

ILLINOIS POLLUTION CONTROL BOARD
March 8, 1973

GENERAL ELECTRIC, MIDWEST)
FUEL RECOVERY PLANT)
)
)
v.) PCB 72-477
)
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ENVIRONMENTAL PROTECTION AGENCY)
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OPINION and ORDER OF THE BOARD (by Mr. Dumelle)

The petitioner requests a variance from Rule 207(e)(2) of the Illinois Air Pollution Regulations which provides that no existing industrial process shall emit more than ten pounds of nitrogen oxides per ton of nitric acid used in such process after December 31, 1973. Hearing was held on February 7, 1973. At the hearing the Agency did not introduce any evidence in opposition to the variance.

The Midwest Fuel Recovery Plant (MFRP) is located near Morris in Grundy County. It is wholly owned by General Electric. The MFRP is a chemical reprocessing plant designed to take partially spent fuel and to recover the unused uranium, plutonium and neptunium for recycle as fresh fuel in order to preserve these natural resources and to provide waste forms suitable for long term storage. This is accomplished by dissolving the fuel material in strong nitric acid and subjecting this feed stream to chemical separation steps to purify the uranium and other elements. The plant is designed to process about 300 tons per year of spent fuel which is equivalent to the spent fuel from about ten large nuclear power plants.

High activity wastes resulting from this process are calcined to an inert oxide form and the other wastes are immobilized for storage on site in reinforced, lined concrete structures. Because only a small amount of the products from the plant are shipped in the nitrate form, it is necessary that the bulk of the nitric acid used in the process be decomposed and reconstituted to minimize the utilization of nitric acid and to prevent potential large scale releases to the environment. The control equipment incorporated at the MFRP to achieve such a maximum recycle system includes calciners, scrubbers and absorbers installed at an aggregate cost of \$2,500,000.

A total of 1,200 pounds per day of nitric acid is put into the plant, however, the actual daily use in the plant is ten times that amount or 12,000 pounds per day. The emissions from the plant are about 350 pounds per day of nitrogen oxides. The difference between the use and consumption is accounted for by recycling of the nitric acid. The acid is recovered for reuse by scrubbing the offgases of the calciners and reconcentrating the acid to the degree desired for the various processes. A final scrubbing of the offgases is done by the V-560 vessel vent scrubber, the primary purpose of which is to remove radioactive constituents, primarily iodine, from the vessel vent header and the condenser vent header system. The offgases are then passed thru a silver reactor and then thru a final offgas filter. They are then discharged into the air tunnel, filtered thru a low velocity sand filter and finally discharged to the atmosphere from the top of the 300 foot main process stack.

According to the testimony, the design estimate release of 350 pounds per day of nitrogen oxides from the main process stack would result in a maximum annual average concentration at the plant site boundary of less than 0.1 micrograms per cubic meter and less than 0.01 micrograms per cubic meter in the general offsite region. The additive effect of the proposed MFRP emission at the site boundary would be less than 1/1000th of the applicable ambient air quality standards and would be less than 1/10,000th of those standards in the general offsite area. The standard is 100 micrograms per cubic meter.

Due to the requirement for handling both radioactive and non-radioactive gases, all equipment for process offgas treatment must be located within the heavily shielded portion of the process canyon area and must therefore be designed to be installed, operated and maintained completely remotely. Because the process offgas system has been designed primarily to assure the highly reliable control of radioactive emissions, any modifications to this system must be carefully evaluated to assure that no adverse operating or reliability problems result therefrom. Further, because the equipment will be required to operate in a radioactive environment the wastes which are generated by such equipment will be radioactive and must be disposed of as such. Also, because the equipment will be radioactive, many times what would otherwise be a minor malfunction or failure will result in the equipment having to be replaced in its entirety because the radioactive contamination associated with the equipment would render such repair extremely difficult if not impossible.

The petitioner also presented testimony on two systems which could be used to further control the nitrogen oxide emissions. Either system would cost about \$500,000 to install and would require around two years for development, design, approval, construction and installation. Prior to the installation of either system a suitable detailed design analysis would have to be performed. The analysis would include the capability

of the equipment to provide the required operating efficiencies under a wide range of both normal and abnormal operating conditions and to maintain the integrity of the system under all conditions including natural disturbances such as earthquakes and tornados. Also, prior to the installation of any system, AEC authorization would have to be obtained.

Petitioner takes the position that because of the substantial complexity associated with such systems and the potential adverse operational and safety problems associated with the installation at the MFRP, the current nitrogen oxide emissions are already as low as practicable for a plant of this type and that the installation of additional nitrogen oxide removal equipment is neither justified nor desirable. The Agency, in its recommendation, suggests that the variance should be granted. It states that the facility emits only a small quantity of nitrogen oxides in excess of the Regulations and that the nature of the operation raises the possibility that the further control of such emissions would be hazardous and expensive.

The Agency recommends a grant and under all the circumstances we will grant the variance for one year but subject to certain conditions which have been recommended by the Agency. We do expect, however, that if the petitioner returns for an extension of the variance that they will be able to prove that they have made substantial efforts between now and then to solve the problem.


This opinion constitutes the Board's findings of fact and conclusions of law.

ORDER

Petitioner is granted a variance for its MFRP facility from Rule 207(e)(2) of the Illinois Air Pollution Regulations until March 8, 1974 under the following conditions:

1. Within thirty days after the plant is in normal operation, the petitioner shall furnish to the Agency a more accurate account of nitrogen oxide emissions and delineate the method by which the figures were obtained.
2. Petitioner shall immediately notify the Agency if it makes any process modifications affecting nitrogen oxide emissions.
3. Petitioner shall supply, install and maintain a continuous nitrogen oxide ambient air monitor of a type and at a location to be approved by the Agency, within thirty days after this Order. Hourly average concentration data is to be submitted to the Agency on a monthly basis.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 8th day of March, 1973 by a vote of 3-0.


Christan L. Moffett, Clerk
Illinois Pollution Control Board

