with storm water.  
• A treatment bypass, or plant upset from malfunctioning equipment, could result in untreated wastewater contacting storm water. |
| Oil/Water Separation| • Systems are present at three buildings (46, 376, 233) to remove oil and grease before wastewater is discharged to the sanitary and laboratory wastewater treatment plants. | • Failure of these systems could result in oily wastewater discharging to either the laboratory or sanitary wastewater treatment plant and could pass through untreated if discharged in excessive quantities. |
3.2.5 Storm Water Monitoring Data

Argonne’s NPDES Permit requires that the Laboratory monitor five outfalls that contain storm water combined with industrial wastewater, as well as four outfalls that contain only storm water. The data is used to determine the types and concentration of contaminants from these “combined” outfalls.

This data also is reported in the Discharge Monitoring Reports submitted monthly to the Illinois Environmental Protection Agency. Data, analyses and reports are all maintained at the Laboratory. Table 3.2 is a summary of monitoring of outfalls containing storm water in 2020. There were three permit exceedances at Outfall D03, related to temperature. Argonne’s investigation of these exceedances indicated that temperature was being recorded at an incorrect location, resulting in higher values recorded.

Table 3.2 Effluent from Argonne Monitored Storm Water Outfalls

<table>
<thead>
<tr>
<th>Outfall</th>
<th>Parameter</th>
<th>Monitoring Frequency &amp; Sample Type</th>
<th>2020 NPDES Data¹</th>
<th>Exceedances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>D03</td>
<td>Flow</td>
<td>1/month – single reading</td>
<td>0.012</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>1/month – grab</td>
<td>7.22</td>
<td>7.95</td>
</tr>
<tr>
<td></td>
<td>Temp</td>
<td>1/month – single reading</td>
<td>3.5</td>
<td>24.8</td>
</tr>
<tr>
<td>006</td>
<td>Flow</td>
<td>1/month – single reading</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>021</td>
<td>TRC</td>
<td>1/month – grab</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Iron</td>
<td>1/month – grab</td>
<td>&lt;0.5</td>
<td>1.434</td>
</tr>
<tr>
<td></td>
<td>Tritium</td>
<td>1/month – grab</td>
<td>&lt;100</td>
<td>&lt;100</td>
</tr>
<tr>
<td></td>
<td>Carbon Tetrachloride⁴</td>
<td>Annual - grab</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Chloroform⁴</td>
<td>Annual - grab</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>1,1,1-trichloroethane⁴</td>
<td>Annual-grab</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>A22</td>
<td>Flow</td>
<td>2/year – single reading</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>Tritium</td>
<td>2/year – grab</td>
<td>&lt;100</td>
<td>&lt;100</td>
</tr>
<tr>
<td>B22</td>
<td>Flow</td>
<td>2/year – single reading</td>
<td>0.014</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>Tritium</td>
<td>2/year – grab</td>
<td>&lt;100</td>
<td>&lt;100</td>
</tr>
<tr>
<td>023</td>
<td>Flow</td>
<td>1/month – single reading</td>
<td>&lt;0.001</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Tritium</td>
<td>1/month – grab</td>
<td>&lt;100</td>
<td>&lt;100</td>
</tr>
</tbody>
</table>

¹Reported data range is January–July 2020. Volatile organics data for Outfall 021 is the annual priority pollutants sample for 2019.

²Units:

- **Flow**: million gallons per day
- **Iron**: milligrams per liter
- **Tritium**: picocuries per liter
- **Temp**: °Celsius

³TRC = Total Residual Chlorine. Sampling is required at Outfall 006 only when industrial water is discharging. No industrial discharges were reported at these outfalls in the period covered in the table.

⁴Priority Pollutants
3.2.6 Non-Storm Water Discharges

In 1992, Argonne conducted the “Floor Drain Project,” which consisted of dye-testing drains in all of the buildings that were not known to be tied into either the sanitary or laboratory sewers; 2,276 drains were tested, including floor drains, laboratory and slop sinks, sumps, cooling towers, and other wastewater-producing devices.

During each test, dye was poured into a drain and wastewater and storm water collection points were watched to see where the dye exited. If dye showed up in a storm water collection device, the drain was labeled as having the potential to empty non-storm wastewater into the storm water system.

Since 1992, as funding permitted, some storm drains inside building service floors were connected to either a laboratory wastewater or sanitary wastewater sewer to reduce the risk of contaminated materials entering the storm water system through building drains. Drains that for either funding reasons or logistical reasons could not be rerouted effectively are labeled with signs designating them as storm water drains to prohibit disposal of non-storm water through them.
4 STORM WATER MANAGEMENT

4.1 Runoff

As described in Section 2.2, Argonne’s storm water flows along 69 drainage areas (most of which are in the greater Sawmill Creek sub-watershed), while others are directly in the Des Plaines River watershed. Water from the northern third of the Argonne site drains to the north (via unnamed tributaries and wetlands) and eventually empties into Sawmill Creek. The middle third of the site is drained largely by Lower and Upper Freund Brook, tributaries, and wetlands. The southern third of the site drains into unnamed drainages that empty directly into the Des Plaines River. If buildings are present in the sub-watersheds, this water is carried to the nearest creek or wetland.

Water that could have been absorbed into ground now occupied by man-made structures adds to the volume of natural flow, leading to erosion and carving of natural features. Eroded sediments are often deposited in downstream wetlands. Where water-absorbing ground can be improved, this added volume of water can be reduced. Otherwise, all storm water eventually reaches Freund Brook or the Des Plaines River.

4.2 Building Storm Water Management

At Argonne, sustainable architecture elements are included in new building designs to obtain LEED certification (Leadership in Energy & Environmental Design, a green building certification program). Instead of using traditional storm water methods, green storm water management systems are designed and built to keep the area’s hydrology in a pre-construction state. Green storm management follows the 2007 Energy Independence and Security Act (EISA) and EO13693 requirements. Rain gardens and bioswales manage storm water and minimize runoff at Buildings 240, 241, 440, and 446 and in the 800 Area (from clay soil stockpiles). At Building 440, storm water is directed to a lift station, then pumped to a bioswale, and eventually emptied into a drainage area. Finally, storm water basins at several building parking lots measure storm water flow into site waterways or promote ground absorption.

Briefly Speaking…

Sustainable Storm Water Management

Argonne has undertaken a program to use green infrastructure in lieu of traditional storm water conveyance systems to manage storm water runoff on the site. Green infrastructure, such as rain gardens, bioswales, and vegetated infiltration basins, help Argonne achieve sustainability goals that require new construction projects mimic pre-existing hydrology to the extent possible.

Bioswale adjacent to parking lot at Advanced Protein Crystallization Facility (Building 446) collects and infiltrates storm water

At newly constructed buildings, rain gardens and bioswales are planted with deep-rooted native species so that runoff from building roofs and nearby pavement can percolate into the ground instead of being piped directly to the nearest waterway. Green infrastructure is also used when possible at existing buildings to address localized flooding problems. The Argonne site as a whole is being evaluated to identify areas where green infrastructure systems could make the site more resilient in the face of climate change.

4.3 Watershed Storm Water Management

Argonne has several initiatives to increase the management of storm water on a watershed basis. Natural resource management transforms about three acres per year of former pastureland or former building areas by planting them with native prairie species. These efforts reduce soil density, and increase storm water storage capacity and evaporation of water from prairie vegetation. Argonne has removed invasive species from woodlands and wetlands, increasing biodiversity and storm water storage capacity. In
addition, Argonne constructs rain gardens and bioswales as part of new building construction or to improve management within specific watersheds and currently manages about 9 rain gardens and 11 bioswales. These green infrastructure features divert about 22.5 million gallons of storm water from site storm sewers and local waterways annually.

In 2016, Argonne collaborated with the United States Geological Survey and completed a flood hazard analysis of site waterways, which assessed:

- Areas of current flood risk;
- Areas of future flood risk under climate change scenario(s); and
- Best locations for green infrastructure to help with current and future storm water management.

The results of the USGS modeling effort indicate existing risks for several critical roadways from extreme precipitation events. No critical Argonne facilities were shown to be affected by potential extreme precipitation events, but flooded roadways would limit access to several areas of the site.

These results are being incorporated into infrastructure planning as part of a broader Argonne effort to adapt to the risks of climate change. The flood analysis provides a more complete picture of storm water impact in areas where new buildings are proposed, and will aid in identifying areas where green infrastructure can be used to meet planning and sustainability goals.
5 DESCRIPTIONS OF OUTFALL CATCHMENTS

Two classifications of outfalls are present at Argonne. NPDES outfalls are outfalls whose discharges are permitted in Argonne’s NPDES permit, generally drain one or more storm water catchment areas, may or may not include an industrial component, and are, in most instances, at or near Argonne’s property line. Permitted outfalls are subject to either pollutant discharge limits and/or storm water protection requirements outlined in this SWPPP. Internal outfalls are outfalls whose sole component is storm water. They generally drain storm water from a specific building or group of buildings, and discharge into water bodies completely within the Argonne property boundary. Because internal outfalls discharge into water bodies on site, they are considered merely components of broader watershed outfalls and are not part of the NPDES permit. Nevertheless, they are important spill interception points and are therefore included in this SWPPP. All outfalls serve as termini for Argonne’s storm sewer system. A layout for the site storm sewer system is contained in Appendix III.

Each catchment is organized by the outfall that serves as the discharge point for the runoff generated within it. The path of drainage and activities taking place in the catchment that could affect storm water quality are provided.

At the end of this section, Table 5.1 shows industrial activities at each Argonne building contributing to each outfall at the time of the annual inspection.

5.1 NPDES Outfalls

5.1.1 Outfall 003

Outfall 003 is located in the eastern part of Lower Freund Brook, upstream of a wetland and Sawmill Creek. This outfall receives discharges from what are former NPDES outfalls discharging into Lower Freund Brook. Outfall 003 receives storm water flow from catchment areas containing “internal” Outfalls B03, H03, K03, I03, L03, and M03, as well as sheet flow from undeveloped and wooded areas of the site. Outfall 003 is located in a natural drainage channel approximately eight feet wide by three feet deep.

5.1.2 Outfall F03

Outfall F03 discharges into the southern fork of the upper branch of the Freund Brook system over a concrete spillway just downstream of outfall J03, described below. This outfall has a very limited catchment area since it serves as emergency overflow of the Building 201 fire water pond, which itself receives limited storm water runoff from Building 201 roof drains.

5.1.3 Outfall G03

The catchment for Outfall G03 collects water from the northern half of Building 201 and the southern portions of Buildings 202, 222, and 223. In addition, storm water catch basins collect runoff from the Inner Circle Drive/Northgate Road intersection and the northern parking area for Building 201, which also has a loading dock. Occasional steam condensate drainage is discharged to this outfall.

Collected storm water runoff is conveyed through storm sewers converging south to the northern area of Building 201. Water then courses south and east of this building via storm sewers to the brook, where it discharges into a small wetland area (Wetland 207) through a 24-inch corrugated metal pipe (CMP). The water then flows into the north fork of the upper branch of Freund Brook system, which feeds directly into Lower Freund Pond at the northwestern extreme of that body of water.

5.1.4 Outfall J03

Outfall J03 discharges into the southern fork of the upper branch of the Freund Brook system through a 48-inch CMP conduit located south of Building 201. This outfall covers much of the central portion of the Laboratory’s 200 area, including Buildings 213 and 233, and portions of Buildings 200, 203, and 221. The catchment consists primarily of parking lots, roadways, and open grounds.

5.1.5 Outfall N03

The catchment for Outfall N03 includes the northern half of Building 212. Building 216, the Sub-Angstrom Microscopy and Microanalysis (SAMM) facility, is within this watershed as well. Roof runoff and runoff from open ground around Building 216 is directed to a rain...
garden feature, to encourage storm water ground absorption and reduce runoff into the Freund Brook system. Outfall N03 discharges into the northern branch of the Freund Brook system, with eventual discharge into Lower Freund Pond and Sawmill Creek.

5.1.6 Outfall 004

Outfall 004 storm water discharges from an area that is approximately 2.7 million square feet (ft²) in size. The area served by this outfall contains the northern portion of Buildings 202, the northeast part of Building 203 (including the ATLAS facility), 221 (northern part), 222, 223, 224 (Argonne Information Center), 240 (Theory and Computing Sciences building), 241 (Energy Sciences Building), and 242 (Materials Design Laboratory). The 200 Area substation (Building 551) also discharges storm water through this outfall.

The storm water flow in this catchment area comes from roof, parking lot, and associated area runoff and is directed to catch basins and ditch inlets. Starting at the western half of the watershed, the flow from these inlets converges together at a common headwall inlet located at the intersection of 94th Street and Northgate Road. This flow combines with flow from the Building 240 catch basin system and flows eastward via storm sewer and open waterway to a common collection point in the ditch line of Outer Circle Drive, approximately 400 ft southeast of the entrance gate. At this point, the flow joins with another flow that originates at the eastern parking lot of Building 202, and flows from the parking lot through storm sewers to a headwall discharge, then through a ditch to the convergence point. A new storm sewer, consisting of an 18-inch HDPE pipe, drains the dock area for the ESB building and discharges into the open waterway about 300 ft northeast of Building 222, joining with the flow described above. The combined flow then passes under Outer Circle Drive through a CMP culvert and into another ditch on the north side of the road. At this point, the flow is joined by another flow that originates at the Visitors Center (Northgate) and continues on through the ditch to a CMP culvert under the fence line, and then discharges off-site to the forest preserve. Sheet runoff from the Building 240 parking lot flows through storm water ditches along Outer Circle Drive to discharge into the outfall.

5.1.7 Outfall 005

Outfall 005 is located in the northwest part of the Argonne site, at a drainage point for a wetland system encompassing portions of the 800 Area and the northwest part of the 200 Area. This outfall receives discharges from what are former NPDES outfalls discharging into a wetland areas west of the 200 Area. These include “internal” Outfalls A05, B05, C05, D05, and E05, which discharge into wetland areas before being discharged through Outfall 005. Outfall 005 is located at the entrance of a 30-in. corrugated metal pipe culvert that directs storm water under a site boundary access road and the Argonne property fence.

5.1.8 Outfall 006

Outfall 006 is located in the extreme south-central area of the laboratory. It serves as the outfall for a drainage area that includes Building 316 and 350, the Canal Water Treatment Plant (Building 583), and the southwestern portion of the 300 Area, including the buildings on top of and inside the ZGS hill, the 377 cooling tower area, the 360 Area fenced radioactive waste storage area, and the 549A and B power substations. The flow from the 316 and 350 Areas is collected in storm water catch basins and grates and directed by sewers and open conveyances toward a ditch in the southeast. The ditch runs for approximately a quarter mile through a wooded area, to a point directly south of the 377 cooling towers, where another CMP culvert (48-inch) joins the flow with the flow collected from the Canal Water Treatment Plant and the southwestern portion of the 300 Area. The ditch then bends south and flows to the south Argonne property fence line, discharging into the forest preserve and an unnamed tributary of the Des Plaines River.

New cooling towers at Building 350 discharge chlorinated cooling water (blowdown) directly into the Laboratory wastewater sewer system and no longer periodically discharge to this outfall. The only industrial flow directed to this outfall is an infrequent discharge of air compressor condensate from an emergency compressor inside Building 364.

