SUBCHAPTER D - TECHNOLOGY

PART 530 - HYDROLOGY

SUBPART A - HYDROLOGIC INVESTIGATIONS

530.00 General.

Hydrologic investigations and analyses are essential for determining the location, quantity, timing, and availability of water resources in the planning and design of water related structures and projects, and for the project evaluation. Hydrologic investigations and analyses rely on available hydrologic data such as volumes and rates of stream flow, meteorological data such as precipitation rates and amounts, and watershed characteristics. If hydrometeorological data are inadequate, the installation of instruments for the collection of data may be necessary. Instrumentation may also be required for reservoir operation to make effective use of available storage to meet project objectives.

530.01 Available hydrologic information.

To the extent possible, available hydrologic information is to be used for planning, design, and operation of water-related structures and systems. Basic data on stream flow are available from the US Geological Survey (USGS) through its water data storage and retrieval system (WATSTORE) and the USGS homepage on the Internet. Precipitation and related climatological data are available from the National Water and Climate Center (NWCC) of NRCS and the National Climatic and Data Center (NCDC) and technical papers and reports of the National Weather Service (NWS). Other sources of hydrologic information include Agricultural Research Service (ARS); Forest Service (FS); and federal, state and local agencies having planning and/or operational responsibilities for water-related projects.

Hydrometeorological data may be found in various reports about the watershed, river basin or floodplain. These reports should be in the libraries of the various federal agencies involved in report preparation.

530.02 Hydrometeorological instrumentation.

(a) Definition. Hydrometeorological instruments include, but are not limited to, water stage recorders; devices for measuring snow depth and snow-water content; and instruments for collecting data on precipitation, soil moisture, maximum and minimum temperatures, wind direction and speed, relative humidity, evaporation, and solar radiation.

(b) Determining need. Hydrometeorological instrumentation is required for project planning if data are inadequate for making reliable estimates for project development. This requirement is particularly important for projects that include storage for irrigation or other beneficial use and for which accurate estimates of available water supply are essential to the project's performance and justification. If a statistically viable sample is needed for hydrologic analysis, a minimum of 10 years of data is required.

(c) Planning for hydrometeorological instrumentation.

(1) A plan for collecting needed hydrologic data is to be developed at the earliest possible date, consistent with project planning or project operation objectives. This plan is to include a statement of justification for the instrumentation; the type of instruments required including numbers, kind, and proposed location; a schedule for installation; and anticipated operation and maintenance costs.

(i) For planning and formulation. If additional hydrometeorological data are required for planning, instruments are to be installed as soon as practical after planning begins. Hydrometeorological instruments installed for planning may be temporary or permanent depending on their probable future usefulness.

(ii) For operation. If hydrometeorological data are required for operation, planning for hydrometeorological instrumentation is to proceed concurrently with other planning activities. The project plan is to include a justification for the instrumentation and describe the required instruments,

including numbers, kind, and location; a schedule for installation; and anticipated operation and maintenance costs. For operation and to ensure that the maximum length of record is available, hydrometeorological instruments are to be installed as soon as possible after the plan is approved.

(iii) For both planning and operation. Hydrometeorological instruments selected for planning purposes are usually as inexpensive as possible to keep planning costs to a minimum. If hydrometeorological instruments will be useful for both planning and operation, select a site that permits future installation of more sophisticated equipment and/or additional instruments at a later date, if needed.

(iv) Post project approval. Projects authorized for construction that did not include needed hydrometeorological instruments in the initial plan should be supplemented to include the needed instruments. The plan supplement should include items and details outlined in preceding paragraph (ii).

(2) In developing proposals that include hydrometeorological instrumentation, the guidelines established in Office of Management & Budget (OMB) Memorandum M-92-1, "Coordination of Water Resources Information," and Circular A-62, "Policies and Procedures for the Coordination of Federal Meteorological Services," are to be followed to avoid duplication of effort and to ensure efficiency of the data collection system. Instrumentation may be required for planning, operation, or both.

(d) Installing hydrometeorological instruments. For planning, hydrometeorological instruments are to be installed as soon as possible after planning is authorized to ensure that the maximum length of record is available.

(e) Operating and maintaining hydrometeorological instruments.

