

Best in Class (BIC) Steep Slopes

Learn how ACP's Best-in-Class (BIC) Steep Slopes program goes above and beyond Federal and State regulatory standards to proactively address sediment and erosion control on steep slopes (greater than 30% and longer than 100 feet) and landslide hazards along the ACP right of way.

Best in Class Program

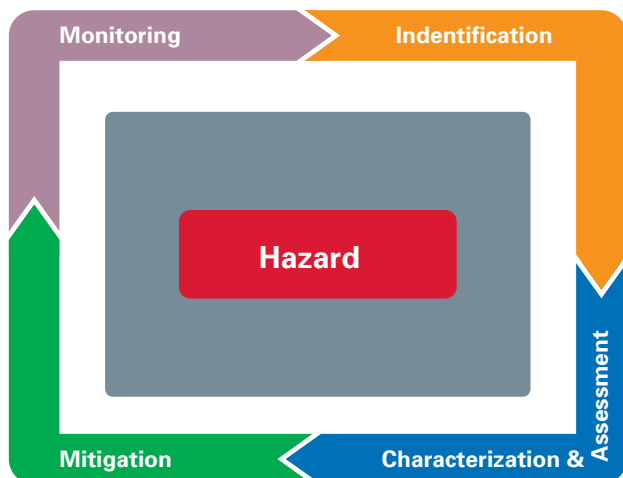
Above and Beyond Regulatory Standards

The ACP Best-in-Class (BIC) Steep Slopes program goes above and beyond Federal and State regulatory standards to proactively address sediment and erosion control on steep slopes (greater than 30% and longer than 100 feet) and landslide hazards. The first step is to identify and avoid steep slope hazards, to the greatest extent practical, during pipeline routing. However for those steep slopes/hazards which cannot be avoided Dominion developed the BIC Program which includes project specific engineering evaluations and recommendations to proactively provide an enhanced level of protection. Dominion has hired subject matter experts to provide input and review during the design, assessment and implementation of measures that go above and beyond regulatory.

How the Program Was Developed

The BIC program is organized around identifying, assessing, mitigating, and monitoring hazards that may threaten pipeline integrity, impact the right-of-way, or impact the environment. The conceptual process for this is shown in Figure 1.

Figure 1 – Hazards Management Process



Information for each identified hazard along the pipeline route alignment that was initially generated by targeted studies such as the "Geohazards Assessment" or supporting soil surveys, and/or from other targeted studies. These studies identify and assess the hazard, and provide a basis for selecting the most robust mitigation needed to minimize or eliminate the hazard, and then to monitor the hazard continually during operations. The process (Figure 1) for identifying, assessing, mitigating, and monitoring (i.e., management) of steep slope hazards and their effects on pipelines can be summarized in four general steps, briefly described as follows:

Hazard Identification, includes efforts to complete soil surveys, a geological hazards study, and other infield and desktop studies - Geologic hazards are systematically identified along the pipeline right-of-way. (e.g., steep slopes, landslides, erosion hazards, etc).

Hazard Characterization, Assessment, and Threat Classification - Hazards are characterized, assessed, and classified to better understand and define the nature of the hazards and their potential impacts on the pipeline.

Hazard Mitigation - Mitigation is evaluated and implemented for targeted hazards identified through the previous steps. Areas for mitigation are selected based upon potential risk to the pipeline, environment, and operation and maintenance.

Hazard Monitoring - Hazards are monitored to evaluate the performance of mitigation measures and to provide information to assess the need for additional mitigation measures.

Categories of Steep Slopes:

1. Steep slopes without evidence of movement
2. Steep slopes with evidence of movement
3. Steep slopes with sensitive resources at bottom of the slope (i.e. stream, wetland, road)
4. Steep slopes previously modified by cut/fill
5. Steep slopes anticipated to become unstable after construction
6. Steep slopes along/near narrow ridge tops

How the Program Will Be Implemented

The BIC program has determined control measures needed for each of the six categories above by first determining the applicable regulatory requirements, and sediment and erosion controls typically used and then adding the enhanced measures needed to achieve BIC objectives.

Special Design and Construction Mitigation Measures

- Targeted management and diversion of surface water around potential landslide sites, including the use of ditches, berms, slope breakers, and/or grading;
- Mitigation of surface erosion by armoring or otherwise stabilizing surface soils using riprap, coir cloth, hydro seeding, mulching, and/or tracking;
- Targeted management of water sources along the trench, including the use of trench breakers and/or added drainage piping in the trench;
- Targeted mitigation of seeps, springs, or other subsurface water encountered along the right-of-way using subsurface drains or other special drainage measures;
- Engineering of the backfill around or within steep slope areas to dry the backfill, add compaction, improve backfill soil strength, and reduce saturation;
- Installation of targeted structures to stabilize backfill using engineered fill, retaining walls, Sakrete placements, key trenches, and/or shear trenches; and,
- Reduction in surcharge on steep slope areas by reducing excess or saturated backfill.

The ACP construction contractor and Dominion will jointly determine on site which of the enhanced measures are needed to address each of the unique steep slope locations along the route to provide the additional enhanced measures needed to meet the BIC objectives. In addition, site-specific plans are being developed to meet the requests of regulatory and natural resource agencies and Dominion recommendations. It is estimated that site-specific plans will be developed for ~ 25 locations (range based on continued planning and engineering assessments).

Compliance: Finally, Dominion is building Erosion and Sediment Controls and Stormwater Pollution Prevention Plans for state land disturbance permits that incorporate these enhancements. Land disturbance permit applications will be submitted to the regulatory agencies in the three states, however, only VA and WV have steep slopes. Incorporating the enhancements from the BIC program into land disturbance permit applications will make these measures enforceable by the states and FERC.



Steep Slope Restoration

Inspections: The land disturbance permit applications typically require the applicant to perform weekly inspections until the right of way has achieved 80% uniform re-vegetation and the permit is terminated. In addition, inspections are required within 24-hours of specific rain event as defined in the permits and a continuous inspector presence for water body crossings. Issues identified during inspections are reported to state environmental agencies and FERC, and a mitigation plan is developed and implemented in coordination with FERC and the state. FERC also requires inspections and requires the hiring of third party inspectors who report to FERC.