Protocols for various HIS activities - SW Domain

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
(A) HIS Observation Network				
1. A standing order from every DDPC detailing all observation stations [SRG/ ARG/ FCS/ GD(SQ)] which form HIS network from which specified type of data are to be observed at specified frequencies and reporting in prescribed formats	One time (March 2002)	Manager DDPC (S9)	Manager SDPC (S11)	HIS network as agreed upon under HP Prescribed forms (formats) enclosed
2. Availability of authenticated information on important characteristics (latitude/longitudes from 1:50,000 scale toposheets, Basin-Zone/Independent river/Tributary, state, district, station category, date of establishment, offices etc.) of all stations in SWDES databases	One time (March 2002)	Manager DDPC (S9)	Manager SDPC (S11)	
(B1) Data Collection - SRG stations				
1. Observation at 0830 hrs. and its recording in field note book	Daily	Hydromet. Observer (M1)	Assist. Hydrologist (S5)	Job description: Ref. No. F1 Observational details: Ref. No. F4 Technical details: Ref. No. D3
2. Preparation and submission of monthly record in prescribed format to the SDDPC	By Day 1 after the Month of observation	- do -	- do -	
(B2) Data Collection - ARG stations				
1. Observation of SRG at 0830 hrs. and its recording in field note book	Daily	Hydromet. Observer (M1)	Assist. Hydrologist (S5)	Job description: Ref. No. F1 Observational details: Ref. No. F5 Technical details: Ref. No. D3
2. Replacement of chart in ARG at 0830 hrs.	- do -	- do -	- do -	
3. Tabulation of ARG chart and its filing	- do -	- do -	- do -	
4. Preparation and submission of monthly records in prescribed format to the SDDPC	By Day 1 after the Month of observation	- do -	- do -	

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
(B3) Data Collection - FCS stations				
1. Observation of all climate variables at 0830 hrs. and 1730 hrs. and their recording in field note book. Various climate variables are: Min. & Max. temperatures, dry & wet bulb temperatures, average & instantaneous wind speed, wind direction, pan evaporation, pan water temperature	Twice-daily at synoptic hours 0830 and 1730 hrs.	Senior Hydromet. Observer (M2)	Assist. Hydrologist (S5)	Job description: Ref. No. F1 Observational details: Ref. No. F6 Technical details: Ref. No. D3
2. Replacement of charts in autographic equipment like ARG, hygrograph and thermograph at 0830 hrs.	Daily	- do -	- do -	
3. Insertion of chart in sunshine recorder before Sunrise and its removal after Sunset	- do -	- do -	- do -	
4. Tabulation of autographic charts and their filing	- do -	- do -	- do -	
5. Preparation and submission of monthly records in prescribed format to the SDDPC	By Day 1 after the Month of observation	- do -	- do -	
(B4) Data Collection - GD(SQ) stations				
1. Observation of water levels by staff gauge and its recording in field note book	At prescribed frequency: Ref. No. D5	Gauge Reader (S2)	Observer (S3)	Job description: Ref. No. F1 Observational details: Ref. No. F8 Technical details: Ref. No. D2 & D4
2. Replacement of charts from autographic recorders or downloading of data from digital water level recorders (AWLRs/DWLRs) including replacement of batteries etc.	- do -	- do -	- do -	
3. Observation of concurrent stage-discharge data (emphasis on covering different stages)	At prescribed frequency: Ref. No. D6	Helper (S1), Gauge Reader (S2), Observer (S3)	Observer (S3)	Job description: Ref. No. F1 Observational details: Ref. No. F9 Technical details: Ref. No. D2 & D4
4. Observation of suspended sediment (only for GDS type of stations)	At prescribed frequency: Ref. No. D8	- do -	- do -	Job description: Ref. No. F1 Observational details: Ref. No. F12
5. Observation of bed material and bed load	At prescribed frequency: Ref. No. D9	- do -	- do -	Technical details: Ref. No. D7