(1) Cost of operating and maintaining hydrometeorological stations used to operate the project reservoirs or other project measures are the responsibility of the sponsors. Funds are not to be used for sharing of operating and maintenance costs. Funds

may be used for instruments and for analysis of data needed for planning and designing a reservoir. These funds should be included as part of the engineering services cost of the structure. Snow survey or other appropriate federal funds may be used.

(2) If requested, and if the sponsors reimburse NRCS for the costs, NRCS can help operate and maintain hydrometeorological instruments including the collection and analysis of data. NRCS may share in operation and maintenance costs if installed hydrometeorological stations provide data used outside the project area and NRCS has responsibility to provide data.

(f) Inspection and follow up.Significant items to consider in inspection and follow up include evidence that: hydrometeorological instruments are maintained in good working order so that reliable data are obtained; data are collected and used in a timely manner according to the operating needs of the reservoir; forecast procedures are updated and accuracy improved as additional data are collected; and reservoir gates and other project features are operated so as to regulate the storage or release of water for project purposes in accordance with the operation and maintenance agreement.

(g) Funding hydrometeorological instruments. Costs of installing instruments required for project development are planning costs and should be charged to that activity. Approval to spend planning funds for hydrometeorological instruments shall be commensurate with the required type of monitoring. Influencing factors include cost and length of time monitoring will be required. If long-term monitoring is required, the likelihood of long-term funding should be considered. Requests for approval should include a description of the required instruments including numbers, kind, and location, a schedule for installation, and a statement of justification.

530.03 Hydrologic reports.

(a) Hydrologic reports provide:

(1) A record of investigations performed.

(2) Factors considered in selection of project alternatives.

(3) Information for future studies.

(4) A record of how a structure or system of structures operates under design conditions.

(b) Reports may include, but are not limited to, the following:

(1) Investigation of water supply for a water storage site.

(2) Effects of alternative systems of floodwater retarding structures on downstream discharges.

(3) Report on unusual storm or flood discharge.

(4) Report on field study of emergency spillway performance.

(5) Reservoir Operation Plans.

(6) Floodplain Management and Flood Insurance Reports.

(7) Dam breach and inundation studies for emergency action plans (EAP).

(8) Water budget analysis for wetland restoration, enhancement, and construction.

(c) Review and Approval of Reports

The preparation, review, and approval of these reports and investigations must be consistent with the job approval authority.

SUBPART B - HYDROLOGIC PROCEDURES AND CRITERIA

530.10 General.

Hydrologic procedures have been developed within NRCS to assist in the planning and design of on-farm conservation practices, including water control structures, and to solve hydrologic problems encountered in developing plans and designs for project activities. Because structure or project costs may range from several hundred to several million dollars, it is important that the most suitable hydrologic procedure be used for a particular problem. The procedure selected must provide the desired level of accuracy and complement other design procedures to ensure that the structure or project meets its functional objective. Hydrologic criteria for designing conservation practices and water control structures have been developed largely from field experience and represent minimum acceptable standards consistent with the objectives of the practice or structure.

530.11 Hydrologic procedures.

(a) Procedures in the Engineering Field Handbook, (EFH), Chapter 2, is the preferred methods for hydrologic analysis for on-farm conservation practices. It shall used unless specifically excepted by the approving engineer.

(b) Procedures in Part 630 of the Directives System and designated references are to be used for hydrologic analysis of soil and water conservation practices to the maximum extent practicable. These hydrologic procedures include Urban Hydrology for Small Watersheds (Part 728.50 formally TR-55) and Computer Program for Project Formulation - Hydrologic Investigations (Part 730.30 formally TR-20).

(c) Procedures outside the scope of the National Engineering Handbook, Section 4, Hydrology, (NEH-4) and other designated references may be used if prior approval has been obtained from the approving engineer.

530.12 Hydrologic criteria.

Hydrologic criteria established in standards and directives are to be used for designing conservation practices and water control structures. Exceptions to use of national criteria are to be obtained from the Director of the Conservation Engineering Division. Requests for such action are to include the recommendations of the approving engineer.

All engineers and technicians shall be trained in the use of NRCS hydrologic procedures needed for the planning, design, and installations of conservation measures.