Current monitoring practices in chemical industry tend to serve three purposes: 1) environmental concerns (e.g., minimize and document gaseous, liquid or solid emissions into the environment); 2) quality control (e.g., that end products meet production specifications); and 3) economic (e.g., that raw materials, equipment, utilities and other process variables are used to best commercial advantage). Because these issues are also of concern with respect to CWC activities, it is instructive to consider current industry practice as the Conference on Disarmament deliberates the use of inspectors and instruments to verify compliance in the areas of process monitoring and chemical destruction.

MONITORING SYSTEM: A monitoring system may consist of most or all of the following components: instruments or sensors to collect the data of interest; data processing, storage, analysis, and transmission; and in addition to these, human participants are required, either as plant operators or inspectors. Depending on the case-by-case monitoring requirements, these components may be quite simple or rather complex; elementary or sophisticated; inherently reliable or difficult to maintain; single-purpose or multipurpose; analog or digital; almost fool-proof or easy to circumvent; manpower intensive or able to operate without much human interaction; located in or near the process equipment or remotely, perhaps even at considerable distance, from the process; inexpensive or costly. In addition, they may operate in-line (where a sensor's probe is inserted into a process stream to collect the data of interest) or on-line (where samples are extracted from the process stream for measurement or analysis). These dimensions will be elaborated briefly below.

Complexity: Tenperature and pressure sensors, for example, are simple, widely used instruments that are likely to be needed to monitor certain aspects of the CW Convention--whether to provide coarse data to reveal if a former production facility has been restarted, or to provide exact data to indicate that illicit chemical agents are not being produced during a certain reaction. Sophisticated analytical instruments--e.g., gas chromatographs, mass spectrometers, etc--may be needed to shed light on allegations of illegal production prohibited agents, or to analyze degradation products from demilitarization or destruction operations.