Fermilab

Section Office
ES&H Section
630.840.8069 (phone)
630.840.3390 (fax)

Memorandum

July 25, 2008

To: Bruce Chrisman

From: William Griffing

Subject: Revised FESHM Chapter 8012 – Sedimentation and Erosion Control Planning

FESHM Chapter 8012, Sedimentation and Erosion Control Planning, has been revised. The modifications include changing the requirements for development of a Storm Water Pollution Prevention Plan to a one acre limitation, a link added to the new 2002 version of the Urban Manual, correction of a minor error in the flow chart, and a few other minor corrections in language. This chapter was out for labwide review and all comments were addressed.

After final approval, please return this approval page to Elizabeth Bancroft at MS119 for posting on the web.

Encl.

Recommended for Approval:

Bruce Chrisman — Date 7/28/08

Approved:

Piermaria Oddone — Date 7/30/08

SEDIMENTATION AND EROSION CONTROL PLANNING

INTRODUCTION

This chapter describes the procedures for ensuring that all activities at Fermilab include effective, appropriate sedimentation and erosion control (S&EC) measures by planning for them early. The objective is to avoid the loss or transportation of soil from disturbed sites, and prevent sedimentation impacts to streams, ponds, wetlands or other waterways on site.

Some construction projects require a National Pollutant Discharge Elimination System (NPDES) permit. In most instances where a permit is needed, coverage can be obtained through Illinois' "General Permit for Stormwater Discharges Associated with Construction Activity" (general permit). If a process (e.g., mining, rock processing, etc.) is involved in the construction, an individual permit may be called for, and procedures would be dictated by the terms and conditions of the actual permit. This chapter sets out procedures for S&EC planning that are consistent with the general permit, whether or not any permit is actually needed. This philosophy will insure that activities at the Laboratory will adhere to sound S&EC practices and result in a minimum of environmental degradation. At the same time, because the rules and regulations for permit applications can be confusing; this procedure will simplify and streamline the process for the manager(s) responsible for completing the construction project in a timely and compliant way.

All standards for erosion control practices and for construction of devices shall conform to the Illinois EPA "Illinois Urban Manual," 2002 Edition.

DEFINITIONS

Construction Coordinator- A person specifically assigned to oversee the work of a fixed-price construction subcontract for conformance to the subcontract documents (see FESHM 7010).

Erosion - Soil erosion is the detachment and movement of soil particles by the forces of wind or water.

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General Erosion Control Standards (GECS) - A general, performance-based standard to be implemented as part of projects that do not require a Site Specific Erosion Control Plan (SSECP). (See Appendix 1)..

Managing Organization (MO) – The organization in which any action/project originates and through which it is funded. When funding or responsibility for a given action is shared, one of the organizations should assume the MO role by mutual agreement.

Notice of Intent (NOI) - Formal notification by the Laboratory (via DOE) to the State that we wish to be covered by the general permit rather than apply for an individual permit.

NPDES General Stormwater Permit - A permit written by the Illinois EPA that sets out general terms and conditions applicable to a wide class of construction activities in the state.

Sedimentation - Deposition of soil particles transported by water over a distance. Sedimentation results in numerous adverse impacts, including: decrease in stream profile, loss of flood storage capacity, additional oxygen demand, habitat destruction and direct suffocation of bottom-dwelling organisms.

Site-Specific Erosion Control Plan (SSECP) – A written, engineered plan for a specific project that specifies structures and/or practices to ensure that erosion impacts are strictly controlled. Controls specified in SSECPs shall be consistent with all requirements of the NPDES General Permit (see Appendix 2), and conform to "Illinois Urban Manual" standards.

Stormwater Pollution Prevention Plan (SWPPP) - A detailed plan that demonstrates how, for a specific construction site, erosion and sedimentation will be controlled. The SWPPP is maintained by Fermilab ES&H Section and must be available for inspection by the Illinois EPA or third parties from the community at any time upon request. Under the terms of this chapter, the SSECP is identical to the SWPPP except for the certifications necessary for the latter, and the accessibility of the SWPPP to the public.

Task Manager - A division/section designated individual specifically assigned to oversee and direct a work activity. Usually this term is applied to individuals directing the work of the blanket order Time and Material Subcontractors for specific trades, general construction or service work (see FESHM 7030).

