


DEPARTMENT OF TRANSPORT AND POWER
METEOROLOGICAL SERVICE

INSTRUCTION ON THE
ROUTINE CARE AND MAINTENANCE
OF SEISMOLOGICAL EQUIPMENT

JANUARY 1963



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VALENTIA OBSERVATORY STAFF INSTRUCTIONS

ROUTINE MAINTENANCE OF SEISMOGRAPH EQUIPMENT

1. CHANGING RECORDS

1.1 The records shall be changed daily at the time indicated on the S.M.A. duty schedules.

The step by step procedure for changing the records is as follows :

1.1.1 Collect record carrying case and proceed to the Seismological Vault.

1.1.2 Check from indicators on control panel that the system is operating on Primary. If it has been operating on Secondary, reset to Primary by pressing the appropriate button and make appropriate entry in the chart change log. Also, advise the O/C or his deputy immediately.

1.1.3 Set calibration selection switches to "+" and "L.P.". Press calibration switch down and release. The relay will hold the pulse for approximately $4\frac{1}{2}$ minutes. Read and record the calibration current, having tapped the meter gently to overcome tendency to stick.

1.1.4 While the L.P. pulse is being held by the relay, determine the clock correction as follows:

Switch on radio : Tune to Rugby (10 Mes or 5 Mes) : Note clock error on Stroboscope and direction of error (+ or -). Each division on the dial equals 10 milliseconds. Adjust the error to zero by rotating the knob on the bottom right hand corner of Stroboscope panel. When it is necessary to adjust the clock rate, this is done by releasing the lock on the frequency standard panel and adjusting by means of the knob on this panel. When completed, relock .

1.1.5 When the L.P. pulse has been released, adjust selector switch to S.P.. Raise switch and hold for 10 secs - release - wait 10 secs - raise switch and hold for 10 secs - release.

1.1.6 Note time. Proceed to recorder room. Switch on safelight.

Do not switch off recorder lamps. Cover the cylindrical lenses with the paper provided . Remove records from drums and place in carrying case.

1.1.7 Change Hygrogram and Thermogram.

1.1.8 If necessary, adjust the images from the galvanometers to central positions on the cylindrical lenses, by rotating very gently the milled torsion head at the top of each galvanometer. As the natural period of the L.P. galvanometers is approximately 100 secs., time must be allowed for the galvanometer to settle after each adjustment.

1.1.9 Remove six charts from the box. Locate emulsion side by taste. Place charts on drums with the overlap away from the galvanometers. The end of the overlap should just project under the bar, the stepped side of which should be away from the drum.

1.1.10 With black soft pencil enter "date on" beside the identification stamp on each record. For this purpose the day will be sufficient, as month will be obvious, e.g., 15th November, enter just "15th".

- 1.1.11 Release drum for lateral movement by raising spring dip.
(on left hand side for S.P. and right hand side for L.P., as one stands behind drum facing the galvanometer). Adjust drum laterally until the light spot is about one inch from right hand edge of chart (standing behind drum facing galvanometers). Release the clip and rotate the drum until the bar is just below the cylindrical lens.
- 1.1.12 Check that all drum motors are turning and that all recorder lights are operating.
- 1.1.13 Remove the paper, covering the lenses. Note the time and switch off safelights.
- 1.1.14 Repeat operation under 1.1.5 above.
- 1.1.15 Repeat operation under 1.1.3 above.
- 1.1.16 When the L.P. pulse relay releases, turn both switches to the "OFF" position.

2. CHANGING OF MAGNIFICATION

- 2.1 The magnification should be changed from time to time, depending on the degree of background noise resulting from state of sea, wind strength etc.
- 2.2 The magnification is adjusted in steps, which are multiples of two, by adjusting the D.B. attenuator on the control box up or down one 6 d.b. step. (DO NOT adjust the "mag. trim")
- 2.3 When the magnification is altered, the calibration current must also be adjusted accordingly.