5.1.9 Outfall 007

The catchment for Outfall 007 includes the southeastern section of the 300 Area. Runoff is collected from an almost completely paved area extending from Building 370 east to Building 366 and north to Building 367. Water is collected in catch basins and conveyed toward the southeast to a point approximately 100 feet southeast of Building 366, where it is discharged into a ditch on the south side of
Old Bluff Road. This ditch runs along the roadside for 50 feet, at which point it turns south and runs to the fence line where it is discharged to the forest preserve.

5.1.10 Outfall 008

The catchment for Outfall 008 includes only the immediate environs of Building 46 (FAC Vehicle Maintenance and Grounds building), and Building 46A. Runoff is collected in storm water grates and catch basins and conveyed through sewers to the discharge point in Sawmill Creek, located directly west of Building 46.

The fueling area for vehicles is completely within engineered secondary containment. This is accomplished by the concrete filling area sloping towards a central sump and the use of a sluice gate valve located in the storm sewer serving this area. When closed, the fueling area is capable of retaining more than 3,000 gallons of fuel. A written procedure is maintained and adhered to for drop-loading of the underground storage tanks.

5.1.11 Outfall 011

The catchment for Outfall 011 includes a small section on the north fence line of the site and contains one parking area with a loading dock, serving Building 203 (northwest corner), access roads, and streets (Outer Circle Drive) for site access. The drainage to the outfall is through ditches along the streets and sewer conduits from the parking lot to a wetland located between Outer Circle Drive and the fence line to the outfall, which consists of a 24-inch CMP with a Palmer-Bowlus flume, a storm water flow-measuring device. This then discharges on the north side of the fence into the forest preserve.

5.1.12 Outfall 012

The catchment for Outfall 012 includes portions of the 100 Area. There are large paved areas involved with industrial activities for the production of steam, such as those areas associated with the water treatment plant, the lime sludge pond, and the tarmac around the Building 108 Boiler House.

The contributing runoff flows are collected from storm water inlet grates and catch basins, through storm sewers to a discharge point (a 12-inch CMP) extending out of the bank of Sawmill Creek. The original Storm Water Characterization Plan described this outfall as an 8-inch PVC pipe located approximately 20 feet downstream from a 12-inch CMP, but that pipe was abandoned with the removal of the Utilities Area Wastewater Treatment Plant project.

5.1.13 Outfall 013

The catchment for Outfall 013 includes the southern and southeastern extreme of the 100 Area, including Buildings 145 and 146, and the area south of the former coal storage area. The outfall is located at the outlet of a 15-inch CMP culvert, located approximately 150 feet from the creek.

5.1.14 Outfall 014

The catchment for Outfall 014 includes the buildings, parking areas, and equipment storage yards remaining in the northwestern part of the East Area. The area is served by a number of roadways leading to and from these buildings, with contributing storm grate inlets on the roadways and parking areas. These drain through a single storm sewer main to a ditch running due west, just north of the remaining Building 25 foundation (this building was demolished in 1996), and then to the storm sewer discharging at the outfall.

5.1.15 Outfall A15/B15

These two outfalls are within distinct, but very small, adjacent watersheds with discharge points located along the same stretch of Sawmill Creek. Due to their close proximity and similar watershed characteristics, these two outfalls are discussed jointly in this SWPPP.

The contributing sources of storm water within these catchments receive runoff from areas around an electrical substation/transformer facility on Eastwood Extension between Tech Road and Sawmill Creek (Building 546), a small telephone switching building (Building 541A), and scrub vegetation areas north of Eastwood Extension.

5.1.16 Outfall A16/B16

This catchment is served by two distinct outfalls, A16 and B16, which were deemed similar within the NPDES permit application. For purposes of the NPDES permit and this SWPPP, these catchments are considered a single catchment area. Although the buildings in the

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eastern part of the East Area have been razed, and the area largely restored to prairie landscaping, the original storm sewer system remains and discharges storm water through Outfalls A16 and B16. Storm water runoff from the Argonne Park area joins this discharge downstream from the outfalls.

The catchments for these outfalls encompasses the largest portion of the East Area, most of which is now demolished and the buildings razed. Miscellaneous equipment and storage shipping containers are stored where some of the buildings once stood; other former building areas are now vacant parcels undergoing restoration. A portion of the eastern edge of the site and a portion of Argonne Park are within this watershed.

5.1.17 Outfall 018

The catchment for Outfall 018 generally encompasses the north and east portions of the 300 Area of the site. The drainage area includes the parking areas north of Building 360 and 362, the buildings in and around Building 360 and 362 (excluding Building 370 and 390, and the southern and western end of the 300 area) and the paved parking and loading dock areas in and around the eastern portions of the 300 Area (surrounding Building 363). Seasonally variable amounts of aggregate are stockpiled in a storage yard just east of this outfall.

In addition, there are three buildings, 331 (north side), 331A (north side), and 335 (north side), that are technically not part of this geographic watershed, but from which associated surface storm water runoff is directed to this outfall. These buildings are located west of Meridian Road and south of Rock Road. However, roof, footing drain, and paved area runoff at these buildings is directed to a separate outfall and watershed (Outfall 006).

5.1.18 Outfall 020

The catchment for Outfall 020 includes the 320 Area Shooting Range (including Building 320), and the area just south of the range. Industrial activity involves use of the shooting range for practice by U.S. Department of Agriculture wildlife management personnel and other wildlife management activities. Historically, target practice by the Argonne protective force was the original reason this outfall was included in the original SWPPP as an Industrial Activities Storm Water Outfall.

In addition, Building 320 is served by a septic tank that is emptied several times a year.

Lead-contaminated soils in the shooting range berm structures and in the small drainage outlet south of the range were remediated in 2002 and the unit was granted a determination of No Further Action by the Illinois Environmental Protection Agency.

No other activity is warranted as the characterization of the storm water has consistently demonstrated the absence of contaminants.

5.1.19 Outfall 021

Outfall 021 is located on the south fence line of the site, directly south of the closed 319 Area Landfill, between the watershed of Outfall 020 and the watershed for Outfalls A22 and B22. This catchment encompasses the closed 319 Area Landfill, the 318 Area (burial area for compressed gas cylinders), portions of the 317 Area (primarily the gravel area), as well as the south side of Building 316. In addition, access roads serving these areas drain to this outfall through a small ditch running along the southern extreme of the 319 landfill, turning south to the fence line, and then to the outfall location, which is a 24-inch CMP culvert that passes under the fence and discharges into the forest preserve.

Groundwater monitoring and treatment via extraction and contaminant breakdown using poplar and willow trees rooted in the contaminated water-bearing zone are currently taking place in this watershed. Portions of the 317 Area are still used for management of radioactive waste.

5.1.20 Outfall A22/B22

Outfalls A22 and B22 are included as one outfall on the NPDES permit due to their geographic proximity and similar discharge nature; however, they are located in two distinct catchments. These two outfalls are addressed together in this SWPPP.

Outfall A22: The contributing sources of storm water within this catchment receive runoff from the southern and western sections of the 317 Area, including the radioactive waste storage vault area. Runoff flow is generally toward the south in sheet flow from the source areas, with the eastern portions consolidating at the Argonne property fence line at the southeastern corner of the 317 Area to pass under the fence through riprap.
Environmental remediation activities in this watershed include active groundwater removal using electric-powered extraction wells and passively through phytoremediation (tree root groundwater uptake and contaminant breakdown, expiration to atmosphere). A small service building (319A) housing an air compressor used to power the groundwater extraction wells is located in the Outfall A22 watershed.

**Outfall B22**: Storm water sources within this catchment include sheet runoff from the extreme southwest part of the 317 Area, including the radioactive waste storage vault area, as well as runoff from Meridian Road and the access road serving the 317 and 319 Areas. The watershed extends northwest to a point just south of Building 316.

The western and central portions of the drainage area sheet flow consolidate in the same manner, and pass under the fence through the same material approximately 50 yards to the west. Both flows discharge into large gullies in the forest preserve, to conjoin into one flow approximately 100 yards south of the Argonne fence line, with eventual discharge into the Des Plaines River.

**5.1.21 Outfall 023**

This outfall is the discharge point for runoff coming from the eastern, southern, and southwestern sections of the closed 800 Area Landfill. The outfall is located in a ditch on the extreme southern end of the landfill, approximately 50 yards from the southwestern corner of the landfill, at the Argonne fence line. This discharge flows under the fence in the ditch and empties into the creek that flows south from the wetland west of the Argonne fence line. The wetland is the headwaters of one leg of the Freund Brook system that runs through the middle of the Argonne facility and discharges into Sawmill Creek.

The 800 Area Landfill last received sanitary waste in September 1992 and immediately underwent Resource Conservation and Recovery Act (RCRA) closure from 1992 through 1993; it is presently in the operations and maintenance post-closure activity phase. Activity within this watershed is limited to closure-required groundwater monitoring around the landfill, methane gas monitoring, and inspection and maintenance of the landfill cap to ensure continued integrity of the vegetative and soil cover cap.

**5.1.22 Outfall 025**

Outfall 025 was originally intended as a storm water discharge point only, but through the course of the storm water characterization process it was determined to contain non-storm water discharge, as well. The source of the discharge was traced and found to be cooling water and tower blowdown from the Building 314, 315, and 316 complex, and for this reason the outfall was incorporated into the NPDES permit system as an industrial wastewater outfall. The discharge point was located; it is a 24-inch cement conduit intended to carry storm water collected from the service areas (south sides) of the aforementioned buildings. Cooling water from this area is now routed to the Laboratory Wastewater Treatment Plant sewer system and no longer discharges to this outfall. Consequently, Outfall 025 was returned to storm water-only status with the reissued NPDES Permit in August 2011.

The catchment for Outfall 025 encompasses the extreme eastern portion of the APS site; the southern areas around the Building 314, 315, and 316 complex; and the far southern portion of the former Building 330 area. It should be noted that the eastern part of Building 316 lies within the Outfall 006 and 021 watersheds, although paved area and roof runoff is directed via sewer lines to Outfall 025. The APS ring and laboratory module roof drains discharge through a cement culvert into a detention basin located on the southeastern portion of the APS site, and then enters a culvert to discharge into a second detention basin to the east. The 24-inch sewer conduit from the Building 314, 315, and 316 complex discharges into a cement culvert, and then enters a marsh and flows about 350 feet south, passes under a grass path through a culvert, and joins the western storm water discharge in the second detention basin. The combined flow from this detention basin discharges south through a 36-inch CMP culvert under the south fence line into the forest preserve.

In 2014, it was determined that at its current location, Outfall 025 was not capturing storm water runoff from the APS roof drainage system. The 36-inch CMP culvert at the property fence line discharges storm water from the entire outfall watershed and was formally designated as the new Outfall 025 location in the reissued (June 2017) NPDES permit.
5.1.23 Outfall 026

Outfall 026 was originally intended as a storm water discharge point only. Through the course of the storm water characterization process, however, it was determined to contain non-storm water discharge as well. The source of the discharge was traced and found to be potable water from the water treatment plant located uphill from the rest of the Utilities area. This source has been located and the flow stopped.

The catchment for Outfall 026 contains sections of the water treatment plant, including the garage and storage area; Buildings 107, 127, 128, 129, 130, 163, the area around well #5; and the associated access roads for the water treatment plant and the former Lime Sludge pond. Soil stockpiling takes place inside the former Lime Sludge pond area in a manner protective of storm water. Flow is conducted through storm water sewers and discharged at the outfall, which is a 10-inch vitrified clay pipe with a cement raceway, into Sawmill Creek.

5.1.24 Outfall 027

The catchment for Outfall 027 includes the western portion of APS and CNM (Building 440). Parking lot runoff from the Building 440 parking lot and dock areas is directed to a storm sewer system and then transported via a lift station and three underground pipes to the Outfall 027 catchment. The system was designed to accommodate the first flush runoff from a 6-hour storm event. The collected water is then pumped toward the south through a 3-inch force main and discharged into a vegetated bioswale. If any storm water remains on the surface, it then flows south out of the bioswale to Outfall 027, toward an unnamed tributary of the Des Plaines River. Subsequent to collecting the first flush runoff, the system overflows the subsequent flush water through Outfall M03 to the north. Runoff from the western portion of the Advanced Protein Crystallization Facility, adjacent to the APS facility, and from the Building 485 area, located west of Kearney Road, is also directed to this outfall.

5.1.25 Outfall 028

The catchment for Outfall 028 includes the drainage from Building 204 (Howard T. Ricketts Laboratory, or HTRL). Flow is conducted through 8- and 12-inch PVC storm sewer piping. Intermediate piping combines into an 18-inch reinforced concrete pipe that flows to the south of the building and discharges to the swale along the north side of Eastwood Drive. Runoff then flows east through the drainage ditch along Eastwood Drive and eventually into the culvert that runs south under Eastwood Drive at the intersection of Outer Circle Drive, where it reaches Outfall 028. Flow also takes place from the east side of Building 204, down the driveway to a storm water ditch on the west side of Outer Circle Drive, and then flows south to the culvert discussed above. A very minor component of this discharge includes “windage” (not flow) from the Building 204 cooling towers. Outfall 028 discharges into Lower Freund Pond, which eventually courses to Sawmill Creek.

The HTRL is directly managed by the University of Chicago Medical Center and is not a DOE or Argonne entity. Facility industrial activities and storm water are managed using a facility-specific storm water pollution prevention plan. HTRL activities potentially affecting storm water are routinely inspected by HTRL personnel. In 2009, Argonne and the University of Chicago agreed to permit annual access by the Argonne NPDES manager for annual SWPPP inspection and agreed that the Argonne NPDES manager would be notified of any spill event potentially affecting the permitted outfall (Outfall 028) for this facility.

5.2 Internal Outfalls

5.2.1 Outfall B03

Outfall B03 encompasses portions of the 300 area, specifically those surrounding Buildings 302, 308, 309, 311, 333, and 340. This area is served by storm sewers that receive runoff from storm grate catch basins, and drain to the north and northeast. While located in a topographically distinct watershed, roof and paved area runoff at the Building 306 complex are directed via storm sewers to this outfall.

All runoff is discharged through a 24-inch cement culvert into a small feeder ditch located approximately 100 yards northeast of Building 308. By December 2009, Building 301 had been demolished and the site backfilled to grade after decontamination and decommissioning was complete. Demolition of Buildings 330 and 310 was completed in 2011. The Building 330 excavation was backfilled with compacted clay and capped with asphalt. Building 310 was demolished, leaving some foundation debris buried below grade, and then backfilled with compacted clay and capped with asphalt.
5.2.2 Outfall C03

The Outfall C03 catchment encompasses the western and southwestern areas around Building 205, and roadway ditches along the north and south sides of Outer Circle Drive west of Meridian Road and in the immediate vicinity of the Meridian Road/Outer Circle Drive intersection.

The outfall also receives runoff from storm sewers that collect runoff from storm grate catch basins, as well as footing drains around Building 205, and drain to the south and west. All the runoff is discharged through a 24-inch cement culvert into Freund Brook due south of Building 205, about 50 yards upstream (west) of the former service station (Building 300).

