Station Descriptions and Quality Assurance Paragraph Examples

A station description documents the location and describes the characteristics of a streamgaging station. Beginning with records for water year 2000, records furnished to the USGS were required to be accompanied by a station description. Hydrographers responsible for station operation are expected to update station descriptions every three years or any time there is a significant change at the station. Examples of Quality Assurance write-ups are provided later in this document.

Most or all of the following elements comprise a station description:

- Location
- Drainage Area
- Establishment and History
- Description of the Gage
- Control
- Discharge Measurements
- Point of Zero Flow (PZF)
- Regulations and Diversions
- Accuracy
- Reference Marks
- Road Log
- Quality Assurance

A description of the rating could be included in the Discharge measurements section or the Quality Assurance section. Items that should be included in describing the rating include:

- date the rating was developed
- the technique that was used to develop it
- the persons, agencies, or contractors who developed it
- the operational range and sensitivity of the rating over that range
- description of planned activities to check the rating or maintain its applicability.

Planned activities to check ratings might include type and number of check measurements anticipated each year, or a plan for explaining the circumstances under which a hydraulic structure or its components will be re-rated, cleaned, repaired, or replaced. If engineered structures, AVMs, power-plant ratings, or other non-standard streamgaging techniques are used, the station description must include a brief discussion of the applicability of the non-standard technique(s) to the computation of streamflow, how the rating for that system was established, its functional limitations, and how the system is maintained.

The following are example write-ups for the Quality assurance section of the Station description.

- Example 1 (Natural Channel): "Quality assurance - Make 8-10 discharge measurements per year, covering the full range of flow. Read all staffs and recorders during each visit and document. Survey levels every 3-5 years. Three RMs, all staffs, point of zero flow (pzf), and present water surface should be surveyed when levels are run. These are minimum quality assurance procedures. Much more may need to be done if unusual events occur."

- Example 2 (Natural Channel); "Monthly measurements will be made throughout the range of flow up to 50,000 cfs. Higher flows would involve heavy debris that would pose significant hazards to hydrographers. Flows higher than 50,000 cfs, will be rated by rating extension no greater than twice the measured discharge. Flows beyond that range will be rated by indirect methods."

- Example 3 (Artificial Control): "A minimum of two discharge measurements each year (one each on the high-and low-end of the rating) will be made with more measurements made as needed to define shifting conditions. Included in these visits will be checks of control-structure condition. A leveling survey is required every 3-5 years. Three RMs, all staffs, pzf, and present water surface should be surveyed during the leveling survey. These are minimum quality assurance procedures. Much more may need to be done if unusual events occur."

- Example 4 (Weir): "This 20 foot weir was rated by the manufacturer in 1959 based on standard ratings published by King. The rating was checked after installation using discharge measurements. The weir is cleared monthly of debris when the width of the accumulated debris exceeds 5 percent of the length of the weir. The approach section depth to dam height ratio is __, greatly exceeding the ratio needed to ensure that the approach section velocity (head) is zero. Brass reference markers are surveyed every 3 years and have shown no settlement or shifting. The spring edge of the weir is covered by angle iron that is in good condition and follows the original profile as determined from visual inspections and level checks. Consequently, the original rating can be continued without change. Flows that exceed the rating are determined by indirect methods for dams as described by USGS TWRI..."

- Example 5 (Power Plants): “This power plant rating was confirmed by the salt-dilution method (Gibson methods, pitot tube methods, etc.) in 1940 by the AAA Turbine Company under contract with the BOR. There is no access for current meter measurements due to backwater from the downstream lake. (Other limitations might apply such as irregular channel bottoms that degrade measurement condition such that measurements are considered poor or unusable by the USGS.) The intake pipes are coated with calcium deposits that have greatly increased flow resistance and may have caused the rating to be in error at low heads. A UVM system has been ordered and will be installed in 2002 to replace the old rating for this intake.”

- Example 6 (AVM): “This AVM was installed in 1985 by the AAA Streamgagers Company. The system consists of 16 transducers in a 60 inch steel pipe 50 feet downstream of the nearest pipe elbow. The transducer readings are temperature-compensated by a temperature probe installed in the turbine forebay near the intakes. The temperature probes are calibrated twice each year with a scientific grade thermometer. The cross-sectional area of the pipe is clean and no changes in area were observed during inspections when the plant was dewatered in 1998. Transducer signal strength is routinely monitored to detect failed transducers. Two transducers failed this year. These failures were reported to the vender who furnished a revised area-weighted coefficient that was applied to compute the mean velocity from the remaining transducers. The unit is expected to be replaced in 2001”.

- Example 7 (AVM): “This AVM was installed in 1990 by Power Omega Corporation. The system consists of 4 transducers in a 36-inch pipe 25 feet downstream of the nearest elbow. The AVM rating is checked twice each year utilizing a strap-on AVM. When the errors exceed 5 percent the unit is serviced or replaced.”

- Example 8 (AVM): “This AVM was installed in 1990 by Tiny Drop Power Company. The system consists of 8 transducers in a 36-inch pipe 25 feet downstream of the nearest elbow. The AVM results match power plant rated flows for heads from 15 (minimum operations pool) to 50 feet (spillway crest) as determined by examination of current records on the 15th of each month in 2001. Flows exceeding the AVM rating are determined by indirect methods at a constricted bridge opening 0.5 miles downstream.”