

NUREG 0612
CONTROL OF HEAVY LOADS

R.E. GINNA NUCLEAR POWER PLANT
ROCHESTER GAS AND ELECTRIC CORPORATION

DOCKET NO. 50-244

FINAL REPORT

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Figure 1. The effect of the concentration of the *Agaricus bisporus* spores on the growth of *Agaricus bisporus* on the substrate.

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1.0 INTRODUCTION

In RG&E's Final Report on the "Control of Heavy Loads" guidelines (Reference 3), four overhead handling systems were listed as "still being evaluated." The evaluations of these overhead handling systems, listed below, are now complete and the results are contained in this submittal.

1. Monorail in Basement of Auxiliary Building.
2. 3-Ton Jib at Containment Equipment Hatch.
3. 40/5 Ton Auxiliary Building Overhead Crane.
4. 100/5 Ton Containment Overhead Crane.

This submittal, combined with RG&E's March 26, 1984 submittal, completes our review of the handling of Heavy Loads at R. E. Ginna Nuclear Power Plant.

2.0 MONORAIL IN BASEMENT OF AUXILIARY BUILDING

This monorail, rated at two and one half tons, is used to remove concrete hatch covers from the RHR pit and remove miscellaneous pump parts. Structural floor drop analyses and systems evaluations were performed for this monrail.

The results of the systems evaluation showed that as long as the plant was not on the RHR system, that a load drop from this monorail would be acceptable in accordance with the "NUREG-0612 criteria.

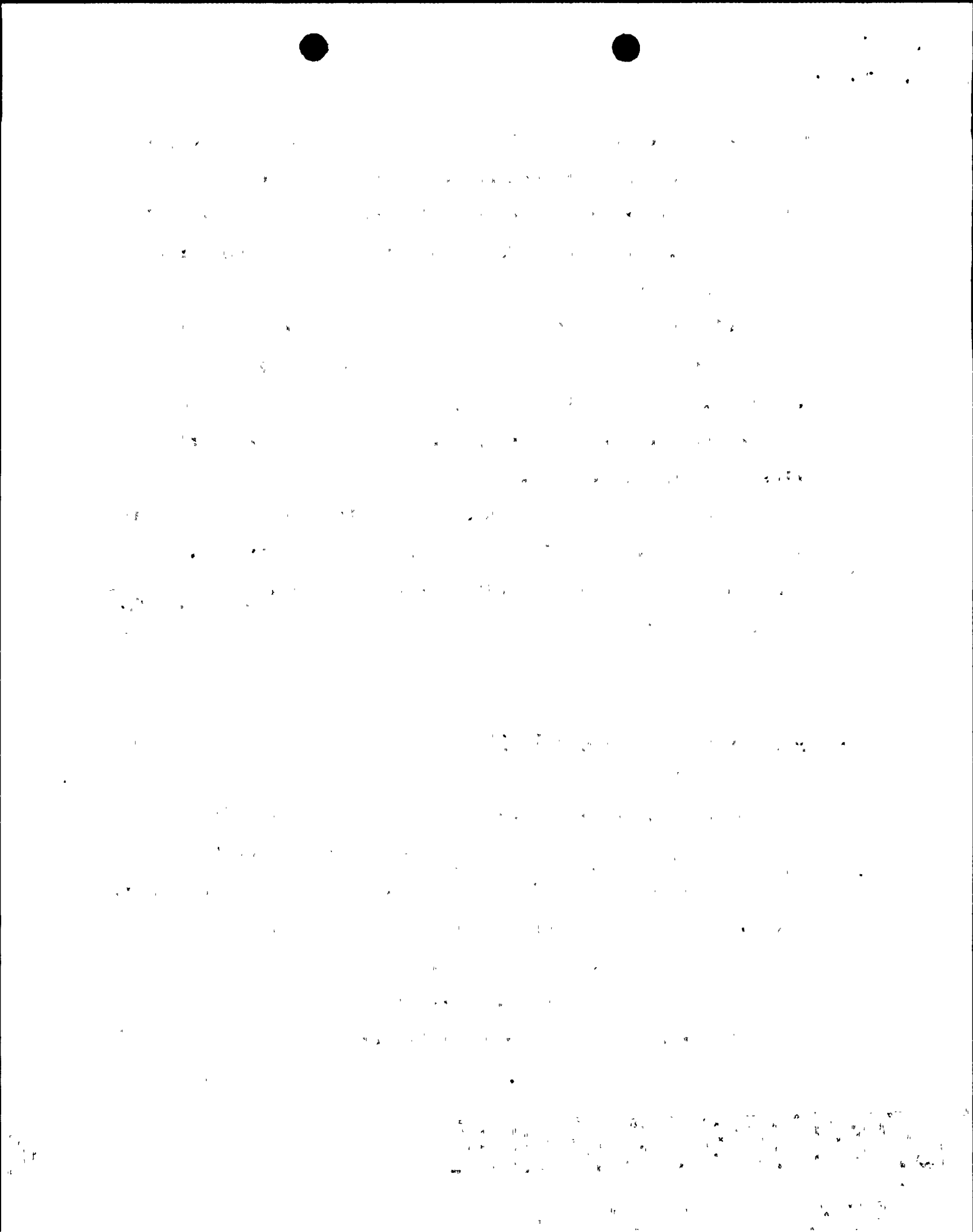
During periods when the RHR system is in operation, the pit access blocks will not be moved except through the use of strict administrative procedures to control the lifting of heavy loads. These procedures will identify the number of available trains for decay heat removal, provide for inspection requirements and other load handling criteria, and shall be subject to plant operating review committee approval. Specific load paths, rigging inspections and control room communication will be incorporated as part of these lifting procedures.