5.2.3 Outfall H03

Outfall H03 discharges into the central branch of the Freund Brook system just southwest of the corner of Outer Circle Drive and Southwood Drive. This converges with the southern branch just above the Lower Freund Pond system. The watershed for this outfall extends from the southern and eastern portions of Building 205, around Building 214, the southern part of Building 212, and the western parking lot of Building 212. All storm water from the southeast corner of Building 205 courses along a ditch running from southwest to northeast, to the northwest corner of the Building 212 western parking lot. Here, the ditch enters a storm sewer that runs under the parking lot to the southern end of the lot, joining there with another storm sewer from around Building 214, and the combined sewer flow then passes east along the southern edge of Building 212. The Building 212 footing tile sumps discharge into this line, which then turns south, passes under Outer Circle Drive, and empties into a brook approximately 20 feet south of the road through a 24-inch corrugated metal pipe (CMP) culvert.

5.2.4 Outfall I03

Outfall I03 discharges into the wetland south of Buildings 211 and 205, which drains into the southern branch of the Freund Brook system, eventually flowing to the Lower Freund Pond system.

Briefly Speaking…

Outfalls and Argonne Drainage areas

Outfalls are locations where storm water exits a facility's property, and are typically characterized by pipes, ditches, swales, or other structures that discharge water as a “point discharge.” At Argonne, outfalls are divided between discharge areas along the property boundary and internal locations representing drainage area discharge points from concentrated building areas.
5.2.5 Outfall K03

The Outfall K03 catchment encompasses the entire User Residence Facility (URF, or Building 460), including the overflow parking lot on the west side of the facility’s driveway. The southern boundary is approximately the same as the southern end of the overflow parking lot, and the watershed extends around Building 460, along the northern wall of the building, toward the northeast, to the southern branch of Freund Brook running along the south side of Outer Circle Drive.

5.2.6 Outfall L03

The catchment for Outfall L03 extends to the north along the northern side of Rock Road, the intersection with the road that leads north to the User Residence Facility, as far south as the booster ring inside the Advanced Photon Source (APS) ring, and as far east as the former Building 330.

This outfall discharges into a wetland identified as Wetland 304, and flow out of this wetland discharges into another wetland (Wetland 303) and the Freund Brook system. Buildings within this watershed are 401, 402, the north side of 450 (APS physical plant), the northeast portion of the APS ring (and associated buildings), and the far northwest portion of the former Building 330. Salt used by FAC-Grounds on site roadways during winter months is stored in an enclosed salt storage dome (Building 330J), located on the east edge of the Outfall L03 watershed. The main parking lot for the APS facility is also located within this watershed. Finally, an apparent groundwater seep, located just north of Rock Road and the APS parking lot, discharges via a storm water ditch into this watershed.

5.2.7 Outfall M03

The catchment for Outfall M03 is the CNM (Building 440) parking lot just north of the building and west of Lab Office Module (LOM) 437, adjacent to the CNM and Building 438. The flow dynamics in this area have been modified through management of runoff to reduce the impact on the wetland that previously received runoff from this area. The runoff water that is discharged through outfall M03 includes runoff from the APS ring roof, roof runoff from the CNM building and LOM 437, and some runoff generated from open ground landscaped areas around these structures. Roof drains flow through a vegetated retention basin east of the CNM parking lot, which discharges through a series of conduits and ditches toward Outfall M03, from where the water flows into Wetland 302. The remaining runoff, consisting of the loading dock and parking lot area runoff from the CNM, is collected and then pumped via a lift station to another outfall, Outfall 027, north of the Outfall M03 watershed.

5.2.8 Outfall A05

The catchment for Outfall A05 encompasses the northwest corner of the facility and includes the northern-most portion of the 800 Area. The drainage arises from the 800 Area, drains north toward Westgate Road, passes under a hedgerow, and continues running north under the road into a forested area. From there, the flow passes north and east, eventually opening up into dispersed flow and soaking into the ground. Storage of miscellaneous equipment and stockpiling of clean clay and topsoil generated during various Argonne construction projects takes place in the 800 Area portion of the Outfall A05 watershed. Stockpiling activities ceased in 2012 and the stockpiled clay and topsoil have established vegetative cover to reduce erosion.
5.2.9 Outfall B05

The catchment for Outfall B05 includes the majority of the 800 Area, specifically that portion bounded by Kearney Road on the east, the 800 Area Landfill east fence on the west, the dumpster storage area on the north, and extends to the southern open portion of the 800 area. Runoff is collected from the northern portion of the area in catch basins leading to storm sewers, all of which run toward the east, where they merge with runoff from the southern sections collected in drainage ditches flowing to the east. The combined flow then passes through a culvert under Kearney Road, where it is discharged into the wetland due east of the 800 area. Remediation activities have concluded within the 800 Area and included the relocation of waste oil storage activities from the 800 Area to storage units near Building 303. All of the buildings in the 800 Area have been removed. Although the eastern edge of the 800 Area landfill is geographically in this catchment, runoff conveyances around the landfill’s perimeter direct all landfill storm water runoff to Outfall 023.

5.2.10 Outfall C05

Outfall C05 is the discharge point for a catchment that drains an area that includes the northern half (excluding M-wing) of Building 200, and the main loading dock and driveway for Building 200. The flow is conveyed through storm sewers from the northern section of the building and south under the building to the loading dock area in the central-west section of the building. From there, it flows west under the driveway for approximately 200 yards through storm sewers, where it is discharged into Wetland 803.

Industrial activity in this catchment is restricted to the loading dock area, and air conditioner and air compressor atmospheric condensate discharge from the building. Water discharges into the storm sewer west of the loading dock.

5.2.11 Outfall D05

The catchment for Outfall D05 is also located in the area around Building 200, and drains the area around M-wing of that building. The storm water flow is conveyed through storm sewers, and is collected in storm grates and catch basins located on the north and west sections of M-wing. The sewers direct the flow toward the west and south, around the western end of M-wing, then west toward the wetland (Wetland 803) located west of Outer Circle Road and Building 200.

5.2.12 Outfall E05

The catchment for Outfall E05 contains portions of Buildings 203, 206, and 208. The runoff in this watershed is collected through storm grates at the uppermost sections of the watershed, located at the intersection of Westgate Road and Inner Circle Drive, and the parking lot and loading dock area between Buildings 206 and 208. The collected water is conveyed through storm sewers toward the north and west, and discharges into open ditches north of the buildings. Another storm water discharge from Building 208 collects roof drainage and footing tile drainage in a sump located in the service floor area of the building. This sump is pumped out to the north of the building and discharged to a drainage ditch running north. This ditch joins with the ditch into which the storm sewer system from the western portion of Building 203 discharges. The converged stream flows north and enters a CMP culvert. This culvert directs the flow underground around the western side of the parking lot (former location of Building 207) and then discharges into an open ditch on the south side of Outer Circle Drive, flowing approximately 25 feet to another culvert that directs the flow under Outer Circle Drive toward the northwest. This combined flow discharges into Wetland 201, located to the northwest.

The parking lot north of Building 208 was rebuilt in 2012 and includes flush edges to allow for storm water sheet flow, as well as a bioswale in the center of the lot. The bioswale directs water to the north to a vegetated swale, and then storm water is combined with the Building 208 discharge and directed to Outfall E05. The green infrastructure storm water management features designed into the new Building 208 parking lot are examples of the BMP, “Site-Wide Storm Water Management Using Green Infrastructure.”

The flow originating between Buildings 206 and 208 flows by storm sewer toward the northwest, and is then discharged to an open ditch. This ditch flows toward the north and east, to join with the open ditch flow from the discharge of the eastern and central portions of the watershed, and then under Outer Circle Drive to the wetland.
Table 5.1  Argonne Outfalls and Applicable Industrial Activities

**Note:** Best management practices (BMPs) are described in detail in Chapter 6.

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<th>Building</th>
<th>Outfall(s)</th>
<th>Access Roads</th>
<th>Chemical Container Storage</th>
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<th>Cooling Towers</th>
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1. Outfall numbers in italics are outfalls that are no longer part of Argonne’s NPDES permit. These outfalls nevertheless convey storm water runoff into site waterways and serve as spill interception points in the event of a spill, and are marked with signage in the field.
6 BEST MANAGEMENT PRACTICES

Best management practices (BMPs) are part of Argonne’s “normal operating procedures” for storm water management and include the following: good housekeeping; visual inspections; spill prevention and response; sedimentation and erosion control; and management of runoff.

6.1 Baseline BMPs

6.1.1 Good Housekeeping Practices

Good housekeeping is one of the main storm water pollution prevention methods, required of all employees and subcontractors (for more detail, see Section 7.2, Employee Training). Poor housekeeping creates more waste than necessary and increases the chance of storm water pollution. Well-maintained material and chemical storage areas also reduce the possibility of storm water mixing with pollutants.

General guidelines for housekeeping include the following:

- Keep paved areas clean using brooms, shovels, vacuum cleaners, or cleaning machines.

- Pick up garbage and waste material regularly and throw it away in the correct bins and dumpsters.

- Make sure equipment is working properly to prevent leaks and spills of fluids.

- Make sure spill cleanup methods are explained to employees who work with materials or equipment containing materials that could spill (see Employee Training, Section 7.2). Make sure employees understand these methods.

- Inspect buildings in outfall watersheds annually and report any changes in industrial activities, as required by Special Condition 9 of the current NPDES permit.

Briefly Speaking...

Storm Water Pollution Prevention

The overarching goal of Argonne’s SWPPP is to minimize or eliminate the discharge of potential pollutants from Argonne activities into storm water runoff. Best management practices (BMPs) for storm water are the control measures used to prevent or minimize the discharge of pollutants to storm water, and are usually a combination of structural and non-structural controls.

At Argonne, good housekeeping, containment of materials, spill prevention and response, “green” storm water management, and snow management are the most important structural controls that can reduce the risk of storm water becoming contaminated by Argonne activities. A good housekeeping program ensures that loading docks and paved areas are kept clean and free of debris, with no long-term outdoor storage of materials that could contaminate storm water.

Bioswale to collect and infiltrate storm water at the Building 203 parking lot

Argonne’s 911 emergency system ensures that spills are addressed immediately, before they can affect storm water. Storm water from developed areas is increasingly directed to “green” storm water management features, in lieu of direct discharge to site waterways, to promote infiltration and breakdown of pollutants. During winter months, seldom used roads and parking lots are closed to traffic so that deicing chemicals do not have to be applied, protecting nearby ecosystems.

Inspections and employee training are two of the most important non-structural controls that help protect storm water. Regular inspection of outdoor areas near buildings identifies and addresses conditions that could lead to storm water becoming contaminated, while training increases employee awareness of the need for storm water protection at Argonne.
6.1.2 Visual Inspections

Qualified personnel\(^1\) from Argonne’s Quality Assurance & Services Environmental Protection (QAS-EP) group visually inspects the exteriors of its buildings, including dock areas and storage areas, on a regular basis to check if there is a potential for contamination. Conditions that could result in polluting storm water runoff include the following:

- Leaks from drums, tanks, and containers
- Leaks from steam pipes, valves, fittings, etc.
- Leaks from pumps and hose connections
- Waste, recycled materials, and scrap metal containers
- Areas showing erosion
- Systems that carry storm water
- Areas with large oil stains
- The condition of storm water outfalls, including any sign of illegal discharge

Concerns are first brought to the attention of the building manager, custodial/grounds manager, or facility engineer so they can decide on the appropriate action. Items that need a longer time to correct are entered in Argonne’s issues management tracking system, Prism, and are tracked to completion. All inspections are entered in an electronic database and include the date, inspector’s name, and the SWPPP item that needs correction with the date it was corrected. QAS-EP maintains the database and sends out relevant data to all building managers and other responsible staff.

Argonne also conducts quarterly observation of discharges from storm water outfalls as required by the NPDES permit. Outfalls are inspected soon after the beginning of a storm event to identify whether or not any indicators of storm water pollution, other than of natural origin, are present in discharges. Inspections are recorded and findings, as well as any corrective actions resulting from the inspections, are documented in Prism.

As a corrective action response to a violation notice related to an unpermitted discharge of oily wastewater to a site waterway, Argonne conducts quarterly inspections of site outfalls following extended dry periods to identify any discharges not resulting from storm water. These inspections are recorded in a manner identical with inspections discussed above.

6.1.3 Spill Prevention and Response

Argonne addresses spill prevention and response in its Comprehensive Emergency Management Plan (CEMP) and Spill Prevention Control and Countermeasures (SPCC) Plan.

CEMP covers all emergency situations occurring at Argonne. Emergency situations include the following:

- Fire
- Severe weather, including tornadoes
- Explosion
- Release of hazardous material

Laboratory employees are trained to call 911 for emergencies, as described in Argonne’s procedure LMS-PROC-157, _Incident Notification_. The 911 call activates the Laboratory’s emergency response system the Argonne Fire Department decides on the appropriate response. For events that become “operational emergencies,” the CEMP goes into effect (for detailed information on CEMP, see Section 8.2). The CEMP provides guidance on response teams, incident commander, required notifications, requests for mutual aid, and additional resources, if needed. The Argonne Fire Department maintains equipment and materials for spill containment and response.

The Spill Prevention Control and Countermeasures (SPCC) Plan also addresses the lab’s spill prevention

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\(^1\) “Qualified personnel” are defined by the IEPA’s General NPDES Permit for Storm Water Discharges from Industrial Activities ILR00 as those persons who possess the knowledge and skills to assess conditions and activities that could impact storm water quality at the Permittee’s facility, and who can also evaluate the effectiveness of control measures. Local QAS-EP standard operating procedures for conducting NPDES and related inspections ensure staff are adequately trained to meet this qualification definition.
and response. An SPCC Plan is required by 40 CFR Part 112 for facilities like Argonne that have a total oil storage capacity of more than 42,000 gallons below ground or 1,320 gallons above ground. (Oil containers that are 55 gallons or greater are also included in this total.)

6.1.4 Sediment and Erosion Control

Argonne’s Sedimentation and Erosion Control (SEC) Plan addresses erosion and sediment control in project areas of less than one acre (Appendix I). The SEC plan is used for construction project-specific sedimentation and erosion control plans, and is included in contractor project specifications. For disturbed areas larger than one acre, project-specific plans are written before the start of the project.

Argonne has some areas with a higher risk of erosion and storm water impact. These include the following:

- Site waterways
- 800 Area soil stockpiles
- ZGS Hill (a hill surrounding Building 364)

These areas are inspected regularly and care is taken to prevent soil erosion. Eroded areas that present a risk for storm water pollution are noted on the inspection reports (see Section 6.1.2). Possible corrective actions are discussed with FAC management and entered as priority projects in the FAC Asset Management System. Any eroded area that could qualify as an NPDES permit violation presents a business case for urgent corrective action funding. In some cases, areas of erosion are addressed immediately with current year funding.

6.1.5 Management of Runoff

The paved area around Building 108 (boiler house facility) diverts storm water to an equalization basin, with eventual discharge to either the laboratory wastewater treatment plant, sanitary wastewater treatment plant, or DuPage County sanitary wastewater treatment facilities. This practice began to manage discharges from NPDES outfalls in this area, before diversion to wastewater treatment facilities began. Runoff from ongoing construction areas are the only other areas requiring active storm water management.

6.2 Advanced BMPs

For specific situations around the Laboratory for which unique, permanent practices have been established beyond the scope of baseline BMPs, Argonne has "advanced" BMPs, described below.