The normal magnifications used at Valentia are 750 for the L.P. and 12,500 for the S.P.

The calibration currents corresponding to these magnifications and also those corresponding to the magnifications one step on either side of the normal are as follows :

<u>L. P.</u>		<u>S. P.</u>	
<u>Mag.</u>	<u>Cal. Current</u>	<u>Mag.</u>	<u>Cal. Current</u>
1500	0.08 ma	25000	6.4 ma
<u>750</u>	<u>0.16 ma</u>	<u>12500</u>	<u>12.8 ma</u>
375	0.32 ma	6250	20.0 ma

Calibration Current = Meter Reading X Appropriate Factor as given on the back of the console.

- 2.4 Any alteration in magnification with the appropriate calibration current should be noted in the log book.
The alteration should also be noted on the face of the first record affected by the change.
- 2.5 Changes in magnification shall be made only at time of changing records

3. WRITING UP THE SEISMOGRAMS

- 3.1 Records shall be developed and written up on the day on which they are removed from the drums.
- 3.2 A soft black pencil shall be used for writing up the records.

- 3.3 In addition to the standard entries (see 3.5 below) any necessary comments (adjustments and changes of magnification etc.) shall be entered in telegraphese on the face of the record.
- 3.4 Headings shall be stamped on the same end of the record as the identification mark. This end will be clear if the record has been lapped correctly on the drum.
- 3.5 The routine data to be entered are as follows :

Station : Val.

Date : Date ON (Month-Date-Year, e.g., 5th Aug. '62 will be VIII, 5, 62., the month being entered in Roman numerals)

Grd Mot : E, N, or Up depending on component.

ON : G.M.T. of 1st minute time mark on chart.

OFF : G.M.T. of last minute time mark on chart.

G.C.T
Corr. : Correction in milliseconds (+ or -) at time OFF of chart.
N.B. + on Stroboscope indicates that clock was fast, and the correction will therefore be Negative and Vice Versa.

Cal. Curr: Current as read on the millimeter (when pulse is applied) multiplied by the appropriate factor given on the back of the console . The factor will remain constant unless the magnification is changed.

Mot. Const. : L.P. Z : 0.1007
L.PNS : 0.0832
L. PEW : 0.0884
All S.P.: 2.0

Mag. : L.P. 750 ; S.P. 12500 .
These normal values may be changed from time to time (see para. 2 above).

To : L.P. 30 secs ; S.P. 1 Sec .

T.G. : LPZ 100 secs ; LPNS 99.5 secs ; LPEW 100 secs.
All S.P. 0.77 secs.

4. WEEKLY MAINTENANCE

4.1 Open inspection windows in styrofoam covers and check that L.P. masses are centred. If adjustments are necessary, switch the appropriate galvanometer control box to "short" and proceed as follows :

4.1.1 Horizontal Seismometer:

Adjust the levelling screw at end (towards which mass has moved) of side parallel to mass movement.

4.1.2 Vertical Seismometer

- (a) Remove inspection covers from side and back of instrument.
- (b) Unscrew cap at back of instrument.
- (c) Withdraw the bar under the cap until the prong projecting at right angles to the bar can be seen through the side window.

- (d) Rotate the bar until the prong is in a position to move the sliding weight on the arm which supports the mass.
- (e) If the mass is too high move the weight gently forward and vice versa.
- (f) When the mass has been centered rotate the bar to bring the prong to upright position.
- (g) Slide the bar forward; replace the screw cap and replace the inspection windows.

N.B. All the above adjustments must be made extremely gently as any accidental sudden displacement of the masses could damage the hinges supporting the masses and such damage would necessitate a major difficult overhaul.

4.2 If any adjustment to the position of the masses has been made the free period of the seismometer must be checked. For the adjustment of the seismometer free period see "Monthly Maintenance" para. 5 below.