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
6. Preparation of WQ samples	At prescribed frequency: Ref. No. D11	- do -	- do -	Job description: Ref. No. F1 Observational details: Ref. No. F13 Technical details: Ref. No. D10
7. Observation/field determination of WQ parameters and dispatch to the designated laboratories	- do -	- do -	- do -	
8. Preparation and submission of all monthly records to the SDDPC	By Day 1 after the Month of observation	Observer (S3)	Assist. Hydrologist (S5)	Preferable to submit fortnightly within the month
(B5) Data Collection - Routine maintenance of stations				
1. Maintenance of meteorological (SRG/ARG/FCS) stations	As per requirement	Hydromet. Observers (M1/M2)	Assist. Hydrologist (S5)	Observational details: Ref. No. F7
2. Maintenance of hydrometric (GDSQ) stations	- do -	Helper (S1), Gauge Reader (S2), Observer (S3)	Observer (S3)	Observational details: Ref. No. F11
3. Technical recommendations about the health of equipment, routine maintenance, requirement and possibility of introduction of new equipment	Every five years	Hydrological Equipment Manager (S7)	Manager DDPC (S6) and Manager SDPC (S9)	Job Description: Ref. No. F1
(B6) Data Collection - Inspection of stations				
1. Routine Inspection of meteorological (SRG/ARG/FCS) stations	To be completed before onset of monsoon	Assist. Hydrologist (S5)	Manager SDDPC (S6)	Observational details: Ref. No. F7
2. Inspection by IMD inspectors - Submission of inspection report	Once in 3 years	IMD Inspectors	IMD State Met. Centres	
3. Implementation of IMD inspection report and submission of action taken report to SDPC and IMD	- do -	Manager SDDPC (S6)	Manager DDPC (S9)	

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
4. Routine Inspection of key and other hydrometric (GDSQ) stations and submission of station-wise inspection reports	As prescribed: Ref. No. F10	Assist. Hydrologist (S5), Manager SDDPC (S6), Manager DDPC (S9)	- do -	Observational details: Ref. No. F10
5. Submission of action taken report to Manager SDPC (S12)	Yearly (well before monsoon)	Assist. Hydrologist (S5), Manager SDDPC (S6)	- do -	
(C) Data entry & primary validation at SDDPCs				
1. Receipt and record of receipt of data manuscripts coming from the field stations	By Day 5 after the Month of observation	Assistant Hydrologist (S5)	Manager SDDPC (S6)	Operational details: Ref. No. O8
2. Feedback to the field stations for the non-receipt or incomplete information	By Day 10 after the Month of observation	- do -	- do -	
3. Entry of all data in SWDES together with the required data entry checks	- do -	DPC Assistant (S4)	Assistant Hydrologist (S5)	Operational details: Ref. No. O5 & O10
4. Primary validation of all types of data for the month on the basis of information available at individual stations	- do -	Assistant Hydrologist (S5)	Manager SDDPC (S6)	
5. Feedback to the observers for incorrect computations or inconsistent data in the manuscript	- do -	- do -	- do -	
6. Dispatch and record of dispatch of incre-mental data in SWDES database to DDPC	- do -	- do -	- do -	Operational details: Ref. No. O8
7. Maintaining a system for regular backups and checking for virus	Ten-daily	- do -	- do -	Operational details: Ref. No. O8
(D) Secondary validation and analysis of data at DDPCs				
1. Receipt and record of receipt of incremental SWDES data coming from SDDPCs	By Day 15 after the month of observation	DPC Assistant (S4)	Assistant Hydrologist (S5)	Operational details: Ref. No. O8
2. Thorough scrutiny of incoming data in SWDES databases for completeness and correctness and its organisation in basin-wise HYMOS databases	By Day 20 after the month of observation	- do -	- do -	