6.2.1 Standard Housekeeping Practices for Loading Dock Activities

Housekeeping of loading dock areas is managed by the FAC Custodial Department and includes the following:

- Cleaning and sweeping so that loose material is picked up;
- Collection of sand, gravel, and anything else that can pollute storm water;
- Clearing of storm drains and grates from debris and other material that may clog drains leading to the storm sewers, and;
- Keeping dumpsters closed when they are not being filled.

6.2.2 Standard Controls for Solid Waste and Recycle Dumpsters

Standard solid waste trash and recycling dumpsters around the Laboratory are also managed by the FAC Custodial Department and are used for regular trash, domestic waste, and recyclables (paper, plastic, metals, and glass) generated in lab buildings. Only the custodial staff and the contractor in charge of pick-up can fill these dumpsters. No free (uncontained) liquids can go in these dumpsters. Loose trash is not permitted to be thrown into dumpsters. Plastic bags are used in order to contain any liquids that may have been thrown away by mistake. All solid waste and recycling dumpsters are to remain closed when not in use and dumpsters must not leak or spill.
6.2.3 Chemical and Fuel Tank Storage

6.2.3.1 Standard Above-Ground Storage Tank Loading and Unloading Practices

Loading and unloading of above-ground tanks must follow Department of Transportation regulations (49 CFR Part 171), and Lab-wide and NWM Division procedures. Containers and tanks should be properly labeled as to their contents (49 CFR 172 Subparts D and E).

Argonne avoids accidental mixing of incompatible or reactive materials. Staff is trained on the regulations, including labeling and separating of materials. Only trained, approved and certified staff personnel may load and unload tanks on site.

Diked containers that cannot be affected by their contents are used as needed. These containers can contain 110% of the volume of the largest single tank, or in the case of drums, 10% of the total volume of material contained within the containment system.

Figure 6.1 shows a new storage building for fuels used in transportation research at Argonne.

6.2.3.2 Standard Tank Inspection and Response for Storage Tanks

Inspections of outdoor storage tanks are part of the area visual inspections discussed in Section 4.1.2, and include checking for weeps, leaks, and spills. Tanks managed by Lab divisions are also inspected regularly. If inspections show that storm water could be polluted in some way, the building manager or responsible staff member is contacted. If liquids are leaking from a tank without secondary containment, staff must call 911 immediately. Areas where material is loaded and unloaded from tanks are also checked to make sure that there are no leaks or spills from hose connections.

6.2.3.3 Standard Aboveground Storage Tank Secondary Containment Precipitation Management

Dikes and berms (also known as “secondary containment”) must include either a drainage valve or other means (like a sump pump) to release accumulated rain. Their line valves should be closed and in the locked position except when draining. Rain must be drained in a timely manner to prevent overflow of the containment system.

If there is spilled material in the dike or berm, the liquid must not be drained to the ground. OAS-EP advises on how to dispose of the liquid. Staff must keep a record of the time and date that rain is released from the dike or berm to the ground.

6.2.4 Standard Electrical Transformer Practices for Inspection and Operation

Argonne’s standards for inspection and operation of all transformers and substations around the site are the following:

- Transformers must be inspected monthly.
- Substations must be inspected weekly.
- Leaks, spills, or discolorations must be recorded, as well as general operation and function of the electrical equipment.
• Inspect standing water in secondary containment for surface oil or oil sheen before release of the collected water. Record any finding of oil on the round sheet (inspection checklist) and notify responsible staff for cleanup and maintenance of the secondary containment.

• Inspection results must be recorded, dated, and initialed on the round sheet. The records are kept in the FAC-Utilities foreman’s office.

Transformer containment systems with oil reclamation have a tank system that collects any liquid released into containment and stores it until it is inspected for surface oil. If no oil is noted, it is pumped out.

Liquids in transformer containment systems without oil reclamation are also inspected for surface oil. Liquids that pass inspection are released by opening the valve and allowed to flow onto the ground.

Pole-mounted transformers are inspected for leaks and spills. Any affected soil beneath them is treated per guidelines in 40 CFR 761 Subpart G, PCB Spill Cleanup Policy.

6.2.5 Materials Control Practices for Waste, Chemical, and Material Storage Areas

Improperly stored waste, chemicals, and materials can get into storm water and contaminate runoff. Here are some ways to minimize contamination:

Inspections – Inspect waste, chemical, and material storage areas (discussed in Section 6.1.2). Inspectors check for:

• Spills, leaks, and contamination by fluids from containers, materials, or equipment

• General condition and deterioration of stored materials

• Access to storage containers

• Proper stacking of containers according to manufacturer’s instructions

6.2.6 Maintenance of Access Roads

Roads leading to storage facilities must be uncontaminated by the material stored there. Material must be kept within its storage container and not allowed to spill or be spread around outside the storage area. Spills must be cleaned up as soon as possible to prevent contact with storm water runoff.

6.2.7 Extension of Standard Loading Dock Housekeeping Practices to the Rest of the Parking and Paved Areas

Many loading docks around the Laboratory are in or near parking lots and other paved areas. The procedures outlined for loading dock housekeeping (see Section 6.2.1) should also be practiced in the paved areas next to the loading dock. Clean up trash, solid waste, dust, and dirt from parking and paved areas.

6.2.8 Metal Reclamation Dumpsters

Metals reclamation is part of the effort to minimize waste at the Laboratory. Argonne has dumpsters located on site for reclaiming metal materials from demolition and normal maintenance. These are placed near areas where metal is generated. The dumpsters are by design open-topped to allow for management of irregularly-shaped scrap metal. Since this permits storm
water contact with dumpster contents, the dumpsters are filled by trained personnel to make sure that only acceptable materials go into the dumpsters. No equipment, oil-filled equipment, pressurized containers, or containers with liquids are allowed in these dumpsters.

When a dumpster is full, Argonne calls the reclaim contractor for pick-up and disposal. Dumpsters are inspected during filling and when the contractor picks them up. Any abnormal conditions are relayed to the custodial manager, and proper action is taken.

6.2.9 Remediation and Decontamination and Decommissioning (D&D) Sites

Argonne has historic waste sites and operation areas that are being considered for decontamination and decommissioning (D&D) activities or corrective action under RCRA. Some sites are undergoing post-remediation monitoring and others await remediation. Remediation can occur through excavation or installation of an engineered barrier, and either removes any contamination or prevents it from contaminating storm water runoff. Remediation takes place under project execution plans and contractor statement of work requirements.

When remediation or D&D takes place, contaminants may be present that can get into storm water. Staff must completely contain the contaminants (radiological or chemical) and keep them from contacting runoff. Some ways to accomplish this include the following:

- Collecting purge water from groundwater wells for further analysis and disposal
- Collecting, sampling, and analyzing the fluids and cuttings from groundwater monitoring wells to determine how contaminated they are
- Collecting, analyzing, and properly disposing of water and fluids from decontamination, sampling, analysis, and demolition equipment
- Collecting dust suppression water from demolition activities and managing the wastewater appropriately
- Storing waste materials according to waste handling procedures in 40 CFR Subpart I (if hazardous waste) and 35 IAC Part 808
- Monitoring groundwater to measure the movement of contaminants through the soil. Contaminated groundwater can travel to the surface at some point away from its origin and become part of storm water runoff. Groundwater monitoring provides valuable data for correcting these situations and preventing runoff contamination.

6.2.10 Radioactive Waste Handling Procedures

Radioactive waste storage containers and handling areas can potentially be contaminated with radiation. Until they are shown to be free from contamination, these sites are managed according to radioactive waste handling procedures outlined in NWM waste handling procedures.

6.2.11 Standard Landfill Maintenance Procedures

All of Argonne’s landfills are now closed and do not receive waste. The 800 Area Sanitary Landfill was closed in 1992. During its post-closure period, it is managed by FAC-Site Services (SS) under the following conditions:

- Monthly inspections.
- Records of erosion areas and evidence of landfill leachate escapes and weeps.
- Filling and compacting of leachate seeps and escapes.
- Immediate blocking of erosion areas with straw bales or silt fencing: Any rivulet is filled and compacted.
- Planting filled areas with seeding mixture for vegetative cover used when a landfill is closed.

Two other landfills, the 319 Area Landfill and the East-Northeast Landfill, were closed in the late 1990s as part of the site-wide RCRA Corrective Action program and are subject to a monitoring program similar to the inspection program described above.
6.2.12 Sedimentation and Erosion Control Plan for Construction Activities

The SEC Plan (Section 3.1.4) is used for any construction site within or controlled by the Laboratory. The plan stays in place until the project is complete, there is no disturbed land remaining, and the stabilization part of the project is complete.

All projects that involve earthmoving activities where the total disturbed area is one acre or greater in size must have a site-specific SEC Plan and complete an Illinois Environmental Protection Agency Notice of Intent Form. The site-specific SEC Plan and Notice must be completed by the contractor before construction begins. The plan is submitted to the FAC project manager and to the QAS-EP group for concurrence or corrections. It is then returned to the contractor for use during the life of the project. The FAC project manager and QAS-EP group delivers the plan and notice to IEPA for the 30-day review period.

6.2.13 Standard Housekeeping Procedures for Maintenance Activities

During maintenance activities, all parts of the SWPPP will be enforced. The housekeeping provisions included in the contractor/subcontractor safety training courses (Section 7.3, Employee Training) will be enforced when applicable.

6.2.14 Standard Operations for Cooling Towers

Cooling tower water can enter storm water runoff during the tower operation. This may occur during filling and draining; incidental overfilling, and during draining to storm water sumps, roof drains, and catch basins.

Cooling tower basins should be drained only to the laboratory sewer system. Every effort should be made to prevent overfilling cooling tower basins.

6.2.15 Snow Management

FAC-Grounds maintains and carries out a site-wide snow management plan that reduces salt use by closing parking lots and roads during snowfalls, restricting its use near environmentally sensitive areas, and limiting application until after snow has ended and roadways and sidewalks are cleared. Roads and parking lots that are closure candidates remain closed until the snow melts naturally, and are plowed but not salted. During off-hours, salt is applied only after snowfall has ended. Salt is applied during daytime snow events as needed for safety. Argonne’s Snow and Ice Control Procedure is contained in Appendix IV.

6.2.15.1 Salt Budgeting

Argonne uses “salt budgeting” to minimize the amount of deicing chemicals spread on roadways. Most snowplow routes at Argonne are several miles in length. During snowfall, salt truck drivers are required to complete their routes using only one full load of salt. A spreader vehicle’s salt spreading rate is adjusted to ensure that the load lasts for the entire route.

6.2.15.2 Event Tracking

After a snowfall, Grounds completes an “Employee’s Snow and Ice Removal Equipment Information” form. The amount of salt used, routes, and total miles treated with deicer, time, driver name, and other information are recorded on the form. This data is used to track trends and to summarize the salt usage per winter event on a graph.

Salt-use data is compared to the frequency and severity of snowfalls to “average-out” the impact of salt use during extreme snow/ice conditions, and to record progress in reducing salt use.

6.2.16 Storm Water Management Using Green Infrastructure

As a federal facility, Argonne adheres to Section 438 of the Energy Independence and Security Act (EISA). EISA requires federal agencies to reduce storm water runoff from federal development and redevelopment projects to protect water resources. Federal agencies can comply using a variety of storm water management practices often referred to as “green infrastructure” or “low impact development” practices. Argonne’s water management strategies include adding green infrastructure to increase storm water infiltration and mimic natural systems to manage and clean water as it runs off paved surfaces.
At Argonne, green infrastructure methods are used in the design of new buildings and when feasible, in the rehabilitation of existing buildings. Argonne also uses green storm water controls to better manage runoff from semi-permanent soil stockpiles, installations constructed “in-house,” and to better control storm water runoff around buildings. As discussed in Section 4.3 above, green infrastructure methods include the use of rain gardens and bioswales, which are plant-based features that promote ground absorption and evaporation of storm water instead of transporting storm water to off-site waterways. Permeable pavement for traffic areas and draining roof runoff to open areas and man-made storm water ground-absorbing features are examples of other methods of green storm water management.

These storm water management methods are permanent features of the site or buildings and are different from construction site storm water controls, which are removed once permanent storm water controls are in place.

6.2.17 Wastewater Treatment

Sanitary and laboratory wastewater at Argonne is carried by two pipe systems to wastewater treatment plants in the 500 Area. In addition to underground sewer pipes, the treatment plants have lift stations that are isolated from the gravity portion of the pipe systems, open clarifier tanks, slow sand filter beds, and open wastewater treatment plant. Approximately 600,000 gallons of wastewater are treated each day and emptied into Sawmill Creek through pipe extending one mile south of the treatment plants.

In an effort to reduce the risk of untreated wastewater contaminating storm water, Argonne regularly inspects all components of the wastewater treatment system, including lift station pumps and valves, clarifier pumps, and slow sand filter beds. Each sand filter bed is regularly cleaned by removing unusable sand and replacing it with clean sand. Argonne’s wastewater treatment plant is also equipped with a supervisory command and data acquisition (SCADA) monitoring system that issues email and pager alerts whenever important preset monitoring values are exceeded. This allows quick response by the FAC wastewater treatment plant operators and reduces the risk of emptying untreated wastewater to Argonne waterways.

The wastewater conveyance system is old, allowing for storm water to enter it during heavy rains. When heavy rains are forecast, treatment occurs in advance so that the untreated wastewater storage tanks (over one million gallons total capacity) are drained enough so there is room for both untreated industrial water and storm water.
7 IMPLEMENTATION AND EVALUATION

Argonne’s SWPPP has been in place since May 1, 1995, as required by the original National Pollutant Discharge Elimination System (NPDES) permit issued in October of 1994. SWPPP implementation is continuous and includes monthly and annual inspections. Deficiencies identified during annual inspections are tracked to completion using Argonne’s Issues Management Tracking System.

Due to changes in Laboratory operations, the SWPPP was updated and reissued in 1997. Continued implementation of the plan is done as required by Special Condition 9 of the current NPDES permit (issued in August 2011). This SWPPP is the most recent update. A copy of this SWPPP will be given to each environmental compliance representative’s directorate safety manager and is available through the Argonne Document Center.

7.1 Line Organization Roles and Responsibilities

The personnel below are included in all line organizations’ functions:

Environmental compliance representatives are responsible for explaining to division management the requirements contained in the SWPPP, what division’s activities fall within its requirements, and what is required to comply with its requirements.

Division directors are responsible for their divisions’ compliance with SWPPP requirements as they apply to division activities. Directors must provide the proper resources to the correct personnel to make sure that requirements are met, including requirements related to building management if the division is responsible for a building. The division director is also responsible for making sure that personnel incorporate SWPPP provisions in their local documents.

Building managers are responsible for carrying out the provisions in this plan as they relate to the buildings they manage.

Building maintenance supervisors are responsible, in conjunction with the building manager and QAS-EP, for carrying out the provisions in this plan as they relate to the buildings they maintain.

QAS-EP water pollution control specialists are responsible for maintaining the SWPPP plan, coordinating the annual site-wide inspection, and for writing and distributing a report of the annual inspection. During the annual inspection, specific BMPs are evaluated to make sure they meet the requirements in this SWPPP.

Grounds foreman directs the activities of site grounds maintenance, including snow removal and deicing operations, and is responsible for implementing the snow and ice control procedure (Appendix IV) and works with QAS-EP to identify salt reduction opportunities.