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SPECIAL RESPONSIBILITIES

The ES&H Section shall determine whether the project requires coverage under the Illinois general permit, which would require an SWPPP, or an individual permit. ES&H will make the determination upon receipt of documentation for activities involving excavation (e.g., NEPA Project Information Form, Conceptual Design Review (CDR), or construction review package) from the MO. ES&H Section shall maintain all current SWPPPs on file.

The Managing Organization shall determine, after consultation with the ES&H Section as necessary, whether individual actions require an SSECP, or may be completed under the GECS. MO's have responsibility for ensuring that SSECPs are reviewed, revised and approved as necessary, so that plans are available sufficiently early to allow preparation of any required documentation for permit applications. SSECP's normally are not finalized until a project is close to the Notice to Proceed decision, but documentation must occasionally be prepared earlier in the planning phase to support application for other permits (e.g., wetland permits). MO's shall be responsible for developing this documentation in lieu of a completed SSECP where necessary to support such applications. They shall ensure that SWPPPs are appropriately signed, and that pertinent certification documentation is included. They shall be responsible for implementation of SSECPs and SWPPPs, although day-to-day implementation in the field will often be delegated to sub-contractors. MOs shall inform the ES&H Section of all modifications to SWPPPs.

The Business Services Section shall have responsibility for ensuring that all requirements of this chapter are accomplished prior to their issuing a Notice to Proceed (NTP).

The Construction Coordinator/Task Manager (CC/TM) shall oversee the construction, installation and maintenance of all control measures as required by his SWPPP, SSECP or the GECS. He/she shall ensure on a day-to-day basis that the plan is carried out and that required inspections are performed.

PROCEDURES

Procedures are outlined here and in flowchart form in Figure 1.

1. Once the project is proposed, the MO should subject the proposal to various reviews (e.g., NEPA, FESS design reviews, etc.). This review should include consideration of erosion control for the action (i.e., NPDES Stormwater permit, SSECP, GECS).

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2. The ES&H Section shall assemble necessary documentation to forward to the State of Illinois when NPDES permitting is required. This normally will consist of a Notice of Intent (NOI) to be covered under the general permit. Information necessary to complete the NOI will be obtained from the Managing Organization. [Note: Other permitting decisions and actions may be necessary at this point, e.g., wetland or air permits.]

3. An SSECP shall normally be required for any project for which the disturbed area is less than one acre, and for which the GECS is not appropriate. For projects not requiring an SSECP, the GECS (see Appendix 1) shall apply. An SSECP may be required for smaller projects if, in the professional judgment of the ES&H Section, GECS's are not sufficient to protect the environment. When making this judgment, the volume of excavated material, proximity to waterways, and slope of the affected areas shall be considered, along with any other information relevant to potential erosion impacts.

4. Preparation of the SSECP or SWPPP shall be the responsibility of the Managing Organization. While the Managing Organization bears the ultimate responsibility for erosion control planning, FESS Engineering should normally be consulted for technical advice. Notice to proceed shall not be given until an appropriate erosion protection plan is completed and approved by the Managing Organization and the ES&H Section.

5. After approval of an SSECP or SWPPP, it shall be forwarded to the ES&H Section for inclusion in any materials to be submitted in application for necessary permits. If an approved Plan is unavailable, sufficient information shall be developed to support permit applications. Appropriate notations to the excavation permit (FESHM 7030.06) and the pre-construction checklist (FESHM 7010, Form 19) shall be made by the construction coordinator.

6. If an NPDES permit is required, the MO shall be responsible for formatting and routing the SWPPP to the Director and to DOE for certification. Certification statements are found in the Illinois General Permit. Certification statements must also be signed by all sub-contractors for permitted projects.

7. Copies of SSECPs and SWPPPs shall be provided to the Task Manager or Construction Coordinator by the MO.

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Appendix 1

GENERAL EROSION CONTROL STANDARD FOR FERMILAB

The following sets out the General Erosion Control Standard (GECS) for Fermilab. This standard is intended to be applied to projects of less than one acre that are not judged to have potential for environmental damage sufficient to warrant the preparation of an SSECP. The complete set of GECS standards shall be applied as Best Management Practices, to all projects at Fermilab, as a minimum.

