

Giant Gas and Dust Cleaning Units Clear Air at U.S. Steel Geneva Works

PROVO, Utah, — U.S. Steel's Columbia-Geneva Steel Division has for the first time taken the wraps off a seven-year program at its Geneva Works to solve a unique air pollution problem here.

An all-out effort to solve this complicated problem — first of its kind in the history of the American Steel industry — was begun late in 1950 when it was discovered that Utah iron ore used as raw material in the big plant contained high concentrations of fluorine. This element contained in effluents emanating from Geneva is known to affect cattle if ingested in sufficiently high doses over a long enough period of time.

On display today were giant gas and dust cleaning units — carrying a \$9 million price tag — which control the emission of fluorides from the plant.

First to see the results of this intensive three-phase effort in development and installation of new equipment, research, and settlement of claims was a party of civic leaders and newsmen from this area. They visited the plant as guests of Division President L. C. Worthington and I. F. Black, general superintendent of Geneva.

Also opened for inspection for the first time were the research facilities of the plant's agricultural department, where fundamental research is conducted on the many aspects of the problem. This unit has also studied an estimated 60,000 farm animals since its organization in 1951 to determine any effects from fluoride emissions from the steel plant and to determine the facts upon which settlements were negotiated.

"We are glad the time is finally at hand for us to tell the story of what has been accomplished in our continued determination to be a good neighbor in this community," Worthington emphasized.

"Since late 1950, when we became aware of this unique situation at Geneva, no expense has been spared to solve this problem as rapidly as possible in a spirit of good will with our friends from Utah County."

Worthington pointed out that the entire program had not been made public until this time, pending judgment several weeks ago in long-standing suits brought against U.S. Steel by a group of 305 Wasatch, Salt Lake and Utah County farmers who alleged fluoride damage to livestock and crops.

Officials of Columbia-Geneva Steel Division first learned of Geneva's fluorine problem late in 1950. In early 1951, scientists from Utah State Agricultural College, checking a complaint by a farmer whose farm was located in the immediate vicinity of Geneva, diagnosed a condition known as fluorosis.

Experts from USAC, now Utah State University, and the Stanford Research Institute were immediately employed to begin a series of some 12,000 surveys in the area involved and evaluate data in April, 1951.

In the meantime, top experts in the field of air pollution control devices pooled their brains and engineering skills in a top priority, around-the-clock research and development program on the problem. Thousands of tests — involving as many as 100,000 manhours — were made on a number of different types of pilot cleaning systems that had to be installed and checked during actual operating conditions.

Stanford Research Institute and the plant's engineering department checked the effectiveness of each

new device tested. Stanford Research Institute and Utah State also determined the fluorine level in all parts of Utah County while these tests were in progress.

Today, as the result of this intensive research and engineering effort, Geneva's new air pollution control equipment — more than 90 per cent effective in removal of fluorides — is among the most modern and efficient in industry. After more than 900 separate final tests, the last of the units selected went into operation two years ago. They have operated continuously since that time.

Contained in each of the big effluent treating and cleaning systems are electrostatic precipitators which give an electric charge to the particles contained in dust and smoke. Then, acting as a large magnet, the precipitators draw off the tiny particles from the air pouring from the furnace.

Fluorine is removed during the process by exposing the smoke and hot air to lime dust—more than 40 tons each day — which collects the gaseous fluorine, converting it into solid particles. These, in turn, are removed by the electrostatic precipitators.

Because the problem — causing fluorides are locked in the Utah iron ore used as a basic raw material at Geneva, the control systems are located at Geneva's ten open hearth furnaces and at the sintering plant, where high temperatures convert fine iron ore into lumps suitable for blast furnace use.

"Since their installation, tests to insure the rated effectiveness of this equipment are conducted continuously and every effort made to improve their performance," Worthington pointed out. "Another feature of these devices of which we are especially proud is that, in addition to virtually eliminating the emission of fluorides, they also remove harmless particles from smoke and dust, making Geneva one of the cleanest steel plants in the world."

The second of U.S. Steel's two-pronged attack on the problem at Geneva is carried on by the plant's agriculture department — believed to be one of the best equipped of its kind in industry — and Utah State Agricultural College, which under Corporation grants has conducted continuous tests since 1951 on the effects of fluorine on farm animals and crops. Both are pioneers in new research in this vital field.

The staff of Geneva's agriculture department reads like a Who's Who of American agriculture. From an original group of two advisors, this staff today contains some 30 members, many of whom are recognized authorities in the fields of veterinary medicine, ani-

mal husbandry, plant pathology and physiology, agronomy, horticulture and meteorology.

"In addition to conducting basic research in this vital area, our agricultural staff in 1952 and 1953 negotiated the settlement of nearly 900 claims totaling \$4,450,234 of alleged damage to livestock in a cooperative, joint approach with farmers of Utah County," Worthington pointed out.