7.2 Employee Training

All Argonne employees are required to complete annual General Employee Training for general safety requirements and specific safety aspects for the buildings in which they work. During training, employees are introduced to the SWPPP, including its goals, sources of pollution, outfalls and building industrial activities. They learn how to recognize situations that may lead to storm water pollution, report spills, and minimize or prevent storm water pollution with BMPs.

Elements of storm water pollution prevention are also important elements of specific training courses, including the following:

Waste Generator/Waste Certification Courses focus on waste containment, control, and contingency plan training.

Hazard Communication Courses train custodial workers to recognize hazardous situations, including spills and how to respond to them, and on waste dumpster use (see Section 4.2).

12-Hour U.S. Department of Transportation (DOT) Hazmat Training is required for all transportation staff, waste mechanics, and loading and unloading personnel working with hazardous waste and materials packaging, transportation, and handling. This training includes performance-based packaging, transportation, and emergency response training. All truck drivers must also be trained in the proper methods of transporting

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materials, including walk-around pre-checks of a vehicle prior to moving it, to prevent leaks from being spread around on and off site during transport.

SPCC Training is given to employees responsible for oil handling and management. The training course describes requirements of the SPCC Plan. Oil spill control and reporting are included in this training. Contractors are also required to include construction equipment fueling as a special safety hazard in project safety analyses.

Building Orientation Training is specifically tailored to building occupants and discusses safety aspects unique to their building. Dumpster use and the types of waste prohibited from dumpster disposal are discussed.

Contractor Safety Orientation is given to contractor personnel involved in site construction activities before working at Argonne. They learn what erosion control and storm water protection to use during construction projects. Contractors are also trained to use the 911 emergency notification system to report chemical, oil, and hazardous material spills.

Job Safety Analysis Plans must be followed by third-party vendors/contractors delivering fuel while transferring the fuel to construction equipment. In addition, third party fuel vendors delivering fuel to storage tanks are required to cover storm drains in the vicinity of storage tanks.

7.3 Evaluation

Argonne’s compliance with its SWPPP must be evaluated at least once a year, according to Special Condition 9 of the NPDES permit. These compliance evaluations consist of inspecting the site to ensure that all SWPPP provisions are being followed, assessing the effectiveness of the plan, and producing an evaluation report.

The inspections are performed by QAS-EP and other “qualified personnel,” that is, personnel who work with water pollution control and compliance and staff experienced in building management, environmental law, natural resource management, and NPDES sampling requirements. The annual compliance review covers all provisions in the SWPPP and evaluates the following:

- Storm water drainage areas (watersheds) for evidence of pollutants entering the system
- The effectiveness of measures to reduce pollution and whether additional measures are needed
- Structural measures, sediment controls, and other storm water BMPs to make sure they are working properly
- Any equipment needed to implement the SWPPP, including spill response equipment

7.3.1 Recordkeeping and Reporting

Inspection records are maintained and circulated internally. The annual evaluation report must comply with all of the following provisions of the NPDES permit Special Condition 9 for reporting to IEPA:

- The SWPPP is revised as needed after each annual compliance evaluation.
- Any necessary changes to the SWPPP are implemented within 12 weeks of the inspection.
- The formal report is submitted on or before November 1 of the subject year.
- The summary report includes the inspection results, follow-up actions, dates of inspection, and inspector names. It certifies that the Laboratory either is in compliance with the plan or identifies any incidents of noncompliance.
- The report is signed by the committee chair who managed the inspections.
- The report is maintained for one year after the permit expires.

7.4 General Requirements

The general requirements below are included within this plan, and are part of the plan’s scope and objectives.
7.4.1 Schedule for Plan Development and Implementation

The plan was required to be written and in place within six months after the effective date of the NPDES permit renewal (October 30, 1994). This requirement was fulfilled when the original plan was put in place on May 1, 1995.

The plan was required to be implemented one year after the effective date of the NPDES permit renewal; this occurred on October 30, 1995. Special Condition 9 of the original NPDES permit required that the first annual storm water pollution prevention inspection report be submitted to IEPA no later than 60 days after the original plan was implemented. This requirement was met and all subsequent reports have been completed and submitted no later than one year after the previous report (November 1). Future reports will be completed and submitted according to these same provisions.

7.4.2 Required Signatures

NPDES permit Special Condition 9 requires that the SWPPP include the signature and title of the person responsible for preparation of the plan and include the date of initial preparation of each amendment. This information is at the front of this document.

7.4.3 Plan Location and Public Access

Special Condition No. 9(I) requires that the SWPPP "be available to the public under Section 308(b) of the CWA." Consistent with this requirement, this updated plan is located on Argonne’s website (www.anl.gov).

7.4.4 Director–Required Plan Modifications

The plan will be made available to the IEPA on request (per NPDES Permit Special Condition 9). In addition, the following is quoted directly from the NPDES permit, Special Condition 9, and is part of this plan for director-required modifications:

“The permittee may be notified by the Agency at any time that the plan does not meet the requirements of this condition. After such notification, the permittee shall make changes to the plan and shall submit a written certification that the requested changes shall be made. Unless otherwise provided, the permittee shall have 30 days after such notification to make the changes.”
8 EXISTING ENVIRONMENTAL PLANS

Argonne has complied with the regulatory requirements for developing and writing plans and procedures, including a Spill Prevention, Control, and Countermeasures Plan (SPCC Plan, 40 CFR 112), an OSHA Emergency Management Plan (Emergency Management Plan, 29 CFR 1910), waste handling procedures, a Sedimentation and Erosion Control (SEC) Plan, a RCRA Contingency Plan (Contingency Plan, 40 CFR 264 and 265), and a Site Sustainability Plan (SSP) (Executive Order 13514). These documents are relevant to this plan and are described below.

8.1 Spill Prevention Control and Countermeasures Plan

The Laboratory has an SPCC Plan in place. An SPCC Plan is required by 40 CFR Part 112 for facilities like Argonne that have a total oil storage capacity of more than 42,000 gallons below ground or 1,320 gallons above ground. (Oil containers that are 55 gallons or greater are also included in this total.) This SWPPP includes the elements in the SPCC Plan, and all contingencies within that plan, and is updated any time the SPCC Plan is changed. The SPCC Plan is addressed in Section 4.1.3, Spill Prevention and Response.

8.2 Comprehensive Emergency Management Plan

The Laboratory has a Comprehensive Emergency Management Plan (CEMP), which describes how to manage responses to large-scale operational emergencies, such as fires, hazardous material releases, severe weather, and security events. In general, routine spill events described in this SWPPP are managed using spill response procedures determined by the Argonne Fire Department, the Nuclear and Waste Management (NWM) Division, and the Argonne Protective Force.

8.3 Waste Handling Procedures

The management of waste materials generated at Argonne is described in NWM waste handling procedures. These include the following:

- Identifying, tracking, and control of all waste
- Managing waste after generation and before pickup by NWM for disposal
- Storing waste at satellite accumulation areas and maintenance of those areas
- Managing waste after pick-up

A list of satellite waste accumulation areas registered in the Chemical Ordering, Records, and Attribute Library (CORAL) can be obtained by contacting the Environment, Safety, and Health Directorate (ESHQ) Chemical Management group. This list is subject to change and is current as of the date of the list. Waste handling procedures are listed under Waste Management documents in the Document Center.

Waste generated during off-normal operations, due to remedial activities and construction and demolition projects, is handled through the project management process. The project manager must interact with QAS Environmental Protection group (QAS-EP) as well as NWM, if necessary, to manage and dispose of waste generated by the project. All projects are subject to review under the requirements of the National Environmental Policy Act (NEPA) prior to their start. This review serves as Argonne’s environmental review process to make sure that the project plan includes correct environmental management, proper handling of materials used, and correct disposal of project waste. Waste generated during decontamination, decommissioning, and other FAC Division projects may be managed directly by the contractor without NWM involvement.

8.4 Sedimentation and Erosion Control (SEC) Plan

Argonne’s SEC Plan provides guidance for construction and other earth-moving projects on avoiding storm
water pollution from sediment and particulates. The plan directs that all projects produce a construction site-specific plan that addresses minimization of run-on water, reduction of erosion, and prevention of sediment-laden runoff from leaving the site. It also describes specific actions for achieving the best results for each of the components.

Site-specific SEC plans, as required by construction contract specifications (Section 01014 – Sediment and Erosion Control), are required to apply specific actions, such as placing silt fences, covering excavated soil, or conducting inspections, to the actual conditions anticipated within the scope of the project. The SEC Plan guidance document appears in Appendix II of this SWPPP. The plan is also listed in Section 4.1.4 as a baseline BMP, since it is an important part of Argonne’s storm water management.

8.5 RCRA Contingency Plan

The RCRA Contingency Plan for Argonne is an element of the RCRA Part B permit application. The Contingency Plan describes the prompt and coordinated response that Argonne will carry out in the event of a release/threat of release of hazardous waste (or its constituents) into the environment.

The SWPPP takes into account Plan contingencies that affect storm water discharge, and will be updated as needed any time the RCRA Contingency Plan is changed. The SWPPP will also be followed any time the Plan’s response will affect storm water discharges off site.

8.6 Site Sustainability Plan

The U.S. DOE requires that each of its facilities have a Site Sustainability Plan (SSP) that complies with the sustainability goals in Executive Order (EO) 13514, Federal Leadership in Environmental, Energy, and Economic Performance. EO 13514 requires all federal facilities to have plans in place to protect and manage storm water. Argonne’s SSP describes its history in meeting these sustainability goals, storm water features planned for new buildings, and sustainable storm water management best practices. The SSP’s overall storm water management goal is to keep storm water on site to maximize water getting into the soil and to promote evaporation of water from plant leaves. To view the SSP, click here.
APPENDIX I
CURRENT CONSTRUCTION PROJECTS–SPECIFIC SWPPPs

There were no construction project-specific SWPPPs in effect at the time of this reissuing of the Argonne SWPPP:
APPENDIX II
SEDIMENTATION AND EROSION CONTROL DOCUMENTATION

General

Argonne requires that all construction projects involving earthmoving have a sediment and erosion control plan (SEC). For those projects equal to or greater than one acre of disturbance, the SEC is submitted to the IEPA, along with an IEPA Notice of Intent form, as a SWPPP for approval prior to the project. For these larger projects, the site-specific SWPPP and Notice are completed by the contractor before construction begins. The plan is reviewed and corrected by the Project Management Organization (PMO) project manager and QAS-EP, and then returned to the contractor to use during the life of the project. The PMO project manager and QAS-EP group will then coordinate delivery of these documents to the Illinois Environmental Protection Agency for a 30-day review period.

The PMO Specification Section 01014 defines site-specific SWPPPs and their requirements. Argonne recommends that construction projects use Specification Section 01014 as a basis for their site-specific SWPPP (SEC Plan).

Argonne also recommends that SEC Plans be prepared using guidance contained in the Illinois Urban Manual and the Illinois Environmental Protection Agency Construction Storm Water webpage.

All Argonne earthmoving projects are reviewed by the National Environmental Policy Act (NEPA) review. NEPA requires appropriate sediment and erosion controls. For projects of less than one acre of disturbed land, NEPA requires that a SEC plan be prepared prior to approval of the digging permit.

Table II.1 summarizes important elements of sediment and erosion control plans at Argonne. While sediment and erosion control are different for each project, these elements are considered when developing SEC Plans.

Table II.1  Elements of Sediment and Erosion Control Plans

<table>
<thead>
<tr>
<th>SEC Element</th>
<th>Content Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intent</td>
<td>• Prevent sediment-laden runoff from disturbed soil from entering surface water, storm sewers.</td>
</tr>
<tr>
<td></td>
<td>• Disturbed soil defined as area containing excavation, spoils piles, embankment/fill, materials stockpiles, and any earthmoving activity.</td>
</tr>
<tr>
<td>Erosion Prevention Methods</td>
<td>• Run-On Prevention: Diversion dikes (compost, soil, sandbags) to direct water around construction site.</td>
</tr>
<tr>
<td></td>
<td>• Flow Speed Reduction: Slow flow of water over disturbed earth to reduce the amount of erosion, using minimal size of disturbed area and grade controls.</td>
</tr>
<tr>
<td></td>
<td>• Sediment Capture: Removes solids from water prior to discharge, using techniques to slow water such as silt fencing, hay bales, or sediment basins. Discharged water must contain less than or equal to 30 mg/L solids as per NPDES requirements.</td>
</tr>
<tr>
<td>Physical Structures/Methods for Erosion Control</td>
<td>• Projects may use any of the following methods to reduce erosion at construction sites:</td>
</tr>
<tr>
<td></td>
<td>• Sediment Basins: Temporary basin to halt flow and allow solids to settle.</td>
</tr>
<tr>
<td></td>
<td>• Check Dams: Placed in drainage ditches, swales, channels to slow speed of flows to reduce erosion and removal of sediment from flow.</td>
</tr>
</tbody>
</table>
Table II.1  Elements of Sediment and Erosion Control Plans (continued)

<table>
<thead>
<tr>
<th>SEC Element</th>
<th>Content Summary</th>
</tr>
</thead>
</table>
| **Physical Structures/Methods for Erosion Control** (cont.) | • *Diversion Ridge/Terrace*: Ridge or channel constructed uphill to divert flow from disturbed areas.  
• *Filter Berm*: Ridge constructed of gravel placed in water flow path to slow velocity and allow solids to settle.  
• *Interceptor Channel*: Constructed across a slope to capture and reduce velocity of storm water and divert it to discharge area.  
• *Mulching*: Organic materials (grass, hay, woodchips, etc.) placed on disturbed soils to reduce storm water contact, flow and resultant erosion.  
• *Compost Filter Berms*: Berm constructed of organic materials to reduce storm water flow and increase sedimentation through filtering.  
• *Silt Fence*: Filter fabric anchored into 4 inches of soil across storm water flow path. Water is slowed and sediment settles out on uphill side of fence. Should be used with straw bales (placed on downhill side and serve as anchor for fence).  
• *Stabilization*: Proper placing, grading, and/or covering of soil, rock, or earth to increase their resistance to erosion or other movement.  
• *Straw Bale Diversions*: Placed in flow path of storm water to slow storm water flow and remove sediment. Should be staked to prevent movement.  
• *Surface Roughening*: Soil roughening along contours of the land using stair-step grading, grooving, or tracking. Roughening slows water flow and reduces erosion.  
• *Temporary Seeding*: Temporary stabilization using fast-growing grasses in the disturbed area; used only if final stabilization is delayed or if permanent plant growth is not necessary. Soil stockpiles shall be stabilized in this manner immediately after placement.  
• *Permanent Seeding*: Native seed mixes should be used to establish vegetative cover to control storm water flow and erosion. Project examples include demolition projects, green infrastructure installations, and restoration of previously disturbed lands. PMO-Planning shall be consulted for appropriate seed mix specifications. |
| **Sewer Sedimentation Prevention** | • Sanitary, laboratory sewer manholes sealed prior to excavation. Plastic sheeting weighted on the manhole cover may be used as a seal.  
• Storm sewer inlets should be protected from sedimentation. Diverted water is then directed to a sedimentation feature to remove sediment. Filter fabric, gravel berms, or sod can be used to protect storm sewer grates by slowing water and allowing sedimentation to take place.  
• Sewer manholes and inlets in construction areas should be staked or otherwise identified to prevent damage to the structure. Damaged inlets or manholes will be repaired immediately. |
Table II.1  Elements of Sediment and Erosion Control Plans (continued)

<table>
<thead>
<tr>
<th>SEC Element</th>
<th>Content Summary</th>
</tr>
</thead>
</table>
| Release of Retained Water | • Retained water containing suspended solids equal to or greater than 30 mg/L should not be released. Water should be retained until this threshold is achieved.  
  • Alternatively, water with suspended solids greater than 30 mg/L can be released to a vegetated ground surface to infiltrate the subsurface. |
| Maintenance and Inspections | • Sediment and erosion control systems should be maintained in good condition.  
  • Failure (a breach in the sediment and erosion control system) can cause a system bypass.  
  • Regular inspections, and inspections after rain events (within 24 hours), should take place to identify areas requiring maintenance to minimize risk of failure.  
  • Maintenance program should include procedures for inspection, schedule, responsible contractor personnel, recordkeeping, and testing of retained water. |
| Restoration               | • Element includes removal of temporary storm water control measures.  
  • Stabilize disturbed areas within one day after construction is complete.  
  • PMO-Planning should be consulted for appropriate seed mix specifications. |

Intent of the SEC Plan

The intent of the SEC plan is to prevent soil-laden runoff from disturbed areas from entering ponds, creeks, streams, wetlands, ditches, or any of the sewer systems used to transport water around Argonne. Soil-laden runoff is the result of erosion occurring in disturbed areas, where runoff water accepts soil particles and suspends them within the water, carrying them off as it leaves the area.

