

# Arizona Nuclear Power Project

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March 2, 1988  
161-00851-EEVB/MRO

Mr. John B. Martin, Regional Administrator  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission, Region V  
1450 Maria Lane, Suite 210  
Walnut Creek, CA 94596-5368

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station  
Unit 1  
Request for Additional Information - Justification  
for Continued Operation: Re: Inability of CEA 56  
to Drop  
File: 88-A-056-026

Reference: (a) Letter (161-00826-EEVB/JRP), Dated February 25, 1988  
from E. E. Van Brunt to J. B. Martin, Justification  
for Continued Operation - Inability of CEA 56 To Drop

A justification for continued operation on Palo Verde Unit 1 was forwarded in Reference (a). This was discussed in a meeting at Walnut Creek, CA on February 29, 1988. At the meeting, additional information on maintenance history was requested. This letter addresses the following issues:

- \* Maintenance History of the Multi Stud Tensioner - Stud Handling Vehicle (MST-SHV) caster bearings
  - \* Reason for bearing replacement, if replaced
  - \* Location of caster bearing repair
  - \* Bearing pack failures during replacement
- \* Engineering History for MST-SHV failure

In order to address these issues and as a part of the ANPP Special Plant Event Evaluation Report process, extensive research was required. The course of research included:

- \* A review of all available work orders written against the MST since the initial fuel load.
- \* A review of the Engineering Evaluation Requests since 1984 on components classified within the Reactor Coolant System and containment.

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- \* Interviews with available Maintenance Supervision, Foremen and Mechanics who performed work on the MST during the course of the pre-refueling overhaul and bearing replacement prior to head lift.
- \* Interviews with a Planner/Coordinator responsible for Work Order preparation on MST.
- \* Review of the MST Technical Manual to determine the scope of requirements to overhaul the MST.

#### Maintenance History of MST-SHV Caster Bearings

A review of the available work order was performed to determine the maintenance history of the MST-SHV. This review identified several Work Orders on the MST-SHV. Repairs of this type are normally performed as "Minor-Maintenance," since the MST is classified as a tool. In the case of Minor Maintenance on tools no documentation of activities performed is required. Therefore, the exact number of bearing repairs is indeterminate.

The review of Work Orders performed on the MST identified three work orders of major significance.

- 1) In 1986 the MST was rebuilt in the fuel building in preparation for refueling:

The manufacturer of the MST recommends replacing all gaskets on the hydraulic cylinders once every four years. During this process, the MST was overhauled in order to prepare it for the first refueling outage. As part of the work performed, three or four caster bearings were replaced due to their being "locked-up". The caster bearing or bearing assembly is an integral unit consisting of a bearing housing, ball bearings, a roller ball, a felt ring, and a cap. A total of five or six caster bearings were locked up but there were only spare parts for three or four bearings.

Interviewees have stated that during the replacement of the three or four caster bearings in the fuel building they did not notice any small ball bearings falling out of the caster bearing. The tech manual recommends that the caster bearings be tested for freedom of movement. Maintenance personnel removed a caster bearing that was locked up and took it apart in the fuel building in an attempt to repair it. It was not repaired due to broken ball bearings within the bearing housing. No ball bearings were lost. It was at that time that the design of the caster bearing was first recognized by the maintenance personnel doing this work. (The vendor's technical manual does not include any specifics on the design of this bearing).

Just prior to refueling, the MST was moved into the containment building on to its stand though two caster bearings still required future replacement.

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- 2) A work order was written for performance of the Reactor Vessel head lift in October, 1987. During final preparation of the MST for the head lift, the back ordered replacement bearings arrived. Work was accomplished prior to establishment of cleanliness zone 3 and prior to the head lift. Replacement of two bearings was done inside containment on the MST storage stand. Maintenance personnel that performed the replacement were interviewed and stated that the first caster bearing removed from the SHV came apart during removal, spilling numerous ball bearings. The caster bearing that came apart was located such that it was at the farthest position from the upper guide structure pit, Figure 1. They cleaned up all the small ball bearings found on the MST and on the floor and they disposed of them. The MST was then placed on the Reactor Vessel head and the studs were detensioned. The maintenance crew found more ball bearings at that time on the MST. They requested station services to clean the reactor head and pool seal area prior to removal of the head. The cleaning was then accomplished.

It is possible that one of the ball bearings lost at the time the work order was performed while the MST was on the stand, found its way into CEA 56. The investigation is continuing on Unit 1.

- 3) The MST was inspected subsequent to the recent discovery of the ball bearing in the CEA guide tube in February, 1988.

During this Unit 1 inspection seven (7) caster bearings were determined to be faulty (there are a total of 16 caster bearings on the MST) and removed in the containment building. There were no reports that any ball bearings came apart in the course of this bearing removal. The caster bearings were determined to be faulty if they exhibited "too much" movement or "no" movement. The faulty caster bearings all showed no movement. The seven caster bearings were removed in containment, taken to the service building and disassembled. Three of the caster bearings showed no wear. Two of those were replaced and one returned to service. The other four exhibited a considerable amount of wear (including "destroyed ball bearings, split ball bearings, an insufficient number of ball bearings and a fractured bearing cup").

#### ENGINEERING HISTORY OF MST-SHV FAILURES

A review was performed of the Engineering Evaluation Requests since 1984 for the reactor coolant system components and the containment building. There are no records of Engineering Evaluation Requests to evaluate any MST-SHV ball bearing losses.