5. MONTHLY MAINTENANCE

5.1 Check that all L.P. masses are centered. See para. 4 above.

5.2. Long Period - Vertical.

5.2.1 Check the free period as follows:

5.2.1.1 Put Galvanometer Function switch on control box to "short".

5.2.1.2 Disconnect the input from the seismometer to galvanometer control box.

5.2.1.3 Gently use the prong on the mass adjustor (see para. 4.1.2 above) to vibrate the mass supporting arm. This vibration should be very gentle to avoid the possibility of the seismometer mass hitting the end stop.

5.2.1.4 Time two or three periods with the stopwatch. The period should be between 31 and 32 seconds.

5.2.1.5 If the period is within the limits rotate the bar to bring prong upwards, slide the bar forward and replace the screw cap and inspection covers. Reconnect the control box and put galvanometer switch to "Record".

5.2.1.6 If the period by stopwatch is not within the limits (31 - 32 seconds) a record must be made as follows:

a) Reconnect galvanometer control box. Leave the function switch on "short" and "Record/Seis. F.P." switch on "Seis F.P.". Cover cylindrical lens with paper and put record on drum.

b) Adjust the calibration current to 10 m.a. (actual).

c) Switch the galvanometer function switch to "Record" and remove the paper over the cylindrical lens.

d) Pulse with 10 m.a. (relays will hold for $4\frac{1}{2}$ minutes). Wait for 5 minutes more.

e) Develop the record and check the period. The period on the record should be 29.5 to 30.5 seconds.

f) Short the galvanometer; return "Record/Seis F.P." switch to "Record"; adjust the calibration current to the normal value; switch galvanometer to "Record" position.

- 5.2.1.7 If the period as recorded is outside the limits 29.5 to 30.5 seconds, then the seismometer must be disconnected at the control box and the mass vibrated (see 5.2.1.3 above). The period should be adjusted by tilting by means of the levelling screw at the single screw end until the period is within the limits 31 - 32 seconds as measured on the stop watch.
- Increasing the tilt will shorten the period.
- 5.2.1.8 Repeat 5.2.1.6 above to get a record of the period which when recorded should be within the limits 29.5 to 30.5 seconds.

5.3 LONG PERIOD - HORIZONTAL.

5.3.1 Check the free period as follows:

- 5.3.1.1 As 5.2.1.1 above.
- 5.3.1.2 As 5.2.1.2 above.
- 5.3.1.3 Remove the cover and vibrate the mass by blowing gently.
- 5.3.1.4 Time the period with stopwatch. It should be between 31.5 and 32.5 seconds.
- 5.3.1.5 If the period is within the specified limits replace the covers, reconnect the control box and put the galvanometer function switch to "Record".
- 5.3.1.6 If the period is outside the specified limits a record should be obtained by proceeding in the same manner as instructed under 5.2.1.6 above.
- 5.3.1.7 If the period as recorded is outside the limits (29.5 to 30.5 seconds) the seismometer should be disconnected at the control box and the mass vibrated (see 5.3.1.3 above). The period should be adjusted by tilting by means of the levelling screw at the single screw end until the period as measured by the stopwatch lies within the limits 31.5 to 32.5 seconds.
- Increasing the tilt will shorten the period.
- 5.3.1.8 Repeat 5.2.1.6 to get a record of the period which when recorded should be within the limits 29.5 to 30.5 seconds.

5.4 SHORT PERIOD SEISMOMETERS

5.4.1 Check that all S. P. masses are centered.

- 5.4.1.1 The horizontal masses are centered in the same manner as for the L. P. horizontal seismometers. (Cf. para. 4.1.1 above).
- 5.4.1.2 The vertical masses are centered by means of the capstan nut at the top of the spring.

5.4.2 Check the S. P. Seismometer Free Period as follows:

- 5.4.2.1 Switch Galvanometer Control Box to "Short".
- 5.4.2.2 Disconnect input to galvo. control box.
- 5.4.2.3 Remove styrofoam cover and oscillate mass gently.
- 5.4.2.4 Time 30 oscillations. Total time should be within the limits 32 - 33 seconds.