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
3. Feedback to the SDDPCs for the non-receipt or incomplete or incorrect data in SWDES databases	- do -	Assistant Hydrologist (S5)	Manager DDPC (S9)	
4. Dispatch and record of dispatch of (original) data in SWDES database (only if they are complete and perfect) to SDPC.	- do -	- do -	- do -	
5. Secondary validation of all types of data for the month on the basis of information on the same process from the correlated adjoining stations	By Day 25 after the month of observation	- do -	- do -	Operational details: Ref. No. O2 & O10
6. Correction and completion of data series wherever required and possible	- do -	- do -	- do -	
7. Establishing relations (like stage-discharge relationship) and computation of derived data (such as computed discharge).	By Day 25 of the month after end of monsoon/ non-monsoon periods	- do -	- do -	
8. Compilation of time series at large time intervals (10-daily, monthly, yearly) for the purpose of validation.	By Day 25 after the month of observation	- do -	- do -	
9. Feedback to the SDDPCs for incomplete or ineffective data validation, if so found in the review.	- do -	- do -	- do -	
10. Dispatch of incremental (processed) data set in HYMOS database(s) to SDPC/RDPC alongwith a validation report on the corrected or estimated data in the processed data set	By Day 30 after the month of observation	- do -	- do -	Operational details: Ref. No. O8
11. Maintaining a system for regular backups and checking for virus	Ten-daily	- do -	- do -	Operational details: Ref. No. O8
(E) WQ analysis, data entry and validation at WQ laboratories (II & II+)				
1. Coordination with Level I labs regarding field sampling and analysis	Continuous process	Assistant Chemist (Q2)	Chemist (Q3)	Operational details: Ref. No. O2
2. Upkeep of all WQ testing equipment and availability of required consumables	Continuous process	Chemist (Q3)	Head of Lab. (Q5)	Operational details: Ref. No. O1
3. Receipt and recording of receipt of WQ samples arriving from various observation stations	As per sampling frequency	Assistant Chemist (Q2)	Chemist (Q3)	Job Description: Ref. No. F1

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
4. Submission of report to the concerned DDPC on the late or non-receipt of WQ samples as per the sampling schedule and frequency	Monthly	Assistant Chemist (Q2)	Chemist (Q3)	Operational details: Ref. No. O2
5. Analysis of WQ samples for the required parameters as per the approved monitoring objectives including with-in lab. AQC for every batch of samples received	Within the allowed time period of analysis	Assistant Chemist (Q2) & Chemist (Q3)	Head of Lab. (Q5)	Operational details: Ref. No. O3 Technical details: Ref. No. D12
6. Entry of WQ analysis results in SWDES	On the day of sample analysis itself	Assistant Chemist (Q2) & Chemist (Q3)	Head of Lab. (Q5)	
7. Validation of WQ data & reanalysis of samples, if required	Within a week of the analysis	Assistant Chemist (Q2) & Chemist (Q3)	Head of Lab. (Q5)	
8. Dispatch of incremental WQ data to SDPC/RDPC	By Day 30 after the month of observation	Assistant Chemist (Q2)	Chemist (Q3)	
9. Monitoring quality control through inter-laboratory AQC exercises and/or accreditation of laboratory	Every year	Head of Lab. (Q5)	Head of Lab. of inter laboratory AQC organising laboratory (Q6)	Operational details: Ref. No. O4 Technical details: Ref. No. D12
10. Maintaining a system for regular backups and checking for virus	Ten-daily	Assistant Chemist (Q2)	Chemist (Q3)	Operational details: Ref. No. O8
(F) Hydrological validation and finalsiation of data at SDPCs				
1. A standing order from SDPC detailing the data entry and types of data validation, analysis and reporting to be carried out on a regular and time bound basis by all SDDPCs, DDPCs and SDPC	One time (March 2002)	Manager SDPC (S11)	Manager SDSC (S12)	
2. Ensure availability of comprehensive inventory of all historical data available with agency and its availability in SWDES databases (after adequate scrutiny)	One time (March 2002)	Manager DDPCs (S9) /SDPC (S11)	Manager SDSC	This is most essential for the DSCs to be in a position to disseminate historical data in electronic form to the users
3. Receipt and record of receipt of incremental (original) data in SWDES databases coming from DDPCs and WQ laboratories	By Day 30 after the month of observation	DPC Assistant (S4)	Hydrologist (S7)	Operational details: Ref. No. O8
4. Thorough scrutiny of incoming (original) data in SWDES databases for completeness	By Day 35 after the month of observation	- do -	- do -	