Erosion Prevention Methods

Methods for preventing erosion include reducing the amount of run-on, reducing the speed at which water moves across the surface of disturbed soil, and capturing the sediment in the water. These methods are described in more detail, below.

Run–on Prevention

One of the best ways to reduce the amount of runoff is to prevent water from getting on the site. Diversion dikes made of soil, sandbags, or other wall-type structure will block water from running onto an area of disturbed soil. Any method used should direct the water around the area to where it will continue draining without contacting the disturbed area.

Flow Speed Reduction

Unless a disturbed area is covered, rainwater will land on the soil and create runoff. Once the water touches the disturbed area, erosion occurs, and the amount of erosion is proportional to the speed of the water running across the surface: faster-moving water carries more and larger particles than slower moving water. To reduce erosion, the water should be slowed down as much as possible. To slow the water, make the disturbed area within the construction zone as small as possible, and control of the grade of the area through the methods in this appendix. Planning excavation techniques at the beginning of the project allows for the best use of erosion prevention techniques.

Capture of Sediment Leaving the Site

Once there is runoff water in the disturbed area, it must be handled so that eroded soil does not leave the area with the water. Filtration and other solids separation techniques can help. The goal is to remove the solids in
the water, then allow the water to be removed from for normal discharge. Discharge of the water must follow the normal National Pollutant Discharge Elimination System (NPDES) permit limitations for Argonne, which state that discharge points other than those from wastewater treatment plants have no more than 30 mg/L of suspended solids in the water.

**Physical Structures and Methods for Erosion Control**

The following methods can be used by themselves or in combination to reduce the amount of erosion and runoff from a disturbed area:

- **Sediment Retention Basin or Pond** – A temporary drain and/or basin that traps and stores sediment produced by erosion and carried to the structure by runoff.

- **Check Dams** – A small temporary or permanent dam built across a drainage ditch, swale, or channel that slows the speed of water, reduces erosion and gullying, and allows sediment to settle out. Check dams can be built from logs, stone, staked straw bales, or pea gravel-filled sandbags.

- **Diversion Ridge** – A temporary ridge of soil built at the top of a cut or fill slope that diverts overland water from small areas and away from unstable slopes. Pea gravel-filled sandbags can also be used to build a diversion ridge.

- **Diversion Terrace** – A diversion made of an excavated channel and a ridge built upslope of a work area that diverts storm water away from the unprotected slope.

- **Filter Berm** – A temporary ridge of gravel or crushed rock built across a graded right-of-way that keeps sediment on site by slowing and filtering runoff, while simultaneously allowing construction traffic to proceed along the right-of-way.

- **Interceptor Channel** – A channel or dike built across a slope that catches storm water, reducing the speed of flow and diverting it to outlets where it can be discharged.

- **Mulching** – A temporary method where grasses, hay, woodchips, wood fibers, straw, or gravel are placed on the soil surface to reduce the movement of surface soils. Mulching reduces erosion and allows regrowth of plants for permanent stabilization of soil. This can also be accomplished by using mulch matting or netting.

- **Silt Fence** – A temporary fence made of filter fabric stretched across wood or metal posts. The fence is installed along the down slope or side slope outside path of a disturbed area. The bottom of the silt fence fabric is dug four inches into the soil, curved under toward the direction of water flow approaching the fence, and has support posts on the side of the fabric away from the flow. Runoff passes through the openings in the fabric and sediment is trapped on the uphill side. To strengthen the filter fence, use this method in combination with straw bales in areas where high flow rates are expected and stake the bales on the downstream side of the silt fence for support.

- **Compost Filter Berm** – These can be used in the same manner as a silt fence. When a project is complete, the compost filter berm can be left in place to degrade naturally.

- **Stabilization** – The proper placing, grading, and/or covering of soil, rock, or earth that increases their resistance to erosion, sliding, or other movement.

- **Straw Bale Diversion** – Temporary berms or other barriers made of baled straw that retain sediment by slowing and filtering runoff. Straw bales must be staked so they do not move when there is high flow.

- **Surface Roughening** – A temporary erosion control practice where the soil surface is roughened by creating horizontal grooves, depressions, or steps that run parallel to the contour of the land. Methods include stair-step grading, grooving (using disks, spring harrows, or teeth on a front-end loader), and tracking (driving a crawler tractor up and down a slope, leaving the cleat imprints parallel to the slope’s contour).

- **Temporary Seeding** – Temporary stabilization using fast-growing grasses in a disturbed area where permanent plant growth is not necessary or appropriate. This method is recommended for soil piles that will not be moved for moderate to long periods of time.

- **Permanent Seeding** – For areas that will be permanently seeded, native plants/shrubs/trees
should be considered as a way to control/prevent storm water runoff. Area examples include demolition project sites, installation of rain gardens or bioswales, and restoration to green fields. Contact QAS-EP for a list of these plants and help with design and planting.

**Sewer Sedimentation Prevention Methods**

Sanitary and laboratory sewer manholes are sealed before digging around them, unless the excavation is for repair or replacement of a manhole. Sealing includes opening the manhole, placing plastic sheeting on top of the opening, and re-covering the manhole. The edges of the plastic are held down with cement blocks or bricks.

Storm sewer inlets and grates must also be protected from sediment-laden runoff. Plastic sheeting can be used (as for manholes) and the runoff water routed to facilities for removal or settling of sediment before discharge at another location. Other methods include the following:

- **Filter Fabric Protection** – Silt fencing can be used to protect sewer inlets using the installation steps described in Section 1.3. Take care to use the appropriate support structures if water flow will be high.

- **Gravel Inlet Protection** – This method uses gravel arranged around an inlet grate to form a small filter berm, as described in Section 1.3. The berm reduces the flow rate to the sewer inlet and traps sediment in the gravel. A similar method can be used at entrances to storm culverts by building a filter berm of gravel, supported by cement blocks or staked straw bales.

- **Sod Inlet Protection** – Sod strips can be used around storm inlets to trap sediment in the grass. The sod must be staked so that the strips remain in place. The sod should be placed so that the width of the sodded surface is twice the width of the storm.

Whenever a sewer manhole or storm inlet is in a construction area, it must be staked. This lets construction traffic know where the grate or manhole is, otherwise it could be damaged by equipment driving over it. Damaged inlets or manholes must be repaired immediately.

**Release of Retained Water**

In general, water discharged from a construction site's sediment control best management practices shall not result in offensive conditions (that is turbidity other than natural origin that can be traced back to the construction site) to waterways into which it is discharged or eventually enters.

If any water is deemed likely to cause offensive conditions if released to a waterway, it must be held or treated until as much suspended sediment as possible is removed from the water column. If held, the solids will naturally settle. If treated, then the SEC Plan gives methods for treating the water. Alternatively, the water can be discharged to a vegetated ground surface area to infiltrate the subsurface.

**Maintenance of SEC Systems**

Systems used to control erosion and sedimentation should be in good operating order at all times. Regular, appropriate maintenance prevents the failure of system components.

A *system failure* is a breach in or overburdening of filtration or retention systems, causing the system to be bypassed. Some indicators that a failure has occurred include gullying under or around a retention or filtration system, torn or ripped silt fencing fabric, and loss of water that should have been retained. Failures are noted and become a repair item in the maintenance program.

Since silt fencing is the most common method for dealing with capturing sediment, the maintenance program includes changing the silt fencing as it becomes clogged with sediment and no longer works. During inspections, a recommendation for changing the silt fencing must be noted in the inspection record.

**Inspections and Recordkeeping**

The maintenance program includes the following:

- Inspection procedures,
- How often inspections occur (once per day, at the end of the day, through the rain seasons, plus after every rain event, etc.).
- Who are the responsible personnel,

- Procedures for reporting and record-keeping procedures (logs), and

- Test methods and results needed to measure the sediment concentration of any trapped storm water before its release.

IEPA storm water permit regulations require that inspections be made at least every seven days and within 24 hours of a significant rain event. During inspections, indications of actual or possible system failures are recorded in the inspection log, and any repairs are made as soon as possible (at least repairing the failure before the next rain event). If a failure happens during a rain event, then the failure must be repaired as soon safely possible (for example, after danger of lightning strikes or flooding is over).

The inspections must also note if there are any inadequacies in the SEC Plan. Evaluation of inadequacies should be done as soon as possible and before the next storm event.

### Restoration of Site

After construction, the work site should be restored to a useable condition, including proper storm water measures, and removal of all temporary measures and control facilities used during the project. Restoration should be completed within 30 days of complete stabilization (except for compost filter berms). All of these items must be included in the final restoration plan.

Full stabilization of the work site is required, and all disturbed areas should be stabilized to prevent erosion. After a site is stable, final grading, seeding and other provisions should be completed for final site restoration.
APPENDIX III  STORM SEWER LAYOUT MAP
APPENDIX IV
SNOW AND ICE CONTROL PROCEDURE

1 Purpose
To provide the processes and practices for snow and ice control on the Argonne National Laboratory site and the protocol for notifications to senior management regarding the status of snow and ice removal operations.

2 Scope
This procedure applies only within the following organizations: Infrastructure Services, Facilities Division (FAC), and the Office of the ALD for Operations (OPS).

This procedure:
- Describes the current operational procedures for snow and ice removal.
- Specifies FAC operations personnel roles.
- Identifies environmentally sensitive areas desirable for the reduction/elimination of salt usage.
- Affirms assessment of post event feedback after each snow event and provides a method of integration into operational procedures.

3 Safety Precautions and Limitations
While performing this procedure, take the following precautions and observe the following limitations to avoid serious injury or property damage:
- Delineate snow clearing boundary with high visibility markers ahead of the snow clearing season
- Move pedestrian crosswalk signs from roadway to nearest practical location on shoulder
- Winter gloves
- Safety glasses
- Laboratory-issued safety shoes
- Cold weather outerwear
- Protective headgear
- Reflective vests or clothing

4 Required Training
Individuals who perform this procedure must complete the following training before beginning the work.
Training completion must be documented as shown below.

<table>
<thead>
<tr>
<th>Job Role</th>
<th>Training Course or Reading</th>
<th>Documentation of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grounds and Custodial personnel</td>
<td>PFS 50164, Snow and Winter Preparation and Field Run</td>
<td>Sign in log</td>
</tr>
</tbody>
</table>
5 Forms and Information Systems Used in Work Process

Individuals who perform this procedure need access to the following forms and information systems.

- Daily Snow Command Schedule
- Off-Shift Route and Equipment Assignment
- Inspection of Vehicle and Equipment by Operator
- Snow and Ice Removal Equipment Readiness Information
- Emergency Exit Door List

6 Work Process

The steps below are mandatory unless noted otherwise.

6.1 Management Actions

<table>
<thead>
<tr>
<th>Step</th>
<th>Job Role</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FAC Division Director and FAC Deputy Division Director</td>
<td>1.1 Provide the proper resources to verify that the provisions of this procedure are met.</td>
</tr>
<tr>
<td>2</td>
<td>FAC Grounds Manager</td>
<td>2.1 Allocate and prioritize the proper resources, to include appropriate staffing, and to confirm that the provisions of this procedure are met.</td>
</tr>
<tr>
<td>3</td>
<td>FAC Grounds Manager Grounds Foreman</td>
<td>3.1 Schedule staff to verify snow command personnel are available as dictated during a storm event. 3.2 Verify that all equipment is operational and properly maintained prior to all events and provide report to senior FAC staff. 3.3 Activate the Snow Command and authorize snow command personnel to perform snow removal and de-icing activities. Submit Daily Snow Command Schedule to notify critical staff and Divisions of the activation of</td>
</tr>
</tbody>
</table>
Ch. 1, Snow and Ice Control Procedure

2017-18 SNOW AND ICE CONTROL PROCEDURE

<table>
<thead>
<tr>
<th>Step</th>
<th>Job Role</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Snow Command All Hands</td>
<td>4.1 An All Hands meeting shall be conducted prior to winter snow fall for all of Snow command to discuss Operations which shall include but not limited to the Snow and Ice Control Procedure, lessons learned, Vehicle Maintenance concerns, equipment use/care and assignment, extreme weather events that activate overnight housing and emergency exit door operations, and changes/differences from previous year operations.</td>
</tr>
<tr>
<td>5</td>
<td>Custodial Manager and Grounds Manager</td>
<td>5.1 Schedule Staff to clear Main and Emergency Exit Doors per master door list in the event of snow blocking the function of door and egress of occupants.</td>
</tr>
</tbody>
</table>

6.2 Snow removal

<table>
<thead>
<tr>
<th>Step</th>
<th>Job Role</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FAC Heavy Equipment Operators/Grounds Specialists /</td>
<td>1.1 Wear/don supplied personal protective equipment (PPE) as directed by the Foreman and worker safety</td>
</tr>
</tbody>
</table>
### 2017-18 SNOW AND ICE CONTROL PROCEDURE