- 5.4.2.5 If period is within these limits, replace covers, reconnect galvo. control box and set function switch to "Record"
- 5.4.2.6 If the period on stopwatch is outside the prescribed limits, check period on recording as follows:
- a) Set function switch to "Short" and "Record/Seis F.P." switch to "Seismo. F.P."
 - b) Attenuate to 6 db.
 - c) Set mag, trim, to zero and place chart on drum.
 - d) Set pulse at 40 microamps X 500.
 - e) Set function switch to "Record" and apply pulse. Don't hold but wait 60 seconds.
 - f) Check record to see the time for 60 cycles. It should be 59 - 61 seconds
 - g) If within correct limits reset Attenuation and Mag. trim (See para. 5.5 below.)
- 5.4.2.7 If the period on the recording is outside the limits it should be adjusted as follows:
- a) Remove cover from the instrument and check that the mass is central.
 - b) Switch Galvo. Control Box to "Short".
 - c) Disconnect input to Galvo Control Box.
 - d) Oscillate mass gently (Manually).
 - e) Time 30 oscillations. Total time should be within the limits 32 - 33 seconds.
 - f) Adjust the period by means of the Tension Spring adjusting screw.
- N.B. 1. The appropriate section in the Manual is labelled "Seismometers Model 1051 and 1101".
- N.B. 2. As the ribbons are tightened tap each one gently with a rubber pad. The tone will give a guide to the relative tightness to ensure that the ribbons have been tightened evenly.
- g) When the period is adjusted within the correct limits by the stop watch it must be checked from a recording as prescribed in para. 5.4.2.6 above.

5.5 Resetting "MAG. TRIM".

- 5.5.1 Set function switch on galvo, control box to "short".
- 5.5.2 Set attenuator to the normal db step.
- 5.5.3 Adjust the calibration current to the normal value.
- 5.5.4 Set "Mag. Trim" to Zero.
- 5.5.5 Switch Galvo to "Record".
- 5.5.6 Mark a piece of paper with two lines separated by a distance corresponding to the current pulse size. (At present the pulse size is 75 mm.)
Place the paper over the cylindrical lens with one line on Zero position of the light spot and the other line on the side to which the release pulse will move.

5.5.7 Adjust the "Mag. Trim" until the spot just reaches the other line when the correct current is pulsed.

5.5.8 When adjusted record the pulse with all controls in normal operating condition.

5.6 GALVANOMETER FREE PERIOD

5.6.1 Long Period

5.6.1.1 Set Function Switch on control box to free period.

5.6.1.2 Wet tips of finger and thumb and produce deflection of galvo. by placing finger and thumb in terminals at the back of the galvanometer. Do not give too large a deflection.

5.6.1.3 Allow the galvanometer to complete one oscillation, then time the second oscillation.

The period should be 100 seconds, \pm 1 second.

5.6.1.4 If the period is not within the specified limits by the stop watch a check should be made by getting a record of the period before any adjustment is made.

The record is made as follows:

- a) Place chart on drum.
- b) Set function switch on galvo. control box to Free Period.
- c) Pulse with finger as per 5.6.1.2 above and wait for 10 minutes.
- d) Develop record and check period.

5.6.1.5 If necessary adjust the galvanometer period by altering the tilt by means of the ^{front} ~~rear~~ adjusting screw.

5.6.1.6 After adjustment and check by stop watch, a final check must always be made from a record as per 5.6.1.4 above.

5.6.2 Short Period

5.6.2.1 Place chart on drum.

5.6.2.2 Set Function Switch on control box to free period.

5.6.2.3 Pulse with 0.25 microamps using galvanometer test set. Wait 60 seconds.

5.6.2.4 Repeat 5.6.2.3 twice more.

5.6.2.5 The free period as recorded should be 0.77 seconds. If not correct the galvanometer should be replaced as no adjustment is possible.

