Installation and commissioning of Patuxent River Crossing (HDD, 1.4km) Project in US

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ABSTRACT

Southern Maryland Electric Cooperative (SMECO) planed and designed the Holland Cliff to Hewitt Road 230 kV transmission line project which is part of SMECO's overall Southern Maryland Reliability Project (SMRP). The SMRP includes a segment of underground transmission line crossing the Patuxent River using 230 kV high voltage solid dielectric (XLPE) cables. This river crossing was done by using HDD method and this is one of the longest HDD crossings in the US. This paper presents methods of installation and techniques to enhance the system integrity.

KEYWORDS

HV cable installation, HDD, River crossing, Cable pulling

INTRODUCTION

Underground cables are installed in many areas and sometimes crossing of river, lake or sea are required. In this case the section length is much longer than usual but the long length of cable gives us some challenges that this paper will introduce.

High cable pulling tension should be checked to know whether the maximum allowable pulling tension is acceptable or not.

Racking system to prevent the cables from moving is also one of the points to be checked.

Moreover system engineering part should check the limitation of induced voltage by using special bonding method.

These kind of check points that we've done during the project are presented in this paper.

PROJECT OVERVIEW

As a part of Southern Maryland Reliability Project(SMRP), 4600ft(=1.4km) the HDD Patuxent river crossing was required. When it was discussed by the customer as a feasibility study stage, submarine cable installation was one of the possible solutions. However this area is turbulent, with high tidal current. Furthermore, as there are natural oyster bars located on both shorelines, a permit for the installation of a submarine cable would not have been accepted easily. Therefore HDD was the only installation method possible by using underground cables.

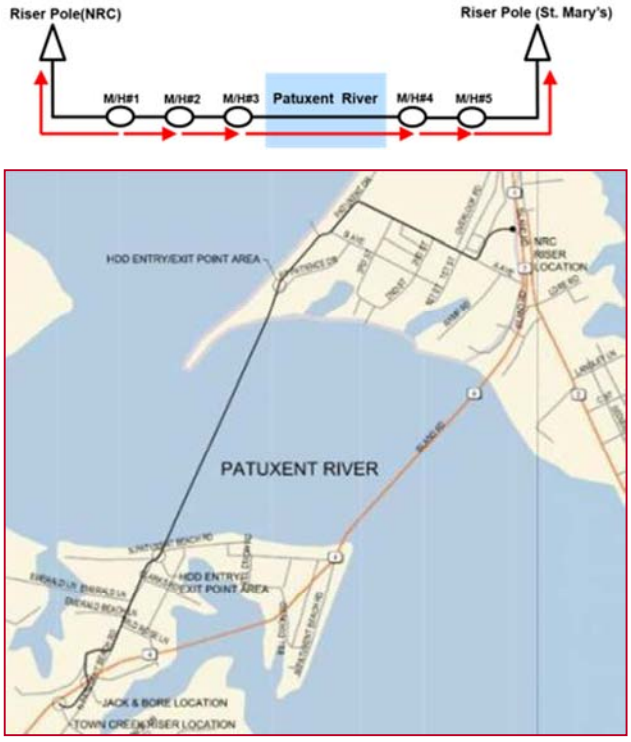

Fig. 1: Diagram and route of the project

The route consists of 6 sections in total including 5 joint manholes and 1 long section of the Patuxent river crossing. Except for the HDD river crossing, the 5 sections are installed in a concrete duct bank and these are considered as normal installation.

Installed cable is a 230kV 1600sqmm Cu-XLPE-Lead-PE cable. As there is a possibility of water immersion, a lead sheathed cable was adopted to prevent water tree of XLPE insulation even though it is heavier than other sheath type of cable. The cable weight is 38.5kg/m, total 54 ton for a 1.4km length.

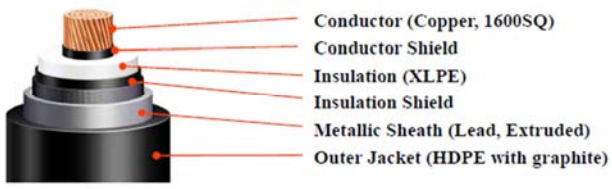

Fig. 2: Cable cut sheet