When not required for use, the trolley on this monorail is locked and the key is held by the shift supervisor.

All revisions to the plant procedures will be completed by December 31, 1984.

3.0 3-TON JIB AT EQUIPMENT HATCH

This jib, located inside the equipment hatch in containment, is used to transfer loads into the containment during shutdown. The jib, approximately 18 feet long, swings from the equipment hatch door to the crane bay. The floor below is a system of 9" and 24" thick concrete slabs supported by steel framing. Structural floor analyses have been performed and safe load height curves have been generated for these slabs. In order to avoid limiting the



physical operating restrictions in the field, however, systems evaluations in the drop zones were also performed. System analyses were done for each drop area for various modes of plant operation, with the acceptance criteria being the objectives of Section 5.1 of NUREG-0612, "Recommended Guidelines". The analyses determined the plant operating modes during which a load drop could occur and safe shutdown functions could be fulfilled even if the load drop resulted in a loss of primary system inventory requiring mitigating action.

The results of the systems analyses determined that a postulated heavy load drop by this jib while the plant is shutdown, but not yet on the RHR system, would be unacceptable.

As a result of these analyses and a review of Ginna Station's load handling requirements for this crane, the jib will be administratively restricted from carrying heavy loads until such time as the plant is shutdown and on the residual heat removal system. When the plant is on RHR, postulated heavy load drops have been determined to be acceptable. Administrative procedures will be revised and in place by December 31, 1984.

4.0 40/5 TON AUXILIARY BUILDING OVERHEAD CRANE

The overhead bridge crane located in the Auxiliary Building has two hoists. The main hoist, as described in our March 26, 1984 submittal will undergo a modification to



enable it to meet single-failure-proof criteria. Heavy Loads lifts using this hoist, after the modification is complete will meet the criteria in Section 5.1.2(1) of NUREG-0612. A description of the modification was provided in our application for license amendment submitted by letter dated January 18, 1984.

The Auxiliary Hoist is not being modified. Therefore, RG&E performed structural floor drop analyses for the maximum load it can carry, and systems evaluations for its travel path. (Note: Since the area over the spent fuel pool is protected by electrical interlocks, it was not included in the travel path).

The systems evaluations have shown that a load drop anywhere in the travel area of the Auxiliary Hoist is acceptable providing the plant is not operating on the RHR system.

When the plant is on the RHR system, a small section of the crane travel area is susceptible to an unacceptable postulated load drop (see attached sketch, area 1). The load handling requirements in area 1 during outages when the RHR is operational have been reviewed. It was determined that the lifting and transfer of heavy loads in this area using the auxiliary hook can be restricted during this time period.

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Revisions to the plant administrative procedures will prohibit the use of the auxiliary hook from handling heavy loads in area 1 when the plant is on RHR. Restriction signs and floor markings will also be provided for visual reminders. The above commitments will be completed by December 31, 1984.

5.0 100/20 TON CONTAINMENT OVERHEAD CRANE

In conjunction with the structural load drop analyses which were done for the reactor pressure vessel head and the upper internals package, RG&E has performed safety systems analyses for all areas of crane travel. The containment crane travel area was divided into six zones based on the physical separation of compartments in the building. Plant systems were evaluated for a potential loss of core cooling and safe shutdown capacity. The specific safe load paths for the reactor head lift, upper and lower internals lifts and reactor coolant pump lifts were traced through each zone and postulated drops considered along each path. In addition, all the remaining travel area was also considered for miscellaneous load drops. The evaluation in the six zones resulted in various plant operating modes which are required for heavy load movement in each of the zones, i.e., "plant on RHR" or "plant shutdown a minimum of 8 hours". In all cases, the limiting plant operating condition for heavy loads movement is RHR operation.