5.7 Batteries

5.7.1 Check the level of the electrolyte in the batteries using the tube supplied.

5.7.2 Check that the terminals are tight. Grease as necessary.

6 SIX MONTHLY MAINTENANCE

6.1 Long Period

6.1.1 Check that all L.P. masses are centered. Adjust if necessary. See para. 4 above.

- 6.1.2 Check Critical Damping of Galvanometer as follows :
 - 6.1.2.1 Turn attenuator on Galvanometer Control Box fully anticlockwise.
 - 6.1.2.2 Plug the galvanometer into the output of the control box.
 - 6.1.2.3 Plug the galvanometer test set into the control box.
 - 6.1.2.4 Put a chart on drum.
 - 6.1.2.5 Pulse with 0.0175 microamps from galvanometer test set. Hold for 30 seconds and wait 5 minutes.
 - 6.1.2.6 Check the record to ensure that the galvanometer returns to zero without overshoot in 100 seconds, ± 1 second.
 - 6.1.2.7 Compare with corresponding record in Mr. Kerry's installation report.
 - 6.1.2.8 If necessary, the damping may be adjusted by means of the screw at the back of the galvanometer.
- 6.1.3 Check the galvanometer free period. See monthly maintenance , para. 5.6.1 above.
- 6.1.4 Check sensitivity of system as follows:
 - 6.1.4.1 Set attenuator on Galvanometer Control Box to zero.
 - 6.1.4.2 Shunt the galvanometer with a precision 10 Ω resistor.
 - 6.1.4.3 Set the "F.P./Record" switch on control box to "Record"
 - 6.1.4.4 Connect the Seismometer to the control box and center the trace.
 - 6.1.4.5 Put chart on drum.
 - 6.1.4.6 Pulse with calibration control at 0.5 milliamps. Hold for 1 minute - wait 5 minutes.
 - 6.1.4.7 Develop and check the record against the figures and corresponding record in Mr. Kerry's initial installation report.
- 6.1.5 Check Seismometer Free Period.
See paras 5.2 and 5.3 above.

6.2 Short Period

- 6.2.1 Check that all S.P. masses are centered.
See para. 5.4 above.
- 6.2.2 Check critical damping of galvanometer as follows:
 - 6.2.2.1 Proceed as for para. 6.1.2.1 - 6.1.2.4 above.
 - 6.2.2.2 Pulse with 1 microamp - wait for 10 seconds.
 - 6.2.2.3 Repeat 6.2.2.2 three times.
 - 6.2.2.4 Check record. The galvanometer should return to zero immediately without overshoot.
 - 6.2.2.5 Compare with record in Mr. Kerry's final installation report.
 - 6.2.2.6 If necessary, damping may be adjusted by "Damp Trim" on galvo control box.
- 6.2.3 Check the galvanometer Free Period.
See para. 5.6.2 above.
- 6.2.4 Check System Sensitivity as follows:

- 6.2.4.1 Set Function Switch on Control Box to "Record"
- 6.2.4.2 Set "Record/FP" switch to "Record".
- 6.2.4.3 Set attenuator to 24 db.
- 6.2.4.4 Set mag. trim to zero.
- 6.2.4.5 Put chart on drum.
- 6.2.4.6 Pulse with 7.5 microamp X 500. Hold for 5 seconds and wait further 5 seconds.
- 6.2.4.7 Develop record and check against the figures and diagrams in Mr. Kerry's installation report.

6.2.5 Check Seismometer Free Period.

See para. 5.4.2 above.

6.3 Short Period Weight Lift Test

When instructed by the O.C., the system sensitivity will also be checked by the "Weight Lift Test" as follows:

6.3.1 Vertical Seismometer

- 6.3.1.1 Set galvanometer function switch to "Short"
- 6.3.1.2 Remove styrofoam covers.
- 6.3.1.3 Attach fine silk thread to 1 gm. weight and set weight on mass limit stop.
- 6.3.1.4 Set Mag. Trim to zero, attenuator to 24 db and galvanometer to "Record".
- 6.3.1.5 Put chart on drum.
- 6.3.1.6 Lift the weight - wait 10 seconds.
- 6.3.1.7 Repeat 6.3.1.6 for a total of six times.
- 6.3.1.8 Perform calibration current sensitivity test (as per 6.2.4 above) on same record.
- 6.3.1.9 Measure the deflection and overshoot on the record for both the weight lift and calibration current tests.
The ratio of deflection to overshoot in both cases should be 17/1.
Compare the deflections obtained with those included in the installation report.

