Item # 1

AFFIDAVIT

My name is I am giving this sworn statement freely, without any threat or inducement, to John Clewett, who has identified himself to me as an attorney working with the Government Accountability Project (GAP) of the Institute for Policy Studies (IPS) in Washington, D.C. I have decided to speak openly about the safety-related problems at Diablo Canyon because I fear that the Nuclear Regulatory Commission may otherwise take the premature action of allowing the startup of Diablo Canyon before it has been shown to be safe to operate.

I am currently working at Diablo Canyon for Pullman Power Products as a Quality Control Inspector, Level II.

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As an individual trained and experienced in quality control inspection, I have found serious quality-control problems at Diablo Canyon. These QC failures affect safety-related structures and systems that are crucial to the safe operation of the Diablo Canyon nuclear reactors.

My particular concerns include the following practices:

189 1. In October or November of 1982, while I was working for Pullman Power Products as a QC inspector, Magnaflux Corporation was brought in by Bechtel/PG&E for a weld reverification program on butt welds on Unit 1 ruprture restraints using ultrasonic testing. It was apparent after the testing was done, that an unacceptable percentage of the welds were bad.

There were some truly pathetic welds. In one particularly vivid case, I observed a butt weld, which is required by professional welding codes to incorporate a backing bar as an integral part of the welded joint. However, the backing bar was only held on in this case by the tack-welds meant to hold the bar in position while the weld itself is completed. It was on so weakly (no penetration) that a light tap with a hammer knocked it off completely. This weld was on a steel ruptrue restraint that was probably also structural, holding up a pipe rack at Unit 1.

Later, I was told by one of the Magnaflux inspectors that a

a PG&E engineer from San Francisco declared that in spite of the ultrasonic testing results, the welds were acceptable, on a volumetric basis. What this means is that the number of defects in the welds doesn't matter because the remaining acceptable weld volume is sufficient. The problem with this analysis is that ultrasonic testing is unable to determine what type of discontinuity exists in the weld. For certain discontinuities, such as trapped gas or slag, the volumetric size can be a valid consideration. But if the weld is internally cracked, there is a good chance that the crack will propogate, causing the weld to fail. For this reason, the acceptance of these welds on a volumetric basis is completely improper, because the welds could still be bad.

I am concerned that the specific welding of the ruture restraints and pipe supports may not be adequate to insure safety. But beyond that I am concerned that the actions of the Bechtel/PG&E officials who tampered with the ultrasonic testing showed contempt for the very concept of quality assurance, which presupposes reliable testing of components, systems and structures so that they have been honestly shown to comply with applicable principles of quality assurance.

2. To my knowledge, from personal observation and from discussions with others, improperly made studs have been and are still at the present time being welded on to the containment interior liner of the containment buildings for Units 1 and 2. Because of the crucial safety importance of the containment liner, one of the few things allowed to be welded onto the containment liner are studs, from which crucial systems are hung, such as the containment spray ring.

The problem is that many of these studs, which perform a crucial safety-related function, were fabricated on-site using unqualified materials (ASTM A307 Grade B) that were not designed for the purpose of being welded. As a consequence not only have the applicable welding procedures been violated, but the welds attaching these studs to the containment liner are likely to be insufficiently strong and durable to meet design requirements.

The improper studs were made by taking ordinary bolts and cutting off the heads of the bolts, then chisel pointed the end so that it could be welded to the containment liner. Other components were then attached to those studs.

Using these bolts as studs at all is a violation of the plant design and of the concept of quality assurance. Beyond that, however, the welds holding these bolts to the containment liner are in all likelihood weaker than they would be if done with proper materials.

The bolts in question are made of material, namely ASTM A 307 Grade B, that is not qualifiable by ASME 9, which covers the welder procedures for pressure vessels (nor, for that matter, by AWS D1.1, which covers structural welding).

The procedure used for making these welds specified that studs had to be "P1", a rating of the weldability of the studs. As unqualified material it is dubious that ASTM A307 Grade B is weldable, especially because bolts often contain elements such as sulphur and phosphorus to make them easier to machine, but which would contaminate and weaken any welds done with such materials. Also,

the bolts are probably much higher in carbon than is acceptable for welding. Because of this, welding these bolts to the containment liner would create welds that are not as strong as welds made with P1 material. In addition, the contaminating elements in the bolts could cause the heat-affected zone of the containment liner itself to become weaker.

Even if the material were weldable, ~~PG&E~~ Pullman Power Products doesn't have a procedure to weld it, since it is an unqualified material.

The fact that unqualified bolts were used in place of the studs that are required by the design raises serious questions not only about the safety of the studs themselves, but also about the integrity of the Engineering and Quality Assurance system at Diablo Canyon.

