



DIRECTION DES REACTEURS NUCLEAIRES

DEPARTEMENT DE THERMOHYDRAULIQUE ET DE PHYSIQUE

SERVICE DE THERMOHYDRAULIQUE POUR LES APPLICATIONS INDUSTRIELLES

LABORATOIRE D'APPLICATIONS SPECIALES DE LA PHYSIQUE



CEA : Atomic Commission Energy

DRN : Nuclear Reactor Headquarters

DTP : Department of Thermohydraulics and Physics

STI : Thermohydraulics for Industrial Applications division

LASP : Special Applied Physics Laboratory

IN SITU TESTING OF THE PREVECTRON EARLY
STREAMER EMISSION LIGHTNING CONDUCTOR

(E.S.E.L.C) MANUFACTURED BY *INDELEC*

1994 TRIGGERED LIGHTNING CAMPAIGN

Camp Blanding, Florida, USA

J.P. BERLANDIS, A.EYBERT-BERARD.

DTP/STI/LASP/94-25 /JPB/AEB

November 1994

COMMISSARIAT A L'ENERGIE ATOMIQUE - GRENOBLE
17, Rue des Martyrs - 38054 GRENOBLE CEDEX 9 - FRANCE

DRN

DTP

STI

LASP

IDENTIFICATION

STI/LASP/94-25/JPB/AEB

DATE

November 1994

TITLE

IN SITU TESTING OF THE PREVECTRON EARLY STREAMER EMISSION LIGHTNING CONDUCTORS (E.S.E.L.C.) MANUFACTURED BY INDELEC.
1994 TRIGGERED LIGHTNING CAMPAIGN. Camp Blanding, Florida, USA.

AUTHORS :

J.P. BERLANDIS, A.EYBERT-BERARD

ABSTRACT :

For the second year running, INDELEC - one of the foremost companies in Europe for lightning protection - asked that the S.A.P.L. should be the ones to carry out the in situ testing of their Early Streamer Emission Lightning Conductors (ESELCS). The testing was carried out in Florida, USA, in the course of an experimental triggered lightning campaign. The findings of this document relate specifically to INDELEC.

In light of the findings of the 1993 campaign, it was decided to hook up two rather than four prototypes. The first one, an ESELCS-type (except that it was electrically passive), was set up to ensure correct operational functionality. The second, an active ESELCS, was set up as per real-life specification. The two conductors were hooked up to control equipment so as to measure the leader current.

Despite the survey's being conducted over a short period of time (1 month) and exceptionally poor prevalent storm conditions, we were nevertheless able to register three strikes, each of which gave valuable and complementary information.

With the first strike, it was shown that the ESELCS, known as the PREVECTRON, produced streamers at the correct moment, i.e. on the approach of the step leaders - the tell-tale sign of an imminent lightning discharge. This information proves that the PREVECTRON works as it was designed to.

With the second strike we sought to show the values of the electric field required to activate the ESELCS. This is an important detail with respect to the laboratory tests.

The third strike gave us information relative to the operating radius of a lightning conductor in general.

Having completed the survey, we believe that very considerable progress has been achieved towards the understanding of the operational pattern of a PREVECTRON lightning conductor.

The most significant results, as well as an analysis of the three major strikes, are presented in this report.

| | |
|-------------------|---|
| KEY WORDS | Lightning , strike, lightning conductor, discharge, leader, streamer, early streamer emission |
| N° F.A/N° CONTRAT | GR 766-166 |

Use of any material contained within this report outside of the CEA is restricted in accordance with the terms specified in the contract referred to above.

| | NOM | VISA | Nbre PAGES | CLASSIFICATION | | | | | |
|--------------|------------------------------------|------------|------------|----------------|---|---|---|----|---|
| REDACTION | JP. BERLANDIS, A. EYBERT-BERARD | JPB AEB | 33 | Lib | C | C | C | SD | D |
| VERIFICATION | T. ALLEAU | TA | | X | | | | | |