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
5. Submission and record of submission of (original) data from complete SWDES databases to SDSC	- do -	Hydrologist (S7)	Manager SDPC (S11)	Operational details: Ref. No. O8
6. Receipt and record of receipt of incremental (processed) data in HYMOS databases coming from DDPCs	By Day 30 after the month of observation	- do -	- do -	
7. Feedback to the DDPCs for the non-receipt or incomplete (processed) data in HYMOS databases	By Day 35 after the month of observation	- do -	- do -	
8. Review of the validation reports submitted by DDPCs and review of (processed) data sets on random sample basis (about 5%). Identify sources of errors and make corrections if required and possible. Apprise DDPCs if the error(s) were due to inefficient data validation.	By Day 55 after the month of observation			Operational details: Ref. No. O2 & O10
9. Submission and record of submission of (processed) data from HYMOS databases to SDSC	By Day 60 after the month of observation	- do -	- do -	Operational details: Ref. No. O8
10. Hydrological validation for selected basins/sub-basins on daily or ten-daily basis and making note of any inconsistencies found	Twice-a-year (by Jan. 15 and July 15)	- do -	- do -	Operational details: Ref. No. O7 & O10 Bi-annual: For Monsoon (June - Nov.) and non-monsoon periods (Dec. - May)
11. Publishing water year books	Yearly	- do -	- do -	Operational details: Ref. No. O7
12. Maintaining a system for regular backups and checking for virus	Weekly	IT Expert (I1)	DB Administrator (I2)	Operational details: Ref. No. O8
(G) Inter-agency data validation				
1. Document the details on specific stations, data types and the frequency of data that are needed to be exchanged by one agency with another for carrying out inter-agency validation.	One time	Hydrologist (S7)	Manager SDPC (S9)	Operational details: Ref. No. O10
2. Joint approval to the process of data exchange and inter-agency validation by the concerned agencies	One time	Manager SDPC (S11)	Competent authority	[Manager SDSC (S12)/Secretary WRD]

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
3. Regular request/dispatch of data (through SDSC) agreed to be exchanged for inter-agency validation by owner agency to the other agencies	Twice-a-year (By Jan. 15 & July 15)	Hydrologist (S7)	Manager SDPC (S11)	Bi-annual: For Monsoon (June - Nov.) and non-monsoon periods (Dec. - May)
4. Validation of data with respect to inter-agency consistency	By Jan. 31 and July 31	- do -	- do -	Operational details: Ref. No. O10
5. Exchange of inter-agency validation draft reports among concerned agencies	- do -	- do -	- do -	
6. Joint meetings for finalising the inter-agency data validation reports	By 15 Feb. and 15 Aug	- do -	- do -	
7. Correction/completion of data on the basis of approved inter-agency data validation report and submitting the action taken report	By 28 Feb. and 31 Aug			Operational details: Ref. No. O10
8. Submission and record of submission of corrected data (if any) to the SDSC, as result of hydrological validation & inter-agency validation	By 28 Feb. and 31 Aug	- do -	- do -	
(H) Data Communication				
1. Availability of communication facilities at SDDPCs and DDPCs PSTN dial-up facility and internet connectivity with email	To be ensured by June 2002 and to be continued in future	Manager DDPC (S9)	Manager SDSC (S12)	
2. Availability of communication facilities at SDPCs LAN to communicate with SDSC (in case it is in the same building) PSTN dial-up facility: minimum one dedicated line (may be on sharable basis with SDSC) and internet connectivity with email ISDN dial-up facility and ISDN internet connectivity (on sharable basis with SDSC)	To be ensured by June 2002 and to be continued in future	IT Expert (I1) and DB Administrator (I2)	Manager SDPC (S9)	

