OSF TEST PROCEDURES

Programming and Timing

1. TEST UNIT

1.1 If power is switched on, neither test neither PS mode shall be on. Test mode is selected by pushbutton "test". As long as test mode is on, PS mode is excluded even if selected. To change to PS mode, switch the pushbutton "test" off and "PS" on. PS mode goes on by the PS signal MW. To revert to test mode, switch "PS" off and "test" on.

1.2 Switch on pushbutton "lamps off": all lamp signals of the program sequencer go off. Press upon pushbutton "lamp test"; all lamps go on if "lamps off" is off.

1.3 Switch test cycle to 0.5 - 1 - 2 - 3,3 sec repetition time. Measure the repetition time between two consecuting pulses MW or MO. The time interval between two consecuting pulses MW and MO is 30 ms. 3 ms after MO the M-train starts and lasts until MW containing 140-290-590-990 pulses. All M-pulses have an amplitude of + 20 v if loaded by 50 Ohms and a pulse width of 1 µs. The repetition frequency of the M-Train is 300 Hz.

1.4 The outputs RF and RF/20 produce a pulse train of 10 MHz - 3 v - 50 ns for RF and a synchronous train of 0,5 MHz - 3v - 150 ns. for RF/20.

1.5 If the PS signals M-train, RF or RF/20 are not available to the test unit, the warning lamps M-train/PS off, RF/PS off or RF/20 PS off are switched on, provided the RF signal is sampled by Preset M.

2. PROGRAM UNIT

2.1 Select the number of test cycles by the digital switches. Switch test unit to test mode. The sequence starts by the first plug-in unit. Check by the Nixie display, if all counters count and reset correctly. If the overflow is broken or a double sequence exists, the sequence is reset and started by the first plug-in unit.

2.2 Select area programs by green lamps programmed. Drawing out a lamp it goes on, pushing back it goes off. For a programmed area the receipt lamp "operates" flashes, if the front gap is triggered by the kick and bunch selector.

2.3 Check if program units are bypassed when the digital switches indicate oo number of test cycles.

2.4 If the sequence and program generator of the MCR are connected to the program sequencer, switch to PS mode. The Nixie tubes repeat the two sequence generators. The lamps "programmed" repeat 5 controlled programs of the program generator. Any area can be switched on/off locally.

3. M- EJECTION

Check the coarse timing of ejection by the flashlight, data output and oscilloscope.

4. FIRST BUNCH

Check the fine timing of the front gap by the flashlight and data output. Measure the time interval between the preset pulses of M-ejection and first bunch. The RF- master is gated by the program sequencer.

5. EJECTED BUNCHES

Check the timing of the clipping gap by the flashlight and data output. Measure the time interval between front and clipping gap trigger pulse.

6. BUNCH/ENERGY INDICATION

6.1 Test the lamps of the kick and bunch selector by pushbutton "lamp test. Compare the bunch indication with the digital switches of the plug-ins "first bunch" and "ejected bunches".

6.2 If the B-train up/down is available, check energy calculation : 80 MeV/M-pulse of M-ejection.

7. HIGH VOLTAGE / FIELD INVERTER CONTROL

7.1 Compare the preselected high voltage with the measured value indicated by the Nixies.

7.2 Check the field inverter and kicker magnet units control by by the lampswitches.

7.3 Check the timing of the tail gap by an oscilloscope and compare it with the clipping gap pulse.

8. DELAY LINES

8.1 Adjust the phase of the RF signal for each kick and bunch selector.

8.2 Adjust the propagation delay of the front and clipping gap avalanche trigger pass.

8.3 Adjust the propagation differences of trigger split, Marx triggers and gaps.

9. PRE/POST PULSES

Check the timing with respect to the master units by means of flashlights, data outputs and an oscilloscope. The units are free running or programmed corresponding to the internal mode switch.

