B.4.1.

Effects of sea salt sediment on 110 kV cable stations on the Croatian Adriatic coast

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Some regions on the Croatian coast are exposed to harsh weather conditions, in winter particularly, with stormy north winds called "bura". This kind of wind is a cause for the salt haze / sea salt sediment created by the presence of finely divided particles of sea salt in the air. Since the salinity of the Adriatic Sea is rather high, from 35 to 38‰ the salt concentration in the haze is very high. As the water evaporates the salt crystals are carried in the air by the wind. The crystals and the drops with concentrated salt solution fall on the ground, trees, buildings and people. In the Croatian language this phenomenon is called "posolica" (salt haze, sea salt sediments) for which we could not find an adequate expression in English. Perhaps the nearest expression would be the sea salt sediments, which is used in this paper.

This paper discusses the problems of the sea salt sediment on electric power facilities, the cable stations particularly on those situated close to the sea and as such exposed most to its action.

The sea salt solution on the electric power facilities, that is the sodium chloride, is a cause for partial discharges and even flashovers. The Figures 1 and 2 illustrate vividly the effect of the sea salt sediment in 110/35 kV Pag Substation showing very strong partial discharges.

Fig. 1. Discharges on surge arrestor

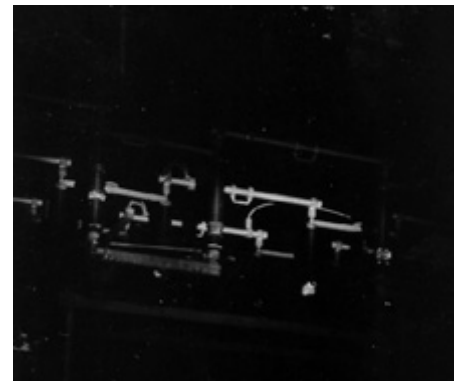

Fig. 2. Discharges on busbars in Pag SS

The consequences of these partial discharges i.e. the flashovers are severe losses in the electric power system. The sea salt sediment is a reason for corrosion of metal components. Since we cannot change the climate, the struggle against the sea salt sediment is reduced to lessening its destructive action on the electric power facilities.

The basis of the struggle against destructive effects of the sea salt sediment is to find the most convenient and suitable locations for the electric power facilities. When the cable stations are concerned, the selection of a cove/bay protected from north wind action is an

important aspect. In addition, the enclosed plants are recommended to have a longer creepage path. Special attention should be given to the bushing insulators.

When older design power facilities are in question, where the need to lessen the destructive effects of the sea salt sediment was realized subsequently, a net structure placed in front of the cable station in the direction of wind blowing as illustrated on Fig. 3 proved to be the most suitable solution.

Fig. 3. Travna Cable Station – A net structure for protection from the sea salt sediment

The paper discusses the appearance of damages on electric power facilities in connection with relative humidity, wind force and temperature, reviews some experiences of HEP Prijenos d.o.o., Transmission Area of Split in its struggle with the sea salt sediments on unequal terms.