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
3. Availability of communication facilities at SDSCs LAN to communicate with SDPC (in case it is in the same building) PSTN dial-up facility: minimum one dedicated line (may be on sharable basis with SDPC) and internet connectivity with email ISDN dial-up facility and ISDN internet connectivity (on sharable basis with SDPC)	To be ensured by June 2002 and to be continued in future	IT Expert (I1) and DB Administrator (I2)	Manager SDSC (S12)	
4. Availability of communication facilities at DSCs for communicating with the data users Option A (Preferred): Bought out space on external web-server with control for uploading and maintaining web-site Option B : Local web-server : Leased line with leased line modem and infrastructure for running web server	To be ensured by June 2002 and to be continued in future	IT Expert (I1) and DB Administrator (I2)	Manager SDSC (S12)	
(I) Data storage and dissemination				
1. Documentation of the data dissemination policy of the agency	One time (June2002)	Agencies	HLTG/PCS	Draft model policy (CWC); Observations/agreement by individual agencies
2. Approval of the data dissemination policy	One time (July 2002)	Manager SDSC	PCS	Approval by respective competent authorities
3. Establish administration for incoming and outgoing data streams and management of databases at DSC and securing them from unauthorised use and loss.	July 2002 - Sept. 2002	ROLTA/ Consultants	Manager SDSC	Operational details: Ref. No. O9
4. Receipt and record of receipt of (original) data in SWDES databases from SDPC.	By Day 35 after the month of observation	IT Expert (I1)	DB Administrator (I2)	

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
5. Feedback to the SDPC for the non-receipt or incomplete or incorrect data in SWDES databases	- do -	- do -	- do -	
6. Receipt and record of receipt of (processed) data as transfer databases from SDPC.	By Day 60 after the month of observation	- do -	- do -	
7. Feedback to the SDPC for the non-receipt or incomplete in transfer databases	- do -	- do -	- do -	
8. Receipt and record of receipt of corrected data (if any) from the SDPC, as result of inter-agency validation.	As and when required	- do -	- do -	
9. Updating databases of DSC in light of new data from the DPCs	Every month	DB Administrator (I2)	Manager SDSC (S12)	Operational details: Ref. No. O9
10. Assisting SDPC in sending and receiving data from other SDPCs through respective SDSCs	As and when required	IT Expert (I1)	DB Administrator (I2)	
11. Updating of catalogue and its dissemination	Monthly after updating of databases	DB Administrator (I2)	Manager SDSC (S12)	
12. Process requests of the hydrological data users and supply data to the users	Within a time frame on receipt of requests	- do -	- do -	
13. Maintaining agency's HIS web-site and the on-line catalogue	Continuous process	IT Expert (I1)	DB Administrator (I2)	
14. Distributing anti-virus updates to all the lower level DPCs	Monthly or earlier (if available)	IT Expert (I1)	DB Administrator (I2)	
15. Assisting all lower level DPCs to enter into AMC for computers	Continuous	DB Administrator (I2)	Manager SDSC (S12)	
(J) HIS Training				
1. Assess training requirements and arrange for training courses for hydrometeorological observers through IMD	Bi-annually	Manager DDPCs (S9) /SDPC (S11) and IMD	Manager SDSC	
2. Apprise IMD about observance of standard observational procedures and seek to fill gaps, if any, through additional training	Annually	Manager SDPC (S11)	Manager SDSC and IMD	IMD to make a forum of C.E.s and itself so as to meet annually and discuss such reports