<table>
<thead>
<tr>
<th></th>
<th>Custodial support personnel</th>
<th>directives including this document under Section 3.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2 Inspect equipment prior to use to confirm proper operation and complete inspection form before and after use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 Notify manager of any equipment malfunction.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.4 Clean and lubricate utilized equipment as soon as possible</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FAC Grounds Foreman</td>
<td>2.1 Dispatch route assignments.</td>
</tr>
<tr>
<td></td>
<td>2.2 Provide snow command crew with radios to provide consistent communication with Grounds Management.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.3 Monitor work progress, weather, and lab conditions</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FAC Grounds Foreman</td>
<td>3.1 Monitor site condition, weather, staff, equipment, communication, and snow command progress and make strategic decisions to achieve the objectives of snow command</td>
</tr>
<tr>
<td>4</td>
<td>FAC Grounds Foreman</td>
<td>4.1 Verify that all equipment is operational and properly maintained during and immediately after event.</td>
</tr>
<tr>
<td></td>
<td>4.2 Activate the Snow Command and authorize snow command personnel to perform snow removal and de-icing activities. Submit Daily Snow Command Schedule to critical Management staff and Divisions to notify of the activation of Snow Command (See Appendix E)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.3 Evaluate storm forecast for impact on emergency exit doors and when necessary advise Custodial and Grounds Manager to activate additional crews and provide a master list of all emergency exit doors to be checked and cleared.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.4 Perform surveillances during snow command operational events to evaluate the effectiveness of snow command operations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.5 Direct correcting actions resulting from worker feedback and surveillance findings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.6 Minimize salt usage to the extent practicable by following SWPP BMPs. (Refer to Appendix B for further information.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.7 Address any operational deficiencies with additional training of personnel on equipment use and snow control techniques</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FAC Heavy Equipment</td>
<td>5.1 Perform snow removal and de-icing as described in</td>
</tr>
</tbody>
</table>
### 2017-18 SNOW AND ICE CONTROL PROCEDURE

<table>
<thead>
<tr>
<th>Step</th>
<th>Job Role</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Monitor (continually) weather activity and forecast during periods that have snow or ice potential.</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Site conditions;</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Route assignments;</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Present or expected weather conditions; and</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>Equipment concerns or repairs needed.</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>Determines possible need of additional staff for emergency door clearance</td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>Implements Road Closure Plan as necessary based on conditions and notifies critical/concerned party list of decision by 4:00 am. See Appendix E for Need to Know Contact list</td>
<td></td>
</tr>
<tr>
<td>2.7</td>
<td>Submits state of the lab reports of the site conditions and lab weather reports to the Emergency Management and Security Department, the Deputy COO (or Interim Deputy COO), and Senior IS/FAC Division Staff as necessary during the work day - 7:00 am to 5:00 pm. The report shall identify the condition of roads, parking lots, sidewalks, and building emergency exit, and also identifies the actions of Grounds and Snow Command.</td>
<td></td>
</tr>
<tr>
<td>2.8</td>
<td>Provide state of the lab report by 5:00 am to the Lab Deputy COO (or Interim Deputy COO), after receiving input of the site conditions from Utilities Off Shift Foremen, Fire Department, and Security Force for overnight events. The Grounds Manager then makes the official state of the lab notification to the Deputy COO. (or Interim Deputy COO).</td>
<td></td>
</tr>
</tbody>
</table>
7 Records Created by Work Process
The records listed below must be retained as indicated below.

<table>
<thead>
<tr>
<th>Description of Record (give form number if applicable)</th>
<th>Custodial Division</th>
<th>Applicable Federal Retention Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAC- Site Services Employee Snow and Ice Equipment Information</td>
<td>FAC</td>
<td>Destroy when 3 years old</td>
</tr>
<tr>
<td>Inspection of Vehicle and Equipment by Operator</td>
<td>FAC</td>
<td>Destroy when 3 years old</td>
</tr>
</tbody>
</table>

8 Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

9 About this Procedure
- Responsible division: Infrastructure Services / Facilities (FAC) Division
- Subject matter expert: Anthony Sendra, (Custodial Manager), Scott Thomas (Grounds Manager), (Darrell Cathy, (Acting Grounds Dept. Foreman). Steve Geitz, (Grounds Specialist and Backup Acting Grounds Dept. Foreman).
- Review cycle: Annually

10 Related Documents
This procedure implements requirements established by the following basis documents.
- Stormwater Pollution Prevention / Best Management Practices
- Salt Use Minimization Plan

This procedure implements requirements established by the following Argonne policies and procedures.
- NEPA
2017-18 SNOW AND ICE CONTROL PROCEDURE

- Environmental Management System
- Integrated Safety Management
- Work Planning and Control
- Snow Control Salt/De-icing Compound Use Reduction
- Argonne Chemical Management Program – SDS documentation of deicing compounds
- Traffic Safety Precautions and Limitations

The following document provides additional information regarding Laboratory communications that may take place following the “state of the Lab” reports to the Deputy COO (or Interim Deputy COO) (e.g. communications regarding site closure).

Argonne Office of Emergency Management OEM-PROC-020 “Severe Weather Protective Actions”
### 2017-18 Snow and Ice Control Procedure

#### Appendix A: Snow Removal/De-Icing

#### A-1 Staffing Requirement Guide As Dictated By Weather Conditions

<table>
<thead>
<tr>
<th>Weather Conditions</th>
<th>Staff Requirements</th>
<th>Hours of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable; light snowfall predicted during regular site operation; no major accumulation expected. ≤ .5 inches</td>
<td>Full Grounds Staff</td>
<td>6:00 am to 4:30 pm -- 8 hours (possible hold-over small crew to cover key roads/walks)</td>
</tr>
<tr>
<td>Light snowfall overnight; icy conditions; predicted light to moderate snow accumulation. ≤ 1 Inch</td>
<td>Full Grounds Staff</td>
<td>6:00 am to 4:30 pm -- 10 hours (possible hold-over small crew to cover key roads/walks)</td>
</tr>
<tr>
<td>Moderate snowfall overnight; ice; temperature dropping; windy conditions; snow predicted throughout day ≥ 1 inch ≤ 2 Inches</td>
<td>Full Grounds Staff, Custodial Crew, 1 or more Mechanic(s)</td>
<td>4:00 am to 4:30 pm -- 12 hours (possible hold-over small crew to cover key roads/walks)</td>
</tr>
<tr>
<td>Heavy snowfall overnight; heavy accumulation; lots covered; additional snow predicted. ≤ 2 inches; Blowing and drifting snow predicted at least 24 hours in advance with ≥ 6”</td>
<td>Full Grounds Staff, Custodial Crew, Emergency door clearance crew of X number of staff</td>
<td>2:00 am to 4:30 pm -- 14 hours (possible hold-over small crew to cover key roads/walks)</td>
</tr>
<tr>
<td>Heavy snowfall overnight; continual heavy accumulation; predicted heavy snowfall, 2 or more days.</td>
<td>Full Grounds Staff, Custodial Crew, Emergency door clearance crew of X number of staff</td>
<td>12 hour shift rotation in which overnight lodging may be required of all staff</td>
</tr>
</tbody>
</table>
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## Off Hours (Saturday, Sunday, Holidays)

<table>
<thead>
<tr>
<th>Weather Conditions</th>
<th>Staff Requirements</th>
<th>Hours of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light to moderate accumulation; site traffic expected light. ≤ 1 Inch</td>
<td>Selected Grounds staff only</td>
<td>6:00 am until all main roads and key walks/lots cleared</td>
</tr>
<tr>
<td>Moderate to heavy accumulation; site traffic expected light. ≥ 1</td>
<td>Full Grounds staff Custodial Crew</td>
<td>6:00 am until all main roads and key walks/lots cleared</td>
</tr>
</tbody>
</table>

## Regular Workdays

<table>
<thead>
<tr>
<th>Weather Conditions</th>
<th>Staff Requirements</th>
<th>Hours of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate to heavy snowfall/ice accumulation on lots/walks. ≥0.25 inch</td>
<td>Full Grounds staff Custodial crew All mechanics</td>
<td>2:00 am or 4:00 am start time, based on accumulation</td>
</tr>
<tr>
<td>Blowing and drifting snow predicted at least 24 hours in advance with 6”</td>
<td>Emergency door clearance crew of X number of staff</td>
<td>12:00 am to start time</td>
</tr>
</tbody>
</table>
A-2 PARKING LOT / ROAD CLOSURES

FAC Site Services/grounds evaluates road and parking lot conditions during every snow event. If warranted, grounds advises the OPS Office and road and Lot Closure Notification List contacts on which areas of the Laboratory are deemed necessary for closure. This measure is performed to further increase the safety of Argonne personnel. Closed roads will be plowed as soon as possible after open access areas and at the end of precipitation/accumulation; however, no deicing compounds shall be applied. The closures shall occur based on storm event predictions and eventual conditions. During overnight events that warrant road/lot closure the action shall be announced to emergency and vital staff when the decision occurs. Roads and lots may be closed for extended periods of time. The same staff shall be notified of the decision to open the closed areas.

Parking lot and road closures may include the following depending on weather circumstances.

Roads: 1. Tech Road – From Eastwood Drive to the Eastwood Extension
   2. Railroad Drive – the southern gravel access area to the exit Gate 7
   3. Railroad Drive – the gravel access roads from Eastwood Extension to the Utilities Operation Area.
   4. Bluff Road – East of Railroad Drive
   5. Freund Road – from Railroad Drive to the Parking lot area of B617
   6. Access Drive – From B614 to Bluff Road
   7. Old Bluff Road – East of B366
   8. B350 Bypass Road (Unnamed road south and east of Building 350)
   9. B205 Gravel Road – road on southwest side of building is closed
   10. Water Tower Road – From Kearny Road to the Outer Circle Road

Lots: 1. Parking Lot northwest of B306 – middle 1/3rd the parking area northwest of B306
   2. Parking Lot of B206 – north ½ of parking area
   3. Parking Lot north of B208 – west 1/4 of parking area
   4. 200 South Lot and Access Road (unnamed drive north of B205)
   5. 350 North lot – closed, the lot northwest of B350.
   6. Parking Lot of B360 – the lot north of Rock Road and south of Bluff Road (currently fenced)
   7. Parking Lot of 360 - area west of 360 south to 375 including road (some of this area now the solar bank)
   8. APS Overflow Lot – Closed unless requested for use
   9. B46 – area to the east of B46 unless requested
   10. Argonne Park- Gravel parking lot
   11. B315 On road parking on north side of Bluff Road
   12. B330 Old on road Parking Lot on north side of Rock Road
A-3 MAJOR ROADWAY SNOW REMOVAL AND DE-ICING

A-3.1 NIGHT SHIFT 4:30 - Monday through Friday

A-3.1.1 Route / Equipment / Removal Technique

Route #1: All Main Streets

Equipment: Heavy truck with plow and salt spreader.

Removal Technique: Plow select main roads to keep 24 hour facilities (Utilities, APS, Security, Fire) accessible. Operator should envision road closure program engaged after 6:30 PM and circumvent those areas to effectively utilize time. Apply deicing materials as necessary to intersections.

A-3.1.2 Route / Equipment / Removal Technique

Route #2: Building Entrances and Other pedestrian walking surfaces

Equipment: 1 ton dump truck with plow and salt spreader, hand shovel, portable salt spreader

Removal Technique: Clear and de-ice Child Development Center front entrance walkway, shovel/de-ice handicap ramps and entrance walkways; Northgate Guards station; Provide access to doors and walking surfaces as best as possible to B108, B114, B129, B145, B146, B595, B576, B574, B583; B460 Front Door, Provide walking path to the entrance of B401 and maintain driving paths in APS parking lots; Shovel entrances and plow approaches to B302 and B333.

Route #3: If sufficient staff or late night (10:30 pm) Custodial staff are available.

Equipment: Heavy duty Pick-up truck with plow, hand shovels, portable salt spreaders

Removal Technique: Split Route 2 as operation dictates
B460 Front Door, Provide walking path the entrance of B401, Shovel entrances and plow approaches to B302 and B333, B595, B576, B574, B58
A-3.2 MORNING SHIFT

A-3.2.1 Route / Equipment / Removal Technique

Route #1: Main Streets A

Equipment: Heavy truck with plow and salt spreader.

Removal Technique: Fill truck with deicing product at the 330 salt retention area in advance if possible to the amount needed for the first portion of operations. Plow following the desired sequence below for at least 2 cuts. When plowing is complete, travel back over the route to check road conditions and to de-ice parking lots along the route. During overnight events, apply salt at the end of snowfall, but approaching and during day operations apply salt as necessary.

DRIVING DIRECTIONS:

Leave Building 46 and head west on Eastwood Extension to Outer Circle Drive; turn right on to
Outer Circle Drive proceed north to 94th Street, turn right on to
94th Street proceed to the Boiler house then reverse and return to
Outer Circle Drive turn Right and proceed to Northgate and turn right to
Northgate Road follow Northgate Road north to Cass, turn around without crossing Cass and return to Northgate Road and turn right on to
Northgate Road proceed to 94th Street turn Right on to
94th Street proceed the full length of 94th Street, Turn around, and travel back to Northgate Road, turn right on to
Northgate Road proceed to Inner Circle and turn right on to
Inner Circle proceed west on Inner Circle and Merge on to
Westgate Road proceed west to Lemont Road, turn around at Lemont Road, proceed east on Westgate, then turn right onto
Kearney Road proceed south to the intersection of Rock Road on the South side, turn around and return driving north to turn right on to
Westgate Road proceed east to Inner Circle, merge with Inner Circle and continue east. Turn left on to
Northgate proceed north and east to merge with Outer Circle heading east and south on
Outer Circle continue on Outer Circle to the westernmost extension of 94th Street (near ATLAS), turn around and proceed back for return pass on Outer Circle. Proceed to Water Tower Road and turn right on to
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Water Tower Road
IF CLOSED SKIP TO NEXT – proceed toward Kearney and turn around for the return pass. Turn right on to

Outer Circle
proceed to Hotel Drive turn right on to

Hotel Drive
proceed toward Rock Road, Cross Rock Road and use the 401 drive to turn around for return pass on Hotel Drive. Plow this loop twice and return to Outer Circle turn right on to

Outer Circle
proceed to cast and north and turn left on to

Eastwood Road
proceed to Inner Circle and turn right on to

Inner Circle
proceed to Northgate turn around and proceed cast and eventually west on Inner Circle turn right on to

Meridian Road
proceed north to B221 dock, turn around and proceed south on Meridian to south Inner Circle, turn right on to

Inner Circle
follow inner Circle to Westgate, turn around and proceed back to Meridian Road, turn right on to

Meridian Road
proceed south on Meridian to Old Bluff Road, turn around and proceed north to Inner Circle and turn right on to

Inner Circle
proceed to Eastwood via Inner Circle turn right on to

Eastwood Road
proceed east on Eastwood to B46 turn around and proceed back to point of origin – B46.

After completing Route #1 A, re-drive all streets and check, plow and apply deicing salt any missed areas. Call in when your route is completed and check for instruction on possible assistance on other routes. Return to the Grounds base of operations B46.

A-3.2.2 Route / Equipment / Removal Technique

Route #2: Main Streets B

Equipment: Heavy truck with plow and salt spreader.

Removal Technique: Fill truck with deicing product at the 330 salt retention area in advance if possible for the first part of operation. Plow following the desired sequence below for at least 2 cuts. When plowing is complete, travel back over the route to check road conditions and de-ice parking lots along the route. During overnight events, apply salt at the end of snowfall, but approaching and during day operations apply salt as necessary.

