to isolate problem streams while they are still easy to contain. In many cases, the recovered chemicals may be suitable for reuse or recycle. Care must be taken, however, before recovered chemicals are recycled. After they are purified, tests should be performed to ensure that these chemicals are suitable for recycling.

By using spray rinse, the following benefits may be realized:

- Improved quality resulting from improved rinsing.
- A reduction of the chemical loading on the treatment system.
- Closed-loop rinse cycle becomes a viable option.

Operator

As mentioned previously, the operator must have a good knowledge of the chemical principles behind the treatment process, as well as a good understanding of the equipment, its function and how to maintain it. This could not be manifested better than in the case of the nickel/chromium strip solution, where any chromium salts left over in the filter will redissolve in the high pH solution used for nickel precipitation, producing chromium-contaminated effluent. Pumps will not operate with clogged strainers, and we all know what happens if they are run dry. Likewise, pH probes will not work if stored dry or in the wrong solution. The fact that a pH probe works does not mean it is accurate.

Good housekeeping, operating practices and a daily activity log are indispensable for the successful performance of the system. Changes may happen very slowly and can be almost impossible to detect without looking back at the record. Frequently, operational difficulties can be detected by charting analysis results or chemical use. Certain routine activities, such as replacement of filter cartridges, probe cleaning and calibration, should be just that—**routine**.

Its Time Has Come

Hydroxide precipitation systems used to be the "Best Available Technology." It is time, however, to take advantage of new, environmentally friendly technology. Hydroxide precipitation systems are best used for batch treatment of concentrated waste streams produced by other technologies, such as concentrates separated by nanofiltration membranes or ion exchange resin regeneration liquor.

There are too many variables that control the operation of hydroxide precipitation systems. This is the reason for their poor performance. In defense of the operator, all of the variables are not in his control. Hydroxide precipitation, the oldest and most cumbersome wastewater treatment technique, produces the most waste. One pound of sodium copper cyanide consumes 6.33 lb of chemicals to produce 2.5 lb of filter press cake that contains 20 percent solids. In addition, the five pounds of soluble chemicals produced, added to total dissolved solids (TDS), henders recycling efforts. As new technologies develop and existing technologies become more affordable,

AESF Technical Staff Launches New Publication

AESF's technical staff recently published its first issue of *The Faraday,* a bimonthly newsletter for providing information of interest to the Society's instructors. The newsletter is edited by Richard G. Baker, CEF-SE, AESF Fellow.

Here's an item about "Weird Science" that appeared in the first issue.

The following is a list of comments from test papers, essays, etc., submited to science and health teachers by elementary, junior high, high school and college students. The author is unknown. Your editor thought that you might find these somewhat amusing, if you have not already seen them:

- *H_2O is hot water. CO_2 is cold water.*
- *When you smell an odorless gas, it is probably carbon monoxide.*
- *Water is composed of two gins, oxygin and hydrogin. Oxygin is pure gin. Hydrogin is water and gin.*
- *A liter is a nest of young puppies.*
- *Momentum: What you give a person when they are going away.*
- *The pistol of the flower is its only defense against insects.*
- *A fossil is an extinct animal. The older it is, the more extinct it is.*
- *The tides are a fight between the Earth and moon. All water tends toward the moon, because there is no water on the moon, and nature abhors a vacuum. I forgot where the sun joins in this fight.*