Showplace of the agricultural department is the eight-acre experimental farm set up in the shadow of Geneva's stacks in 1953 to test any effect of fluorides on crops commonly grown in Utah County. Here, as many as 155 different varieties of plants are grown in the open, as well as within greenhouses having controlled atmospheres in which crops are exposed to carefully measured amounts of fluorine.

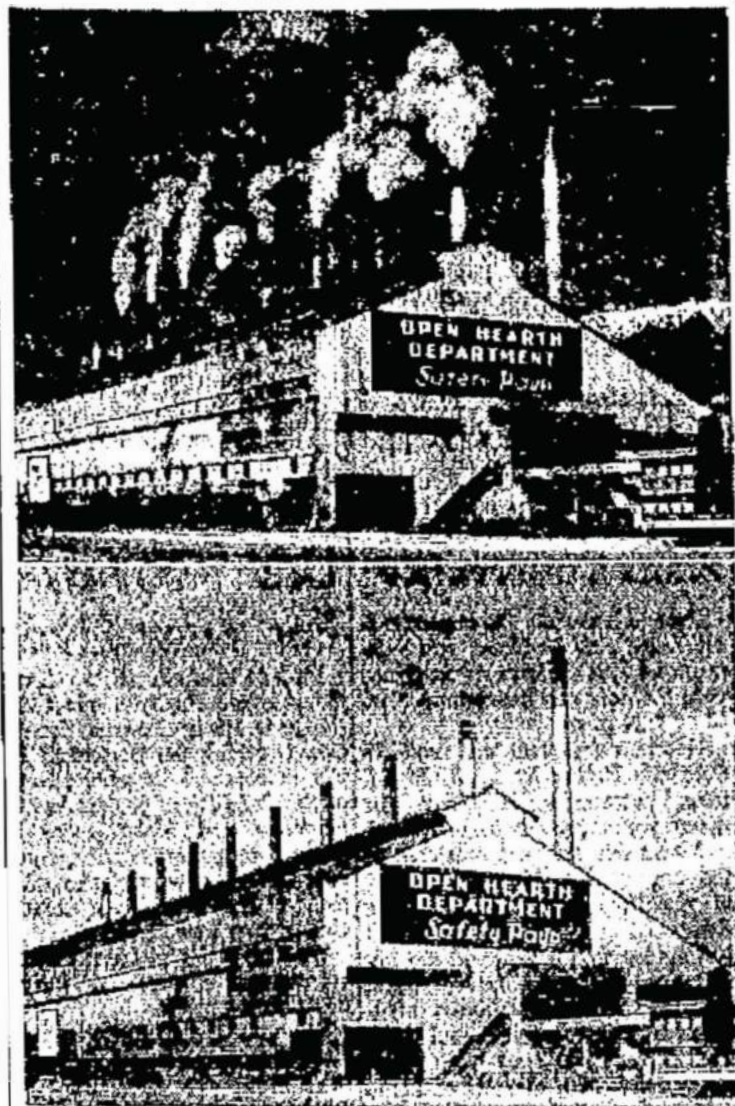
Using the most up-to-date farming techniques practiced in Utah, Geneva's agricultural personnel proudly claim to have raised some of the finest crops grown in Utah County. For example, in 1951, celery grown on the experimental farm was harvested and shipped to a number of eastern markets where it brought top prices.

Another feature of the agricultural department is the plant pathology laboratory, where many causes of crop failure or deterioration are traced and identified. In conducting this modern, scientific work, top agricultural experts have been brought to Utah County by U.S. Steel each year from such institutions as the University of California, Washington State College, United States Department of Agriculture, Rutgers University, University of Utah and Utah State Agricultural College.

Since 1951, at a special chemical laboratory set up and still supervised by Stanford Research Institute, more than 100,000 chemical analyses have been made on crops and feeds. Also, constant studies of the atmosphere in Utah County are made.

"While we are satisfied that our program has solved the fluorine problem in Utah County, we will continue to make certain that our operations at the Geneva Works are not causing damage to agricultural interests in this area," Mr. Worthington emphasized. "We will not relax in our long-range program to insure that corrective equipment is operating efficiently and to continue the beneficial activities of our agricultural unit."

"We believe the cooperative efforts between U.S. Steel and our neighbors of this area to solve this serious problem have demonstrated that agriculture and industry can live and prosper together in mutual trust and good will."



BEFORE AND AFTER — Top picture shows how smoke formerly poured from the ten open hearth stacks at U.S. Steel's Geneva Works near Provo, Utah. Bottom picture shows the result of research and development costing almost \$4,000,000. Electrostatic precipitators, installed in the open hearth department, remove smoke and fluorides emanating from the giant steel-making furnaces. Pictures were supplied by U.S. Steel.