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
3. Assess training requirements for hydrological observers and on advanced equipment like DWLRs etc.	Bi-annually	Manager DDPCs (S9) /SDPC (S11)	Manager SDSC	
4. Prepare plans and provide requisite training in-house through the ToTs on hydrometry	As per requirement	- do -	- do -	
5. Arrange for refresher courses for ToTs on hydrometry through NWA.	- do -	NWA	Manager SDSC and NWA	
6. Apprise NWA about observance of standard observational procedures and seek to fill gaps, if any, through additional training	Annually	Manager SDPC (S11)	Manager SDSC and NWA	NWA to make a forum of C.E.s and itself so as to meet annually and discuss such reports
7. Assess training requirement for WQ sampling and analysis	Bi-annually	Manager DDPCs (S9) /SDPC (S11)	Manager SDSC	
8. Prepare plans and provide requisite training in-house through the ToTs on WQ sampling and analysis	As per requirement	- do -	- do -	
9. Apprise identified laborator(ies) as CTI on WQ (CPCB proposed as CTI) about observance of standard sampling and analytical procedures and seek to fill gaps, if any, through additional training	Annually	Manager SDPC (S11)	Manager SDSC and Head CTI on WQ	CTI on WQ to make a forum of C.E.s and itself so as to meet annually and discuss such reports
10. Assess training requirements for SWDES and HYMOS at SDDPCs/DDPCs and SDPC	Bi-annually	Manager DDPCs (S9) /SDPC (S11)	Manager SDSC	
11. Arrange in-house training courses on SWDES through ToTs on SWDES	As per requirement	SWDES Trainers and Manager SDPC (S11)	- do -	
12. Arrange for training courses on HYMOS by NWA and NIH	- do -	NWA & NIH	Manager SDSC and NWA & NIH	NWA/NIH to chalk out training calendar for HIS training every year
13. Apprise NWA and NIH about implementation of SWDES and HYMOS and seek to fill gaps, if any, through additional training	Annually	Manager SDPC (S11)	- do -	NWA/NIH to make a forum of C.E.s and NWA/NIH so as to meet annually and discuss such reports
(K) HIS Management				
1. Ensure availability of required number and type of staff for various HIS activities at Field stations, WQ labs and at SDDPCs/DDPCs/SDPC and SDSC	Continuous process	Manager SDPC (S11) and Manager SDSC (S12)	Secretary WR	Staff requirement: Ref. No. D3

Component/Details of activities	Time frame	Responsibility	Supervision	References/Remarks
2. Ensure availability of required equipment and consumables at Field stations and at SDDPCs/DDPCs/SDPC and SDSC and at WQ laboratories	- do -	Manager SDDPCs (S6) / DDPCs (S9) and SDPC (S11)	Manager SDSC (S12)	Details: Ref. No. F11
3. Ensure availability of required training support for various HIS activities	- do -	Manager SDPC (S11)	- do -	
4. Ensure adequate interaction with potential HDUs (HDUG meetings) and document and consider their feedback	Every 6 months	- do -	- do -	Technical details: Ref. Nos. D1 ToR for HDUG: Ref. No. F2
5. Ensure required budgetary support for all operational, maintenance activities (AMC provisions for computers and all other major equipment including WQ equipment) of HIS and for any further improvements needed in the system	Continuous process	Manager SDPC (S11) /Manager SDSC (S12)	Secretary WR	
6. Participation in and promotion of inter-agency coordination meetings so as to ensure continuance of uniform HIS standards and tools (specially Software) across various states and agencies and upgradation required in future	Continuous process	Manager SDSCs (S12) / Secretaries WR of states	Secretary MoWR, GoI	GoI to create a forum (like HIS-TS) represented by central and state agencies for ensuring such coordination in future
7. Monitor and review HIS performance on the basis of the above listed factors and take remedial measures, if required	Continuous process	Manager SDPC (S11) /Manager SDSC (S12)	Secretary WR	HIS-TS to evolve a reporting procedure and reports to be discussed annually

