



Dow U.S.A.

The Dow Chemical Company
Midland, Michigan 48667

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Director, Office of Nuclear Reactor Regulation
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DOW TRIGA RESEARCH REACTOR - DOCKET 50-264

Sir:

Enclosed is the Annual Report for the Dow TRIGA facility for the year 1992.

Very truly yours,

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DOW TRIGA RESEARCH REACTOR

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There were no major changes, maintenance problems, or down time involving the reactor during 1992. Operation of the reactor continues to be plagued with an unacceptably large number of unintentional shutdowns (SCRAMs), most of which seem to be caused by the control system itself. A representative of General Atomics, the manufacturer of the control system, visited this laboratory in August 1992 and observed several examples of malfunctions. It is our understanding that an investigation at General Atomics' facility has led to a better understanding of the software and it is expected that changes will be made early in 1993 which will have the result of reducing the number of SCRAMs somewhat.

There were three announced US NRC inspections conducted by two Region III inspectors during 1992, with no violations or open items. The required annual audit was conducted by an outside consultant; recommendations were made and the Reactor Operations Committee has responded to these recommendations. The normal in-house audits of the radiation protection program, safety and housekeeping, and records were also performed and the recommendations acted upon. During 1992 the Reactor Operations Committee has also directed actions taken in response to recommendations made following a December 1991 audit by the carrier of the nuclear liability insurance.

A. Staff, Licenses, and Training

The staff consists of five Senior Reactor Operators, no changes having taken place during 1992:

| | |
|----------------|------------------------------|
| C. W. Kocher | Reactor Supervisor |
| W. L. Rigot | Assistant Reactor Supervisor |
| T. J. Quinn | Assistant Reactor Supervisor |
| M. E. Buchmann | |
| J. D. Romick | |

Licenses are current. Rigot and Quinn will apply for renewals in 1993, Kocher's license will be up for renewal in 1995, while the Buchmann and Romick licenses will be up for renewal in 1997. All operators are scheduled for medical examinations during 1993.

The current two-year requalification program started in the second quarter of 1992 and three sessions have been held. The SROs are current with operating experience and participation in hypothetical emergency drills, Reactor Operation Committee meetings, an annual operating examination, and the annual fuel inventory. Written examinations following each of the three quarterly training sessions were passed by all operators, with no indication of any deficiencies.

Operation of the reactor is an important part of the training program, since this reactor is operated on an as-needed basis, which results in numerous operations each involving reactivity manipulations, use of the control console, placement and retrieval of samples and handling of radioactive materials. The minimum experience of an operator during 1992 was 27.5 hours of actual operating time, involving 186 reactivity manipulations, and the maximum experience was 102.5 hours of actual operating time, involving 583 reactivity manipulations. Furthermore, each licensed person performed about 1/5 of the daily checkout procedures and at least two monthly checkout procedures; one of the monthly checkouts (an extensive combination of tasks involving the physical plant, the control system, and operating characteristics) was performed under the direction of another SRO as part of the annual operating examination.

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All licensed SROs took part in written and oral requalification examinations created and administered by a non-Dow consultant under observation of a NRC staff person. These were the examinations required during the six-year period of each license; each licensed SRO successfully passed these examinations.

E. M. Crim replaced S. W. Maxey as Radiation Safety Officer and member of the Reactor Operations Committee:

| | |
|--------------|------------------------------|
| J. J. Havel | Facility Director; Chair |
| C. W. Kocher | Reactor Supervisor |
| E. M. Crim | Radiation Safety Officer |
| W. L. Rigot | Assistant Reactor Supervisor |
| T. D. Lickly | |

B. Reactor Operating Experience

The reactor was operated for 1.06 Megawatt-days during 1992, for a total of 235 hours (an average of 11.6% of the available normal working hours) and 1,505 reactivity manipulations, including checkouts and testing as well as the irradiation of samples.

C. Major Changes

There were no major changes in the facility, and there were no authorizations of new tests or experiments significantly different than those performed previously, during 1992.

D. Unscheduled Shutdowns

There were 59 unscheduled shutdowns (SCRAMs) during 1992, down from 72 during 1991, a probably insignificant change. During the almost ten years from 1-1-81 the yearly average was 6 SCRAMs, with a high of 9 (1983) and a low of 3 (1989), using the control instrumentation installed in 1971 and 1973. After installation of the new console there were 4 SCRAMs during installation and startup in the last two weeks of December, 1990, 72 during 1991, and 59 during 1992. Some of these were related to hardware problems which have since been fixed, but a large majority seem to be due to two aspects of the control system: computer crashes and noise in the digital smoothing process which produces the period signal.

About 80% of the SCRAMs were associated with three areas: the digital smoothing process (about 50%), computer crashes (about 20%), and period scrams at the count-rate/Campbell crossover (about 10%).

About 5% were associated with hardware: a sticking control rod drive switch. A lubrication program seems to be helping control this; a request has been made to General Atomics to specify a different kind of switch for this application.

About 10% were associated with operator errors, which will be the goal of a reduction-through-training program during 1993.