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As a result of these evaluations and a review of Ginna Station's shutdown heavy load lifting requirements, RG&E will restrict the use of the overhead containment crane in lifting heavy loads until the plant is on the RHR system. One specific exception will be taken to this restriction. After shutdown, but prior to placing the plant on RHR, the three crane bay access blocks will be allowed to be moved. The weight of these blocks is approximately 9 tons each and they are lifted with the 20-ton auxiliary hoist. A written administrative procedure will control these special lifts. It will include identification of lifting slings, inspection of rigging, identification of specific load paths, increased supervision and other pertinent requirements. Control Room communication will also be mandated. The above exception is necessary to maintain a smooth maintenance shutdown schedule. Without being able to lower light loads down into the crane bay for outage maintenance work, the duration of the scheduled outage would be greatly increased. Outage extensions are costly in both manpower and total costs of the down time.

Removing these hatch blocks will allow light loads to be transferred into and out of containment in preparation for outage work. A program to replace the blocks will also be used when the plant goes off the RHR system and starts to heat up.

1. The first part of the report is a general introduction to the subject of the study.

2. The second part of the report is a detailed description of the methods used in the study.

3. The third part of the report is a discussion of the results of the study.

4. The fourth part of the report is a conclusion and a list of references.

5. The fifth part of the report is a list of appendices.

6. The sixth part of the report is a list of figures.

7. The seventh part of the report is a list of tables.

8. The eighth part of the report is a list of abbreviations.

9. The ninth part of the report is a list of symbols.

10. The tenth part of the report is a list of footnotes.

11. The eleventh part of the report is a list of references.

12. The twelfth part of the report is a list of appendices.

13. The thirteenth part of the report is a list of figures.

14. The fourteenth part of the report is a list of tables.

15. The fifteenth part of the report is a list of abbreviations.

16. The sixteenth part of the report is a list of symbols.

17. The seventeenth part of the report is a list of footnotes.

18. The eighteenth part of the report is a list of references.

19. The nineteenth part of the report is a list of appendices.

20. The twentieth part of the report is a list of figures.

21. The twenty-first part of the report is a list of tables.

22. The twenty-second part of the report is a list of abbreviations.

23. The twenty-third part of the report is a list of symbols.

24. The twenty-fourth part of the report is a list of footnotes.

25. The twenty-fifth part of the report is a list of references.

26. The twenty-sixth part of the report is a list of appendices.

27. The twenty-seventh part of the report is a list of figures.

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29. The twenty-ninth part of the report is a list of abbreviations.

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For any other heavy loads which are identified as requiring movement while the plant is not on RHR an evaluation will be made to determine whether that specific load in that specific area can be moved safely. These lifts will require administrative review of the load, load paths and plant status. The acceptance criteria to be used for these lifts will be that of Section 5.1 of the NUREG. Plant administrative procedures will be revised accordingly by December 31, 1984.

6.0 CONCLUSIONS

- A. The monorail in the Auxiliary Building basement could be used with no unacceptable consequences from a load drop when the plant is not on RHR. Strict administrative procedures, including plant operating review committee approval, shall govern any heavy load movement by this monorail when the plant is on RHR.
- B. By administratively limiting the use of the 3-ton jib in containment to defined plant operating modes, the criteria of Section 5.1 of NUREG-0612 and Section 2.4 of Reference 1 will be met.

C. By administratively limiting the use of the 5-ton Auxiliary Hoist on the Auxiliary Building Overhead Crane while the plant is on the RHR system, the criteria of Section 5.1 of NUREG-0612 and Section 2.4 of Reference 1 will be met.

D. Systems analyses have shown that a load drop from the containment overhead crane in each of the six zones in containment is acceptable providing that the plant is operating on RHR. Plant administrative procedures will limit the crane use to only those periods when the plant is operating on RHR with one defined exception. Movement of the hatch blocks for the crane bay will be allowed during other operating modes. A detailed administrative procedure developed for this particular list will provide sufficient confidence that a load drop will not occur.

For any other unidentified heavy loads that require movement at times when the plant is not on the RHR system, the Plant Administrative Procedures will require that a load handling evaluation be performed.

REFERENCES

- (1) NRC Generic Letter "To All Licensees of Operating Plants and Applicants for Operating Licenses and Holders of Construction Permits" on the Control of Heavy Loads, December 22, 1980.
- (2) NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, USNRC, July, 1980.
- (3) Control of Heavy Loads Final Report, dated March 26, 1984.