1. Appropriate controls (e.g., silt fencing, straw bales, etc.) will be used appropriately to prevent soil from being transported from the immediate area of excavation(s). In some cases, existing vegetation adjacent to the excavation may be sufficient to serve as a vegetative filter strip (VFS). Such applications must conform to the Fermilab standard for Vegetative Filter Strips (Appendix 3, this chapter).

2. Stabilization of disturbed areas shall be accomplished promptly after construction, by planting or other suitable means as the season dictates.

3. Short-term structural controls will be provided as needed to adequately control post-construction run-off. The controls shall be suitable for the season and conditions present.

4. Reports on construction progress shall contain information relevant to erosion protection and the efficacy of installed controls/measures.

5. In the event that this standard proves inadequate, the project manager, the Managing Organization, or the ES&H Section may, at any time, require that an SSECP be prepared to complete the project.

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Appendix 2

ELEMENTS OF AN SSECP

1. **Site description**
   - Construction activity
   - Construction sequence/schedule
   - Area of project footprint and area to be disturbed
   - Soil description and runoff coefficients before and after project
   - Site map, including:
     * Drainage patterns
     * Slopes (topographic map with at least two foot contours)
     * Areas of soil disturbance
     * Location and nature of major structural and non-structural controls
     * Expected stabilization areas
     * Surface waters, including wetlands (plus wetland acreage on the affected site)
     * Discharges to surface water

2. **Controls (all controls must follow guidelines in the "Urban Manual")**
   - Erosion and sediment controls
     * Stabilization practices (14/21 days)
     * Structural controls
   - Post-construction storm water management
   - Waste disposal

3. **Maintenance plan**

4. **Inspections**
   - Every seven (7) days or within 24 hr. of a half inch storm, whichever comes first.
   - Inspect: all disturbed areas, controls, vehicle entry and exit points.
   - Reports shall be signed and maintained as part of the SSECP (or SWPPP).

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Appendix 3

Use of Temporary Vegetative Filter Strips to Control Erosion and Sedimentation from Construction Sites at Fermilab

Vegetative filter strips, sometimes referred to as grass filter strips or grass buffer strips, are grassed areas at locations where runoff water flows overland. They can be effective erosion control structures to filter out the sediment, organic material, nutrients, and chemicals carried in runoff water. At Fermilab, this can be used as a best management practice on a temporary basis only, where the installation of more significant structures, such as silt fencing or check dams is impractical.

Vegetative filter strips capture sediment and organic material by decreasing the velocity of runoff water. As water is slowed, larger soil and organic particles rapidly settle out. Smaller clay particles need a longer flow distance to settle out in the filter. Therefore, a larger strip width is needed for removing finer soil particles. Filter strips work best when water flows at a shallow uniform depth across the filter. If water becomes concentrated into small channels, the effectiveness of the strip is drastically reduced. Filter strips also work best on relatively flat slopes.

Research in Indiana, Virginia, Maryland and Iowa has shown that for slopes ranging from 3 to 12 percent, filter strips can remove 56 to 97 percent of sediment, depending on filter strip width and the area draining to the filter strip. Removal rates are best with shallow, uniform flow across the filter and relatively small drainage areas. Actual field removal rates will depend on many factors and will likely be less than experimental rates.

In the field, filter strip effectiveness depend on:

1) soil characteristics;
2) land slope, shape and area of the field draining to the filter;
3) type and quality of vegetation;
4) width; and
5) maintenance.

Soil types at Fermilab are reasonably good for this method. Based on guidelines developed by the Natural Resources Conservation Service, the following width restrictions will be used:

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Field slope, %	*Minimum width, ft*
< 1	10
1-10	15
10-20	20
20-30	25

Adapted from Standards and Specifications No. 393, USDA_NRCS
Field Office Technical Guide, 1988.

At Fermilab, this method will be used only temporarily, and only where grassy vegetation is well developed in the area of the filter strip. Inspections and maintenance therefore become critical factors that determine the effectiveness of this method for erosion control.

Key maintenance requirements include:

1) frequent inspections, especially after intense rains or long runoff events and removal or regrading of accumulated sediment;

2) detection and repair of erosion channels;

3) detection and repair of bare spots

Any erosion channels must be filled and seeded as soon as they become evident. Any bare spots must immediately be repaired by overseeding or blanketing.