References:

Ref. No. D1 HIS Design Manual - V1: Hydrological Information System
Ref. No. D2 HIS Design Manual - V2: Sampling procedure
Ref. No. D3 HIS Design Manual - V3: Hydro-meteorology
Ref. No. D4 HIS Design Manual - V4: Hydrometry
Ref. No. D5 HIS Design Manual - V4: Hydrometry - Section 5.2: Stage measurement frequency
Ref. No. D6 HIS Design Manual - V4: Hydrometry - Section 5.3: Current meter measurement frequency
Ref. No. D7 HIS Design Manual - V5: Sediment transport measurements
Ref. No. D8 HIS Design Manual - V5: Sediment transport measurements - Section 5.2: Suspended sediment measurement frequency
Ref. No. D9 HIS Design Manual - V5: Sediment transport measurements - Section 5.3: Bed load measurement frequency
Ref. No. D10 HIS Design Manual - V6: Water quality sampling
Ref. No. D11 HIS Design Manual - V6: Water quality sampling - Section 4.2: Network density, sampling frequency and parameter
Ref. No. D12 HIS Design Manual - V7: Water quality analysis - Section 8.3: Quality control/Quality control programme

Ref. No. F1 HIS Field Manual - V1: HIS - Part I: Job description
Ref. No. F2 HIS Field Manual - V1: HIS - Part II: ToR for HDUG
Ref. No. F3 HIS Field Manual - V1: HIS - Part III: Data need assessment
Ref. No. F4 HIS Field Manual - V3: Hydro-meteorology - Part II: SRG - Operation and maintenance
Ref. No. F5 HIS Field Manual - V3: Hydro-meteorology - Part III: ARG - Operation and maintenance
Ref. No. F6 HIS Field Manual - V3: Hydro-meteorology - Part IV: FCS - Operation and maintenance
Ref. No. F7 HIS Field Manual - V3: Hydro-meteorology - Part II to V
Ref. No. F8 HIS Field Manual - V4: Hydrometry - Part II: River stage observation
Ref. No. F9 HIS Field Manual - V4: Hydrometry - Part III to VI: Flow measurement by different techniques
Ref. No. F10 HIS Field Manual - V4: Hydrometry - Part VII: Field inspection and audits
Ref. No. F11 HIS Field Manual - V4: Hydrometry - Part VIII: Maintenance and calibration
Ref. No. F12 HIS Field Manual - V5: Sediment transport measurements: Suspended load meas., bed material sampling and sediment analysis
Ref. No. F13 HIS Field Manual - V6: Water quality sampling

Ref. No. O1 HIS Operation Manual - V7: WQ Analysis - Section 2: Analysis protocols
Ref. No. O2 HIS Operation Manual - V7: WQ Analysis - Section 3: Sample analysis
Ref. No. O3 HIS Operation Manual - V7: WQ Analysis - Section 4: Recommended analytical procedures
Ref. No. O4 HIS Operation Manual - V7: WQ Analysis - Section 5: Analysis results
Ref. No. O5 HIS Operation Manual - V8: Data processing and analysis - Part I - Data entry and primary processing
Ref. No. O2 HIS Operation Manual - V8: Data processing and analysis - Part II - Secondary processing
Ref. No. O7 HIS Operation Manual - V8: Data processing and analysis - Part III - Final processing and analysis
Ref. No. O8 HIS Operation Manual - V8: Data processing and analysis - Part IV: Data management
Ref. No. O9 HIS Operation Manual - V9: Data processing and analysis - Data transfer, storage and dissemination
Ref. No. O10 Summary of procedures for SW data validation under HIS (Circulated to members of HLTG-SW during 9th meeting on 29/11/2000)