#### BEARING FAILURE INFORMATION - VENDOR

A representative of Kleiber and Schulz, the licensed broker for Kloeckner Becorit (the manufacturer of the MST) was contacted. He stated that there is no record of bearing failures of the type that occurred at PVNGS (loose bearings). Star Manufacturing, the manufacturer of the bearing, is being contacted to provide an assessment of the failure mode experienced at PVNGS.

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SUMMARY

Results of the investigation to date have found one instance where small bearings were released to the containment during bearing caster replacement on the MST stand in October, 1987 prior to head removal. Further investigations are continuing on post maintenance activities in the units. The results of the investigation to date add weight to the conclusion reached in the JCO, Reference (a) and adds more conclusive evidence to the source of bearing release from the bearing casters. ANPP continues to believe that, as stated in the JCO, areas of concern have been identified with the foreign material exclusion program in that it was not designed or intended to exclude material from component failure e.g., MST caster bearing failure. In addition, as stated in the JCO, the caster bearings on the MST have been replaced with a new design that will eliminate a failure of this type. If any significant information becomes available during further investigation, ANPP will notify you.

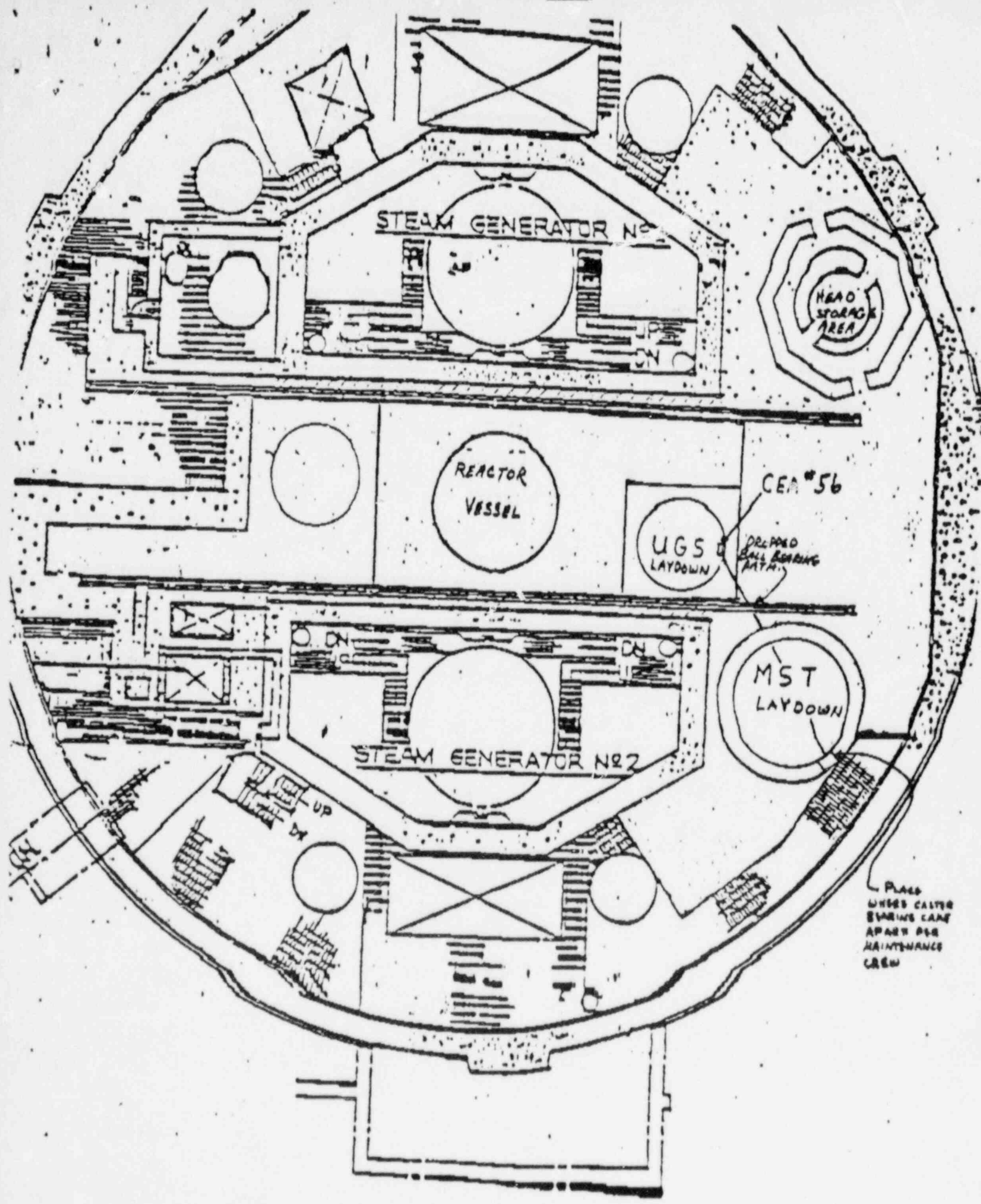
Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.  
Executive Vice President  
Project Director

EEVB/MRO/lr  
Attachment

cc: O. M. De Michele  
J. G. Haynes  
G. W. Knighton  
E. A. Licitra  
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R. J. Pate



MST / UGS FLOOR LAYOUT