DRIVING DIRECTIONS:

Building 46
leave Building 46 and head east via Eastwood Extension to Central Road turn Right (South) on to

Central Road
proceed to Eastgate Road turn left on to

Eastwood Road
proceed past the Guard Station to Cass Avenue. Turn around and turn right on to

Central Drive
proceed north to Eastwood Extension and turn left on to
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Eastwood Extension  proceed west and turn left on to
Rail Road Drive  proceed south to Eastwood Road and turn left on to
Eastwood Road  proceed east to Guard Station, turn around, and proceed west to Rail Road Drive, turn right on to
Rail Road Drive  proceed north to Eastwood Extension and turn left on to
Eastwood Extension  proceed west Rail Road and turn left for second pass on to
Rail Road Drive  proceed south and turn right on to
Rock Road  proceed west and turn left on to Kearney Road
Kearney Road  proceed south to Bluff Road and turn left on to
Bluff Road  proceed to B371, turn around and turn right on to (re-fill truck at this time)
Southwood Road  proceed north and turn around at Outer Circle to turn left on to
Bluff Road  If Closed Skip to Next - proceed to Rock Road, turn around and head west and turn left on to
Southwood Road  proceed south and turn right on to
Old Bluff Road  proceed west and turn left on to
Un-Named Road to 317  proceed South to dead end turn around and head north, make two passes at B350 and turn left on to
Old Bluff Road  proceed west and turn right on to
Kearney Road  proceed north and turn right on to
Rock Road  proceed east and turn left on to
Freund Road  If Closed Skip to Next - proceed to Rail Road Drive turn around and turn left on to
Rock Road  proceed to Gate 5 (IF CLOSED SKIP TO NEXT), turn around and turn right on to
Rail Road Drive  proceed north to Eastwood Extension and return to the beginning of route

After completing Route #1 B, re-drive route and recheck, treating any missed areas. Call in when your route is completed and check for instruction on possible assistance on other routes. Return to the base of operations B 46.

A.3.2.3 Route / Equipment / Removal Technique
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Route #3: Assist Route

Equipment: Heavy truck with plow and salt spreader.

Removal Technique: Split Routes A and B to a 3rd road operator to assist

A-4 WALKING SURFACE SNOW REMOVAL AND DE-ICING
NOTE: NEW SIDEWALKS MAY REQUIRE SPECIAL SNOW CLEARING EFFORT AND DEICING COMPOUNDS

A-4.1 Walkways

1. Route / Equipment / Removal Technique

Route #4: 200 Area Sidewalks and Northgate rd. bike path - SUBSTANTIAL NEW SIDEWALK AREAS NOW EXIST
Route #5: 300, 600, East Area Sidewalk
Route #6: 400 Area
Route #7: 100 area and Childcare

Equipment: Small tractor with spreader

Removal Technique: Begin at 46A retention area and load de-icing product. Plow a single pass all sidewalks and handicap ramp areas, return for second / final pass and apply de-icing materials upon the end of an event/route completion or as otherwise instructed. The materials truck (a medium utility or P/U truck) can bring additional de-icing product, or trailers will be stationed in the 200 and 300 areas.

A-5 PARKING LOTS, DOCKS, AND INTERSECTIONS

A-5.1 Large Lots, Docks, and Intersections

1. Route / Equipment / Removal Technique

Route #8: 200 Area Intersections, Dock, and Large Parking Lots

Equipment: Front End loader with wing or push plow, assistance from smaller unit Industrial Tractor

Removal Technique: Plow areas for Buildings 204, 202(NEW north side lot), 201 East, 201 dock, 201/213, 223 (NEW), 200, 203/208, 241, and ending at 206. Plow all intersections on Westgate Road, Outer Circle, and Inner Circle.

Lots Closed: Parking Lot - North of B205

Parking Lot of B206 – north 1/2 of parking area
Parking Lot of B208 – west 1/2 of parking area

2. Route / Equipment / Removal Technique

Route #9: 200 Area Intersections and Large Parking Lots

Equipment: Front End loader with wing or push plow, assistance from smaller unit Industrial Tractor
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Storm Water Pollution Prevention Plan

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This is an uncontrolled copy when printed.
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Outer Circle and traveling south; Building 350 guard post parking lot; 600 Area parking lots as assist to front end loader.

3. Route / Equipment / Removal Technique

Route #14: 400 Area
Equipment: Industrial tractor with plow
Removal Technique: Plow small lots, IOMs, and details as instructed by HEO of end loader.

A-6 SITE-WIDE HOTSPOT AND HANDWORK

A-6.1 Route / Equipment / Removal Technique:

1. Route #15: Hotspots 1 - 300 Area
Equipment: 1 ton dump truck with plow, portable salt spreader, salt, and hand shovels
Removal Technique: Hot spots can change due to the need of the customer base. A “live” list may reflect more current needs that may change through the winter season
1. Load bulk and bag deicing products at B46A or B330 salt retention area.
2. Assigned to 300 and general East areas - Travel areas to shovel and de-ice all handicap ramps and roadside steps and other selected areas:
   - Child Development Center front entrance walkway (must complete before 7 a.m. on working days), Shovel/de-ice all Sidewalks and entrance walk, apply sand in front of main entrance, salt all others, plow parking lot
   - Detail plow and salt East Gate Entrance and guard station
   - B46 Fuel Pumps,
   - Stairs and entrances to B108, B114, B129,
   - B333, B302,
   - B340 Overhead Door, B360 Pull Off, B363 Central Shops, B331, B360 steam line
3. Supply 300 area sidewalk operators with de-icing products upon request.

2. Route #16: Hot Spots 2 – 200 Areas
Equipment: Heavy duty Pick-up truck, portable spreader, salt, and shovels
Removal Technique:
1. Load bag deicing products at B46A or B330F salt retention area.
2. Assigned to General 200 Area - Travel areas to shovel and de-ice all handicap ramps and roadside steps and other selected areas:
   - Visitor Reception Center / AIC: Sidewalks within 50’ of main entrance and ramp, handicapped parking spaces curb to curb
   - detail shovel and plow of Northgate entrance/exit lanes and around guard station
   - B213 - South entrance stairs, North entrance near doorway, around newspaper boxes, and planting island.
   - B201 - North dock lot and ramp entrances, smoking shelter. Stairs in sidewalk on East side of 201, access from banana lot.
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- B205 - Parking lot stairs across inner circle.
- B208: Westside and Northeast side Stairs
- B214 Front stairs and walk, Side ramp entrance
- B203: Handicap spots at top of lot
- Outer Circle stairs near Atlas
- Inner Circle stairs near 222
- B221: all handicap spaces and entrances with stairs
- NEW BUILDING: B241 (ESB) Front and other TBD areas,

3. Supply 200 area sidewalk operators with de-icing products upon request.

3. Route #17  Hotspot 3 General 400 Area

   Equipment: Medium duty Pick-up truck.

   Removal Technique:
   1. Load bag deicing products at B330F Salt Dome
   2. Assigned to General 400 Areas - Travel areas to shovel and de-ice all handicap ramps and roadside steps and other selected areas:
      - B401 Half of Gallery Entrance and stairs, parking lot stairs, VIP Parking spaces and walking approaches,
      - B450 entrance,
      - stairs to contractor trailers 432-431,
      - LOM 435 Sidewalk with hand rail and handicap spot
      - B460 Front Door and all sidewalks, rear sidewalk and half patio around picnic tables.
      - Detail plow and shovel Westgate Entrance/Exit lanes and Guard Station.

A-7 Emergency Access Doors – In the event of snow drifts that block egress from buildings or threaten lab shut down

   Equipment: Hand Shovels, snow blowers, and backpack leaf blowers

   Removal Technique:
   1. Use gas or electric snow or leaf blower to remove snow drifts from building emergency exits
   2. Detail work with snow shovels
   3. Apply deicing compounds.

A-8 Self Service Consumer Commodity Salt Barrels – Distributed in all major parking areas

   Description:

   -In and around all significant parking areas 55 gallon, weatherproof plastic barrels will be distributed filled with 12# ice melting material shakers. The purpose for the ice melting material shakers is to be available for lab inhabitants that would like to apply ice melting material to the spaces between their cars where ice often accumulates in the absence of sunlight and traffic.

A-9 Bulk Salt Conservation and Rationing Actions – In the event that winter severity results in above average salt usage as well as an unavailable supply chain to replenish storages the above actions
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will be taken.

1. Per event salt usage strictly rationed by salt truck per snow control zone. Rationing allocations will be informed by remaining inventory and remaining expected duration of freezing weather conditions.

2. Salt application to roads restricted to curves, intersections and other high risk spaces conditions permitting. Salt application to parking lots suspended or reduced conditions permitting.

A-10 Fire Hydrant Access – In the event drifting or the sum of fallen snow present exceeds 12” in depth. The grounds department will clear access paths to and around all fire hydrants possible once roads walks and lots have been cleared of snow. The Argonne FD and utilities departments will be made aware of snow clearing activities and their status. (At the time of this revision GIS mapping of site hydrants are currently under review by utilities for accuracy.) Future revisions of the site snow and ice control procedure will include a map of site hydrant locations.

Appendix B: Sensitive Environment Areas

The use of road salt can negatively affect the Laboratory’s natural environment. Therefore, it may be necessary to protect certain environmentally-sensitive areas located within the Argonne Site. These areas can include sensitive wetlands and other areas that may have additional environmental concerns (i.e., oak tree management areas, surface and/or ground water recharge areas, etc.). De-icing practices may be modified in these areas to reduce/eliminate possible impacts resulting from salt-laden snow melt waters.

Utilization of alternate snow and ice control measures are being considered for implementation. Key options are closure of selected roads and parking lots, use of non-salt based de-icing products, other snow and ice control measures such as sand application and appropriate time of Laboratory closure - late start, early departure. The economic and environmental tradeoffs of these and other options must be considered; however, the best balance is sought for meeting environmental baselines and safe working conditions. All new snow control efforts must have some change in customer delivery parameters. Every effort to inform must be extended to confirm this program’s success.

The current environmentally sensitive areas are shown in Map 1. Additionally, it is desirable to minimize salt usage as much as possible where roads are in close proximity to surface waters (i.e., Railroad Drive near Sawmill Creek); therefore, much of the laboratory’s winter storm water run-off must be regarded as a potential pollutant. Deicing applications must be made with precise needs for travel safety in an effort to minimize the laboratory’s contribution to dissolve solids entering into natural waterways.

Deicer products and application shall be reviewed every year to improve performance. The Salt Use Minimization Plan should be updated annually to reflect findings, lessons learned, new products, and procedures to protect the environment.
Map 3. Sensitive areas
Appendix C. Deicing Compound Brief

It is beneficial for personnel involved in snow and ice control operations to understand the action of deicing compounds in order to use such materials to the best affect. Granular and liquid salts have been used to deice or reduce slip conditions on road and sidewalk surfaces. Salts are ionic compounds that dissolve in water. This property is precisely the mechanism that makes them effective snow and ice control materials. However other compounds have recently been added to the snow and ice control tool box. These additional materials behave in similar ways and if used properly can significantly improve snow and ice control operation costs and reduce adverse impacts to the environment.

Heat of Solution – when a molecule dissolves in a solvent energy is exchanged. For many salts heat is released when dissolved in water such as calcium chloride which releases significant heat when dissolved in water.

Freezing Point Depression – molecules in solution act to lower the freezing point of the solution. In the case of rock salt, sodium Chloride, the freezing point of water is lowered. This property of rock salt is the most effective aspect of its use in snow control operations.

Colligative Property of Other Substances - recent examination of other substances has revealed new opportunities for snow control agencies. Any substance that can be suspended in water will lower its freezing point. Some non-ionic molecules have been observed to lower the freezing point of water as a function of an increasing the ratio of other substances in relation to melt water. Organic compounds have been introduced into the snow control lineup of chemical deicing compounds. The most common organics available are byproducts of sugar production from either corn or beet processing. These compounds are readily available, are harmless to humans and wildlife, and biodegrade in the environment.
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## Appendix D: Equipment Inventory 2014

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Dedicated Use</th>
<th>Route</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ME 008 TRUCK</td>
<td>ROAD CONTROL</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ME 707 TRUCK</td>
<td>ROAD CONTROL</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ME 792 TRUCK</td>
<td>ROAD CONTROL</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ME 715 MEDIUM DUTY TRUCK</td>
<td>SMALL LOTS</td>
<td>15</td>
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<tr>
<td>5</td>
<td>ME 915 CREW CAB P/U</td>
<td>HOT SPOT 1</td>
<td>16</td>
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<td>RENTAL COMBINATION LOADER</td>
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<td>ME 274 UTILITY TRACTOR</td>
<td>SM LOTS &amp; DOCKS</td>
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<td>ME 316 Light Duty Tractor</td>
<td>Sidewalks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>ME 302 Light Duty Tractor</td>
<td>Sidewalks</td>
<td></td>
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</table>
Appendix E. Contact Procedures

“Off-Shift State of Campus Conditions Update” Notification from FAC Utilities Off-Shift Foreman On-Duty for FAC-Grounds

Between November 1st and April 30th each winter season the Utilities Off-Shift Foreman on duty will send an “Off-Shift State of Campus Conditions Update” E-mail each day by 4:45AM, describing the condition of paved surfaces such as roads, sidewalks and parking lots, on site in relation to winter snow and ice safety. A brief description of weather conditions and if conditions are unsafe at the time of communication, whether or not the Grounds Dept. is active on site and working on mitigating dangerous conditions.

The “Off-Shift State of Campus Conditions Update” E-mail is to be sent to the Grounds Foreman, Grounds Manager, Utilities Supervisor, Utilities Manager, Deputy FAC Division Director of Site Services and FAC Division Director. The Grounds Manager will be the single point of contact to the Lab Directors’ Office (OTD) by 5 AM.

If at any time during off-shift coverage hours existing or forecasted weather conditions threaten the safety status of the Laboratory and the Grounds Dept. is not on site or scheduled to be so. The Off-shift Foreman on duty will call the Grounds Foreman and Grounds Manager immediately to alert them of the conditions.

“State of the Lab” Notifications for the Deputy COO

The 5:00 am notification is made to the Deputy COO (or Interim Deputy COO) by the Grounds Foreman or his designee. The procedure for communications to the broader Laboratory community (e.g. in the event of site closure) are provided in OEM-PROC-020 “Severe Weather Protective Actions”.

Grounds Manager will call Mike Dunn, Interim Deputy COO. If Mike Dunn is unavailable call John Quintana, Interim COO. If John Quintana is unavailable, then contact Gail Stine, IS Senior Director.

(Personal phone numbers of above personal shall be confirmed by Grounds and FD leadership ahead of each winter season)

Snow Command Activation Notification

Daily Snow Command Schedule Recipients to be notified of Activation of Snow Command. Notification will be via e-mail by: 1. Grounds Foreman, or 2. Custodial and Grounds Manager. Distribution list shall be stored in each position’s desk top computer using Microsoft Outlook e-mail program.

(SNOW COMMAND ACTIVATION LIST WILL BE TESTED AND EDITED AHEAD OF EACH WINTER SEASON BY GROUNDS DEPT LEADERSHIP)

Revise after initial roll call
2017-18 SNOW AND ICE CONTROL PROCEDURE

Road and Lot Closure Notification

Road and Lot Closure Notification Recipients to be notified of road and a parking lot closures. Notification will be via e-mail by: 1. Grounds Foreman, or 2. Custodial and Grounds Manager. Distribution list shall be stored in each position’s desk top computer using Microsoft Outlook e-mail program.

Notification to APS Bldg. Manager (Ed Russell) for APS Users to utilize the LOM 431 Parking lot for off-hours and weekend parking during a snow event.

(ROAD CLOSURE PLAN ACTIVATION LIST WILL BE TESTED AND EDITED AHEAD OF EACH WINTER SEASON BY GROUNDS DEPT LEADERSHIP)

Revise after initial roll call