**Automatic Generation Control (AGC)** is a feedback control system that regulates the power output of electric generators to maintain a specified system frequency and/or scheduled interchange. The area control error (ACE) is calculated based on the operational mode selected by the dispatcher:

- **Constant Net Interchange**, where ACE is calculated from the error in interchange over the tie lines
- **Constant Frequency**, where ACE is calculated from frequency deviation only
- **Tie Line Bias**, where both of the above components are included in ACE
- **Tie Line Bias plus Automatic Time Error Correction**, which adds a component to ACE to automatically correct for previous accumulated time error, and for previous accumulated inadvertent interchange.

Each of these is calculated in accordance with NERC, observing a user-selectable sign convention for flows and ACE.

The AGC program contains two control loops:

- **A Unit Control loop**, which is an inner loop that maintains the desired generator power output by means of setpoints or raise/lower pulses, subject to user-entered output and rate-of-change limits. The rate limiting logic recognizes that thermal units can exceed limits for short periods of time.

- **A Load Allocation loop**, which is an outer loop that alters the desired generator power output in response to ACE, subject to bandwidth restrictions of the inner loop. A non-linear filter is applied to ACE to minimize unnecessary control action.

The load allocation algorithm computes two components of load distribution:

- **Economic**, where each generator is assigned a base load plus an economic participation factor that allows ACE correction to be distributed economically.

- **Regulating**, an additional component used because units which are desirable for regulation are not always the most economic ones. This includes an emergency assist factor for those generators that are not normally used for regulation.

**Economic Dispatch**

The system includes an Economic Dispatch Calculation program that dispatches the system generation required to supply a given load in a manner that minimizes the cost of production. For each dispatchable generator, the program calculates optimum base load and regulating participation factors, used by the closed-loop control algorithms.

Each generator may be assigned up to three sets of economic parameters, consisting of fuel rate curves (piecewise linear), rate limits and high and low economic limits. The dispatcher selects the appropriate economic parameter set at will.

**Reserves Monitor**

A Reserves Monitor function calculates spinning, non-spinning and total reserves in generating capacity.
Alarm limits can be placed around these points to warn the dispatcher of minimum reserve violations. If desired, the limits can be automatically updated to represent a percentage of current load.

**Interchange Scheduling**

An Interchange Scheduling display window allows the dispatcher to define and review scheduled power interchange transactions. The AGC program takes these scheduled interchanges into account when computing the area control error.

For each transaction, the dispatcher enters details including times, ramp rates, etc. The amount that is ramped in at any given time is shown for each transaction on the Interchange display. The display also shows the following totals:

- Net Actual Interchange, based on measurements at the tie lines
- Net Scheduled Interchange, derived from the currently active transactions
- Net Scheduled Ramp Rate, based on all actively ramping transactions
- Net Scheduled Destination, based on the interchange amounts after any currently ramping transactions are fully ramped in or out.

Transactions may be designated to manually pay back previous inadvertent interchange.

**Joint Ownership**

Both the AGC and Economic Dispatch programs contain support for jointly owned units:

- Internal joint units, which your company operates and for which up to four other companies (co-owners) request desired shares of generation. Such requests may be telemetered via RTU or data link (such as ICCP).
- External joint units, which are operated by other companies, to which you telemeter your desired share of generation.

**Other features of the package include:**

- Since the AGC system supports a "scheduled frequency deviation" value, it is possible to perform time error correction.
- AGC outputs include calculated values that satisfy the requirements for reporting NERC C1, C2, CPS1 and CPS2 performance criteria. You can configure an advanced warning of an impending 10-minute interval with no zero-crossing.
- In addition to the NERC-compliant calculation of ACE, AGC can accumulate Inadvertent Interchange, and perform automatic payback using WECC Automatic Time Error Correction.
- The calculated values can be made available even while AGC is deactivated, to verify compliance during those periods.

The AGC package comes with a set of editors that allow you to set up and tune the system. You can create your own custom control panel using the SmartVU user interface.
Survalent Technology makes real-time operational intelligence and control easy. We integrate data from across your network to optimize your operations and help you efficiently make critical decisions that improve reliability and business performance. Our knowledge, experience, and passion encompass every solution we provide to our customers.

For over five decades, Survalent has helped more than 400 utilities use operational data to increase reliability, efficiency and customer service. With the following proven and reliable solutions, utilities transform data into actionable intelligence with Survalent:

- Supervisory Control and Data Acquisition (SCADA)
- Outage Management System (OMS)
- Distribution Management Systems (DMS)
- Distribution Automation (DA)
- Demand Response (DR)
- Substation Automation (SA)
- SurvCentral - Mobile Applications
- SmartVU - Visual Utility

Survalent Technology partners with utilities across the globe to create mission critical solutions that will achieve the promise of the Smart Grid.

Survalent has over 50 years of experience in the utility control room environment and the best customer retention record in the industry.

7965 Heritage Road
Brampton, Ontario
L6Y 5X5, Canada
(905) 826-5000 phone
(905) 826-7144 fax
www.survalent.com