June 4, 1968
HD/ch

TEST AND CHECKING OUT OF INTERLOCKS + CONTROLS

The well functioning of the system in itself will not be discussed. because this will fall under the direct responsibility of Dijkhuizen/ Downton. Following then the "Planning OSF/I Tests".

a) Field inverters :

1) check connections to 3 airvalves (2 h.)
2) simulation in 1 zone and tests of the 3 possibilities

By pass, Kick in, Kick out } each for 1 hour 5 pulses/sec.

and registrate number of faults. A standard double pulse generator can be used. ~ 8 hours time needed depending on performance.

a,b) Field inverter and K.M.'s units connected and preselected from Kick and Bunch selectors : checking connections and ~ 8 hours needed.
By using a standard double pulse generator :
Checking 3 zones step by step for all 6 possibilities

By pass
Kick in
Kick out — 18 x 1/2 hour ~ 9 hours
KM I in
KM II in
KM I + KM II in

Total time needed ~ 24 hours

c) General interlocks : Total number at the moment about 10
check connection and assume functioning.

Total time needed ~ 8 hours

d) Zone interlocks is a system test in itself.

e) Trigger split :

1) connect timing pulse Frontgap
Switch over and over K.M. 1, K.M.2, in and out
Check if the right Marx trigger and Sparkgap are triggered.
Repeat the same for Tail and Clipping gap ~ 4 hours

2) Check if the trigger split introduces jitter ~ 4 hours

Total time needed ~ 8 hours.

f 1) H.V. interconnections :

a) Check and debug on/off remote control H.V. supply ~ 4 hours.

b) Check and debug go/no go. D.A. converter H.V. supply by switching the 3 zones on and off in the Interlocks system ~ 4 hours.

c) Calibration and adjustment of voltage divide signal in steps of 10 KV of the H.V. supply, so that the interlocksystem receives 200 m V/10 KV. ~ 4 hours.

d) Check synchronism of the 2 D/A converters in 3 zones that means about 300 measurments. ~ 8 hours.

e) With help of a double pulse generator check in each zone and take pictures of the H.V. references and the pressure reference in step of 10 KV from 20 to 60 kV ~ 4 hours.

Total time needed ~ 24 hours.

f 2) Pressure regulation :

1) Set all H.V. selectors to "oo" and set pressure low and high to zero.

2) Adjust 2 pressure pick ups sparkgap output signal to zero. (pressure detectors in open air).

3) Mount them in the sparkgaps and put some pressure in the gaps and adjust amplifiers to maximum sensibility.

4) Adjust the pressure regulation so that the desired treshold pressure is obtained (value to be taken out of Caris/Williams meas and balance the 2 servoregulators.

5) Set the H.V. selectors now to 50 KV, adjust the amplification of the pressureregulation so that the manometer reading indicates the desired pressure (to be taken out of Caris/Williams).

6) Adjust the pressure signal amplifiers in the pressure regulation to an output voltage of 1 volt.

7) Adjust the Digital pressure read-outs also to the manometer-reading.

8) If the absolute pressure unit is available, an intermediate adjustment will be made between point 2 and 3.

9) After this, the pressure detection system can be made operational and a series of tests has to be done.

Total time needed ~ 32 hours.

Remark : a) The real timing pulses can be connected at all times under the condition that they are continuously available.
b) The pulse balance adjustment is a monitoring adjustment and needs from the side of Interlocksystem a few hours.

PS/FES/TN-16

June 7, 1968
HB/ch

TEST PROCEDURE MARX-TRIGGERS

1. Static tests

1.1 Check connections

1.2 Check and setting of statical breakdown voltage for the sparkgaps to the same value (~ 9 kV)

1.3 Check time of time delay relays

1.4 Check temp. rise after one hour of the components

2. Dynamic tests : a) input pulse 2 V from pulse generator
b) input pulse 60 V from aval. circuit

2.1 Check output pulse avalanche circuit

2.2 Check output pulse amplifier without and with thyratron mounted.

2.3 Check output pulse thyratron without and with trigger mechanism.

2.4 Check output pulse Marx-trigger into 50 Ω load for both polarities and measure voltage - jitter, delay curves.

3. Life tests : on two reserve units A and B

3.1 Life test into 50 Ω load, check of voltage - jitter, delay, curves every 10^6 shots (A).

3.2 Life test with short circuited output cable (50 Ω) of 10 m (B).

H. van Breugel

4 juin 1968
JL/ch

PREMIERS TESTS D'UTILISATION DU FAST MONITORING

1. Intégration des signaux des pick ups

1-1) Tous les signaux provenant de l'appareillage K.M. sous forme différentiée pourront être individuellement intégrés.

