DOW CHEMICAL U.S.A.

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MICHIGAN DIVISION
MIDLAND, MICHIGAN 48667

Director
Office of Nuclear Reactor Regulation
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Washington, DC 20555

DOW TRIGA REACTOR FACILITY - DOCKET NO. 50-264

The 1990 annual report for the Dow TRIGA Research Reactor Facility is attached.

Yours,

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dmp

Attachment

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ANNUAL REPORT - 1990

A. Staff, Licenses, and Training

The staff consists of six persons:

C. W. Kocher	Senior Reactor Operator	Reactor Supervisor
W. L. Rigot	Senior Reactor Operator	Assistant Reactor Supervisor
T. J. Quinn	Senior Reactor Operator	
J. J. Carni	Senior Reactor Operator	
M. E. Buchmann		
J. D. Romick		

Buchmann and Romick are trainees and are expected to take the Senior Reactor Operator examinations in late 1990. Each normally operates the reactor,, under the direction of a licensed Senior Reactor Operator, at least twice each week, performing the routine checkouts and irradiating samples for the analytical program, and each takes part in the lecture and examination schedule.

Licenses for the Senior Reactor Operators are current and the earliest renewals will be in 1993.

The first two-year requalification program was completed in the first quarter of 1990. Each Senior Reactor Operator took part in the eight quarterly requalification sessions, performed the appropriate operations of the reactor, took part in the annual hypothetical drills, and accumulated the required operating experience. The second two-year requalification program started with the second quarter of 1990.

The Reactor Operations Committee now consists of five persons:

J. J. Havel	Facility director
C. W. Kocher	Reactor Supervisor
S. W. Maxey	Radiation Safety Officer
W. L. Rigot	
T. D. Lickly	

Lickly was added to the ROC in June 1990 as a person knowledgeable in the use of radioactive materials and capable of providing a critical evaluation of the operation of the reactor and the associated activities.

B. Reactor Operating Experience

During the one-year period starting in May 1989 the reactor was operated for about seven megawatt hours, mostly at the maximum power level of 95 kilowatts. During that time there were about 280 operations for the irradiation of samples and about 260 operations for checkouts and training.

C. Major Changes

There were no major changes made to the facility; the operation of the reactor at power levels above 100 kilowatts to the newly-licensed maximum of 300 kilowatts will not commence until late 1990 or early 1991.

There were no new tests or experiments performed which had not been described in the Safety Analysis Report.

D. Unscheduled Shutdowns

From May 1989 through the end of April 1990 there were six unintentional shutdowns.

NUMBER	DATE	SCRAM CIRCUIT	REASON
1.	5-30-89	rate	operator error - inattention during very low-power operation at startup
2.	6-10-89	linear	operator error - pulled control rod instead of inserting rod when coming to power at 1 kilowatt
3.	11-6-89	rate	operator error - inattention during very low-power operation at startup
4.	1-24-90	linear	noise in the linear channel circuits during operation of the control rod drives at very low power
5.	1-31-90	linear	noise in the linear channel circuits during operation of the control rod drives at very low power
6.	1-31-90	linear	noise in the linear channel circuits during operation of the control rod drives at very low power

Unintentional shutdowns #1 and #3, involving different operators, occurred during startup when the operators withdrew control rods enough to allow the reactor to come to power at periods close to the set point. This is normal operating procedure and when the power level is greater than about one watt the circuits are stable and no problem occurs. However, at power levels just above source level, where these shutdowns occurred, the random fluctuations at the low count rate of the log channel can sometimes cause the period circuit to trip. The action required to avoid these shutdowns includes the use of restraint in the initial startup from source level.

Unintentional shutdown #2 (same operator as was involved in unintentional shutdown #3) was due purely to lack of attention during establishment of stable operation at a power level of one kilowatt.

These unintentional shutdowns were the subjects of reports and critical discussions at the meetings of the Reactor Operations Committee, in the presence of the operators. The topic of operator attention was a part of the requalification sessions, and the reactor supervisor reported and explained these unintentional shutdowns during the semi-annual reports to the Radiation Safety Committee.

There have been no unintentional shutdowns due to operator error since late 1989, including the many operations of the reactor by the trainees.

The other unintentional shutdowns, #4-6, were caused by a malfunction of the wiring in the vicinity of the reactor pool: the signal from the compensated ion chamber, used for the linear channel, was degraded by a poor contact in the coaxial cable. This cause was identified and repaired within two days of the last occurrence.

A new control console for the reactor has been ordered and is expected to be installed in late 1990; the signal cables will be replaced at that time. No further problem is expected.

E. Major Preventive and Corrective Maintenance

On July 30 1989 one of the reactor control and safety channels failed during an interval between operations of the reactor. This failure was discovered during a scheduled checkout and did not occur during the operation of the reactor. The affected circuit board was sent to General Atomics for repair; there were no replacement boards. Components on the board were replaced and the system was tested and put back into service. This was not a reportable occurrence.

On December 20, 1989, and again on January 1990, a portion of the circuits of the log channel failed during operation of the reactor. These were reportable occurrences and were duly reported. The cause was identified as poor contacts in a switch used to inject calibration signals to test the log channel. The switch was inspected and tested by the electronics technician and has provided good service since that inspection. The switch is still available from General Atomics and will be replaced if further problems occur. The installation of the new console in late 1990 will eliminate any further recurrence of this failure.

F. Radioactive Effluents

The only radioactive material released to the environment from this facility is argon-41, which is produced from the natural argon dissolved in the water of the pool, subsequently escaping from the pool into the reactor room and from there is emitted from the ventilation system, and from the natural argon present in the air used to transport samples from a laboratory into a terminus in the core of the reactor.

The average release after dilution or diffusion is estimated to be less than 25% of the allowed or recommended concentration.

G. Radiation Exposures

Radiation exposures received by facility personnel and visitors are monitored using film badges and thermoluminescent detectors. No persons have received exposures approaching 25% of those allowed or recommended in 10CFR20.

C. W. Kocher
Reactor Supervisor
1 August 1990