

## ATTACK OPERATION

Because the collection target of HAIEnd is limited to the DCS of the boiler control system, the attack scenario also was implemented targeting the boiler control system.

The 52 attacks were conducted, including 42 attack primitives and 10 combinations of attacks designed to simultaneously perform two attack primitives. The attack scenarios are given below.

Attack

No

ID

Duration

Start Time

Scenario

Target Controller

Target Point(s)

(sec)

1

A101

AP01

P1-PC-SP1

P1 B2016

16:25

237

2

A102

AP02

P1-PC-SP1PV1

P1\_B2016, P1\_PIT01

17:35

198

3

A103

AP04

P1-PC-CO1

P1\_PCV01D

18:32

156

4

A104

AP05

P1-PC-CO1PV1

P1\_PCV01D, P1\_PIT01

Aug.

19:21

164

12,

5

A105

AP07

P1-PC-CO1-ST

P1\_PCV01D

2022

20:43

161

6

A106

AP03

P1-PC-SP1PV1PV2

P1\_B2016, P1\_PIT01

21:36

197

7

A107

AP40

P1-PC-SP1-LT

P1\_B2016

22:47

604

8

A108

AP08

P1-FC-SP1

P1\_B3005

23:35

96

9

A109

AP09

P1-FC-SP1PV1

P1\_B3005,P1\_FT03

0:25

130

10

A110

AP11

P1-FC-CO1

P1\_FCV03D

1:34

55

11

A111

AP12

P1-FC-CO1PV1

P1\_FCV03D, P1\_FT03

Aug.

2:21

131

13,

12

A112

AP13

P1-FC-CO1-ST

P1 FCV03D

2022

3:26

78

13

A113

AP10

P1-FC-SP1PV1PV2

P1\_B3005, P1\_FT03, P1\_LIT01

4:43

133

14

A114

AP41

P1-FC-SP1-LT

P1\_B3005

5:40

627

15

A201

AP14

P1-LC-SP1

P1 B3004

1:27

132

16

A202

AP15

P1-LC-SP1PV1

P1\_B3004, P1\_LIT01

3:37

131

17

A203

AP16

P1-LC-CO1

P1\_LCV01D

4:21

68

18

A204

AP17

P1-LC-CO1PV1

P1\_LCV01D, P1\_LITO1

5:46

122

19

A205

AP18

P1-LC-CO1-ST

P1 LCV01D

6:21

85

20

A206

AP03

P1-PC-SP1PV1PV2

P1\_B2016,P1\_PIT01,P1\_FIT

8:36

196

21

A207

AP43

P1-LC-CO1-LT

P1\_LCV01D

9:42

614

22

A208

AP42

P1-LC-CO1PV1PV2

P1\_LCV01D,P1\_LIT01,P1\_FIT

Aug.

10:36

133

17,

23

A209

AP23

P1-CC-CO1

P1 PP04

2022

11:35

85

24

A210

AP23

P1-CC-CO1

P1\_PP04

12:25

88

25

A211

AP46

P1-CC-CO1PV1

P1\_PP04, P1\_TIT03

13:47

204

26

A212

AP24

P1-CC-CO1-ST

P1\_PP04

14:25

127

27

A213

AP25



P1-CC-SP1-LT

P1\_PP04\_SP

15:13

539

28

A214

AP19

P1-TC-CO1

P1\_FCV01D

17:34

61

29

A215

AP20

P1-TC-CO1PV1

P1\_FCV01D, P1\_TIT01

18:16

147

30

A216

AP21

P1-TC-CO1-ST

P1\_FCV01D

19:40

95

31