6.3.2 Horizontal Seismometer

- 6.3.2.1 Set galvanometer function switch to "Short".
- ~~6.3.2.2~~ Remove styrofoam covers.
- 6.3.2.3 Set up 2 gm weight as shown in Fig. 5-1, page 28 of manual section "Seismometers, Model 1051 and 1101".
Use the jig-support arm and weights supplied.
(The 2 gm weight is used in this case, as when it is mounted, as in figure, it will result in a deflecting force of 1 gm.)
- 6.3.2.4 Complete the test in the same way as described in paras 6.3.1.4 - 6.3.1.9 above.

6.4 After any of the above tests, check the following :

- 6.4.1 Connections to input and output of galvanometer control box have been correctly made.

- 6.4.2 Mag. trim has been adjusted (if it had been disturbed)
See para. 5.5 above.
- 6.4.3 Attenuator returned to normal operating position.
- 6.4.4 Function switch set to "Record"
- 6.4.5 Record/F.P. switch set to "Record".
- 6.4.6 Recording spots correctly centered.
- 6.4.7 Styrofoam covers have been replaced on seismometers.

7. GENERAL

- 7.1 When any work has to be done on the Seismometers, the function switch on the galvanometer control box should first be set to "Short", otherwise the galvanometer may be damaged.
- 7.2 All adjustments to Seismometers must be done with extreme care lest the masses - particularly the L.P. masses - should strike against the stops with resultant injury to the fragile hinges to which the masses are attached.
- 7.3 All weekly or other maintenance should as far as possible be done under reasonably calm weather conditions.
- 7.4 Full information on any check or adjustment to the equipment must be entered in the "Seismograph Log".
- 7.5 Appropriate figures and copies of the records, obtained in any maintenance checks, shall be included in the reports sent to Washington at the end of each month.
- 7.6 Subject to 7.3 above, the schedule of maintenance shall be as follows :
 - 7.6.1 Weekly maintenance - Tuesdays.
 - 7.6.2 Monthly " - 15th of each month.
 - 7.6.3 Six Monthly maintenance - 15th May and November.
- 7.7. After any series of checks the S.P. and L.P. Seismometers should be pulsed (before charts are put on) while the record lights are watched. Having thus checked the continuity of the circuits, make sure that the L.P.pulse has been released before starting normal recording.

.....
 Officer-in-Charge.
 15/12/1962.

Routine Maintenance of Seismograph Equipment

Appendix I. Magnification and Calibration Pulse.

1. Long Period

The size of the calibration pulse for the normal magnification of 750 and a current of 0.16 mA. is obtained from the following relation (See Appendix A of U.S. Manual).

$$\text{Magnification} = \frac{0.015 \times \text{Deflection} \times 980.10^{-5}}{\text{Motor Constant} \times \text{Cal. Current (amps.)}}$$

$$\therefore \text{Deflection} = \frac{750 \times \text{Motor Constant} \times \text{Cal. Current (amps.)}}{0.015 \times 980.10^{-5}}$$

Using the constants appropriate to Long Period E/W (page 16 Installation Note)

$$\begin{aligned} \text{Deflection (for 0.16 mA.)} &= \frac{750 \times 0.0884 \times 0.16.10^{-3}}{0.015 \times 980.10^{-5}} \\ &= 72.1 \text{ mm.} \end{aligned}$$

2. Short Period

Using the weight lift test as described in the Manual, Section Seismometers 1051 and 1101, page 26 the magnification is given by the formula

$$\text{Magnification} = 800 \left(\frac{X_1}{Wt} \right)$$

Where

X_1 = Initial deflection (mm.) after lifting test weight

Wt = Test weight in Grams

800 = Empirical constant derived from "Shake Table" tests.