1-2) L'ajustement des signaux intégrés à des niveaux égaux se fera d'une part en utilisant des pairs d'intégrateurs identiques pour les signaux provenant d'un même point dans les 2 canaux, d'autre part en insérant des atténuateurs fixes.

1-3) S'il existe des différences de retard entre les signaux provenant d'un même point de mesure pris dans les 2 canaux, on pourra procéder à l'ajustement avec des longueurs de câbles. Les contrôles pourront se faire avec précision avec le "Time domaine reflectometer".

2. Sélecteur coaxial

Le sélecteur coaxial pourra être testé avec un clavier à poussoir provisoire installé dans la grande cage de Faraday.

3. Pulse Balance

3-1) L'appareillage pulse balance pour les 2 1/2 Kicker pourra être testé (observation des signaux sur l'oscilloscope 454 installé dans la grande cage Faraday).

3-2) L'appareillage simulant le pulse de référence viendra ensuite.

3-3) Le signal déclenchant les alarmes pourra être essayé à des différents niveaux de sensibilité.

4. Triggering

Au début on pourra utiliser le "Main sweep delayed" du Tektronix 454. Viendra ensuite les circuits "RF Post Pulse unit" (Bossart) associé à la commande à distance par boutons poussoir "Matrices de diodes" + reed relays.

5. Blindage de la cage Faraday

L'appareillage de mesure fast monitoring sera provisoirement monté dans le prototype de cage Faraday déjà utilisé avec succès dans l'anneau. Environ 1 mois après la cage définitive pourra être testée.

6. Lignes à retard

Les lignes à retard prévues avec ou sans commande à distance seront disponibles et pourront être testées début juillet.

Conclusion : L'essentiel de l'appareillage sera donc disponible pour les premiers essais.

J. Leroux

PS/FES/TN-16 - DRAFT

June 5, 1968
EW/ch

OSF TEST PROCEDURES

Stage 1 in the setting up and alignment of the spark gaps of the H.V. generator of operation straight flush.

Pressure tests - responsibility of security group.

Main spark gap - Control of distance settings, adaption of spark gaps to resistor dividers.

The policy is to prepare the resistor dividers beforehand so as to arrive at a division of one half. To measure the distance between H.V. and output electrodes (using tool developed by Mr. King), and to set the central electrode to central position.

Main spark gap - Control of static breakdown, and of dynamic characteristics

With the spark gaps connected to the resistor dividers, a measure of the static characteristics will provide a control on the procedure for setting the position of central electrode, and also a control on the form of the breakdown low. Control on the characteristics of rise time, time jitter and delay as a function of charging voltage.

Short circuit spark gap. Setting up and control of fall time, time jitter and delay.

To find working configuration from measurements of induced breakdown. At the chosen conditions to control fall time, time jitter and delay.

L. Caris E.M. Williams

OSF/1 Programme pour les essais des lignes HT et la formation du K.M.

1ère Phase (K.M. By-passée)

1) Test de la ligne I à la HT static jusqu'à 80 KV avec alimentation S
2) Test de la ligne II dans les mêmes conditions
3) Test des :
   - A) Spark gap I (Marx Trigger? ou Thyratron)
   - B) Tail gap I (Thyratron ou Kamber Trigger)
   - C) Clipping gap I (Goñi Trigger)

4) Test des :

A) Spark gap II (Marx Trigger? ou Thyratron)
B) Tail gap II (Thyratron ou Kamber trigger)
C) Clipping gap II (Goñi Trigger)

Pour A) contrôle du temps de montée, delay et jitter

B) C) contrôle du temps de descente et du jitter, la mesure du delay sera faite au moment de la mise en service des Marx trigger.

5) Essai de la ligne I et II

6) Formation du K.M. mesuration et ajustement du delay, jitter et du temps de transfert

2ème Phase

Mise en service de l'alimentation H.T. Früngel. Mise en service de tous les Marx Trigger. Ajustements finals des delay, jitter etc., montage des lignes.

Formation du K.M.

B. Nicolai.