Reference:

1997 Nebraska Cooperative Extension Publication NF-352

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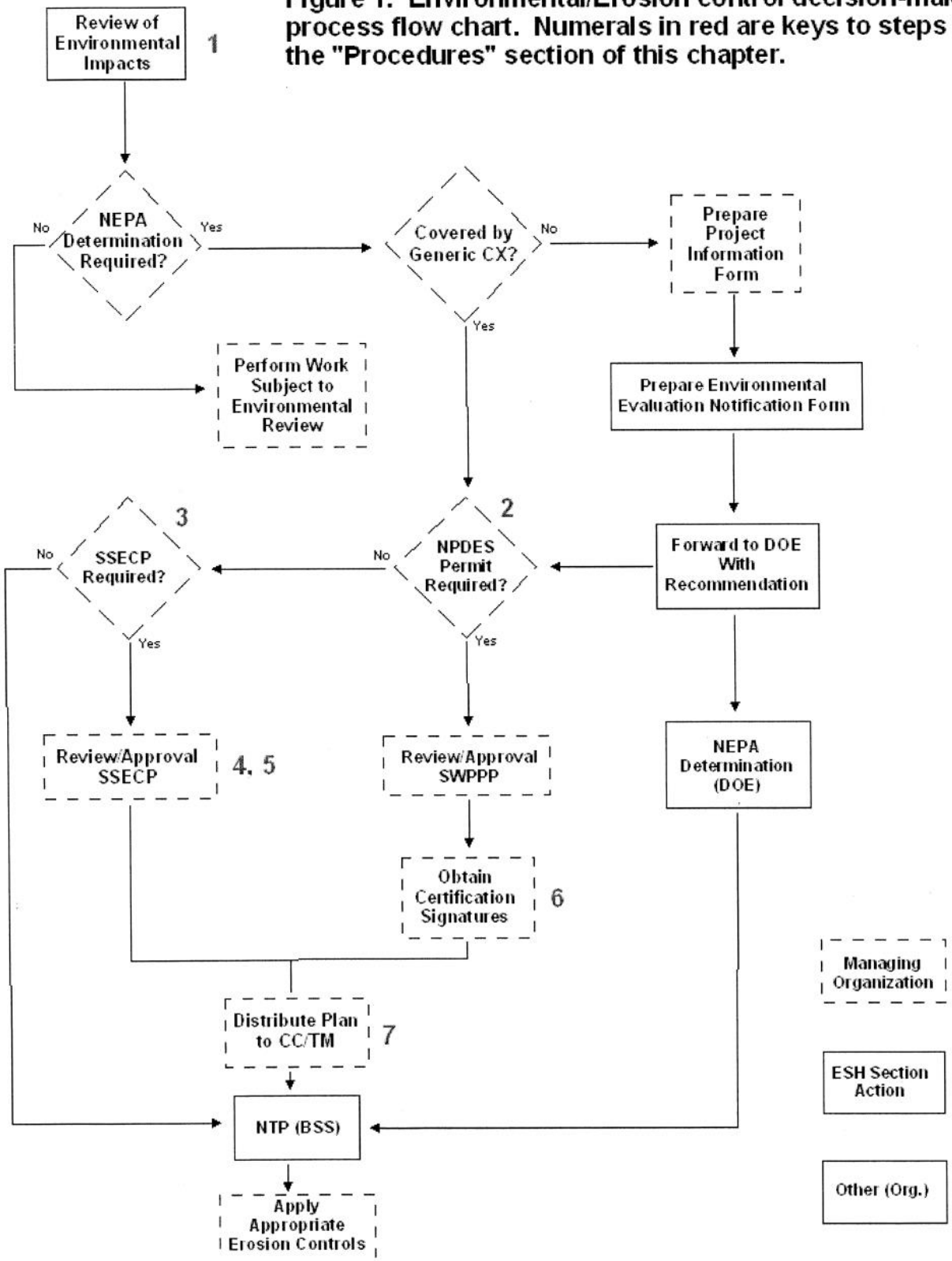
Figure 1: Environmental/Erosion control decision-making process flow chart. Numerals in red are keys to steps in the "Procedures" section of this chapter.



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