In the case of the Short Period Z. (for example)

$$\begin{aligned} \text{Magnification} &= 800 \times \frac{88}{1} && \text{(See Installation report P.19)} \\ &= 70400 \end{aligned}$$

With this magnification a pulse of 3.75 mA. produces a deflection of 67 mm.

$$\therefore \text{For magnification of 12500 (as used at Valentia) the deflection for 3.75 mA.} = \frac{67.12500}{70400} \text{ mm.}$$

12.8 mA. (as used in installation test) would give deflection equal to

$$\begin{aligned} &\frac{67.12500.1280}{80400.375} \\ &= 41 \text{ mm.} \end{aligned}$$

Routine Maintenance of Seismograph Equipment

Appendix 2 Maintaining current supply of Recording Paper and
Recognition of emulsion side of Recording paper

1. Recording paper is received in boxes containing 50 sheets. The paper is packed in a light proof bag inside a cardboard box.
2. A special holder has been fitted in the recording room which will hold 100 sheets of record paper. Fifty sheets will be kept in the bag and cardboard box which fits into the chart holder. The remaining 50 will be inserted without the cardboard box but still inside the lightproof bag. This 50 will constitute the current supply and as soon as it is finished the cardboard box will be removed from the other 50 which will now become the current supply.
 - 2.1. Each time an observer changes to a new batch of 50 he must ensure that another box of charts is installed in the holder at the next visit to the recording room.
 - 2.2. The cardboard box will be placed to the front of the holder while the bag containing the current supply will be placed to the rear (next to the wall)
3. When charts have been extracted for putting on the drums the emulsion side of the chart is normally recognised by tasting. The emulsion side will have a faint vanilla taste. The contrast in taste between the emulsion and reverse sides should normally be quite definite but at Valentia to avoid the consequences of the observers sense of taste being blunted by smoking or otherwise the following additional procedure shall be adopted.
 - 3.1. One corner (a triangle about 1 cm. side) has been cut off each chart. Holding the chart by the short side with the cut corner between finger and thumb of left hand the emulsion side will be facing the observer.

The chart should be put on the drum with the cut corner next to the element indicator and when the drum is rotated to fix the other end of the chart the cut corner will be underneath the overlap.

Routine Maintenance of Seismograph Equipment

Appendix 3 Issue of Records and Reports to H.Q. for forwarding
to Washington

1. The officer responsible for developing the Seismograph records each day will also make a negative (on Linograph recording paper) of the six charts developed and written up the previous day.
2. The negatives will be retained at the station and the originals forwarded to H.Q.
 - 2.1. The issue of the original records to H.Q. will be done twice monthly, the first batch each month comprising the records for 1st - 15th inclusive. The second batch will of course consist of the records for the remainder of the month.
 - 2.2. The records should be issued within 4 days of the date of the last chart which is included in the batch.
 - 2.3. The negatives will be packed carefully in the empty bags and boxes in which the recording paper was received and filed in the collar. As each batch of originals is issued to H.Q. the filing of the corresponding negatives will be completed.
3. Forms C & G S - 1039 and 1040 will be completed and issued monthly.

Form 1039 Is a record of the maintenance, replacements etc. done during the month as recorded at the back of the Seismograph log.

Form 1040 Is based on the daily entries made in the Seismograph Log at time of changing charts.

 - 3.1. Both forms will be completed in triplicate - one copy for H.Q. and two copies for Washington. The Seismograph Log will serve as the Valencia copy.
 - 3.2. The completed forms referring to any month should be issued as soon as possible after the end of the month and in any case not later than 10th of the following month.
4. The officer(s) responsible for performing the various duties referred to above are specified in the current duty schedules.