#138 3. Several problems with Diablo Canyon were brought to my attention in early 1983 by a friend of mine who used to be the assistant manager of the night shift at the H. P. Foley Company until he quit because he was finding so many problems and so much improper work that had been approved and accepted. The H.P. Foley Company is one of the principal subcontractors on site at Diablo Canyon, and is responsible for the structural, electrical and instrumentation work.

One of the most shocking of these problems concerned the in-core thermocouples which perform the safety-related function of monitoring the temperature inside the reactor core. Foley's night shift assistant manager related to me how the in-core thermocouples had been installed in rush fashion on Sundays,

without the normal quality-assurance procedures required for safety-related hardware. The reason for the rush was that at the time they were installed, PG&E was hurring to finish completing the systems required by the NRC in order to license the plant. In particular, Foley did not treat the in-core thermocouples as Class 1, so that there was no need to maintain material traceability on the work.

When Foley's night shift assistant manager told his management about the problem, it was implied that he was ~~they told him~~ to keep quiet about it or else he would be fired.

4. Another safety-related problem that related to the work of the Foley company concerned the "beam clamps" that clamp onto I-beams and support the electrical cable trays, which carry all the electrical cables for instrumentation, control, lighting and other purposes.

The I-beam flanges onto which these clamps attach come in two types (M and W), one of which is straight-sided and one of which tapers. Because of this, proper practice requires each beam clamp to be of a type that matches the type of I-beam flange to which it must attach.

However, the H.P. Foley Company bought only one kind of beam clamp. Therefore, sometimes the beam clamp would fit properly, and sometimes it wouldn't. On a walking tour inside the containment, my friend the night assistant manager for Foley showed me a large number of beam clamps that were cock-eyed and appeared loose. He said that a lot of the beam clamps could be kicked completely off. And he showed me that a number of the beam clamps that didn't fit properly had been tack-welded onto the I-beams to keep them from falling off. This is

an unqualified procedure; beam clamps are not supposed to be welded.

Through the use of improper materials and unqualified procedures, the beam clamps that hold up the crucial electrical cable trays have been installed in flagrant violation of quality-assurance standards, and are of indeterminate quality. In fact, many of them are probably affirmatively unsafe. This is a continuing problem - I have seen cock-eyed beam clamps as recently as last week.

5. In early 1982, while I was working for Central Coast, I became personally acquainted with yet another instance of a questionable quality assurance approach by H.P. Foley Company. They had installed a substantial amount of copper and stainless steel tubing for use in the instrumentation systems of the plant. One of the procedures used to install that tubing was a procedure that joined two pieces of tubing together by placing the ends inside a sleeve, and then brazing the joint to assure a hermetic seal.

At the time the work was actually done, this procedure had not been qualified. After the tubing was installed, Foley came to Central Coast to get the brazing procedure qualified. I was the one who actually did the work of testing the sample supplied by Foley to see if it passed.

Because there was an inadequate amount of brazing within the joint, I rejected the procedure. Foley's response was to prepare another sample and re-submit the procedure for qualification. Again, it was inadequate. Again Foley simply prepared another sample and re-submitted the procedure. Finally, on the third or fourth re-submission of the procedure, I found an adequate joint had been made, and I was able to approve the procedure.

This incident concerns me for two reasons. First of all, the procedure should have been qualified before the work was done. That way, if the procedure failed, Foley would have been able to alter the parameters of the procedure to increase the likelihood of creating a good joint, before they resubitted it. As it was, Foley had no choice but to repeatedly resubmit the original procedure, or re-do the work to a better procedure. Since it took three (possibly four) tries before the sample brazing, which would have been done by Foley's best brazer under ideal circumstances, could pass the test, I have strong doubts that the work on site is adequate. The results suggest that the procedure may only be effective 25% to 33% of the time, even under ideal conditions. Beyond that, the pressure to avoid having to re-do the work could have tempted the Foley Company, after the first two failures, to submit a sample that was done to a different procedure (such as a hotter temperature) to help insure approval. Central Coast had no way to know whether the sample being tested actually conformed to the procedure being qualified. Even if the final system were tested, hydrostatically for example, the long-term reliability of the work is dubious at best.

Another problem with qualifying the procedure after the work had been done is that all work in a nuclear plant is supposed to be done by welders who have been qualified to that procedure. That cannot have been the case with this important safety-related tubing, that plays a key role in the plant's instrumentation system, because the procedure itself had not been qualified when the work was done.

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6. Another problem, that I have seen recently at the Diablo Canyon plant, concerns the fashion in which pipe support baseplates are installed throughout

the plant. In the concrete floor are anchor bolts, which secure the baseplates to the floor. Nuts are then torqued onto the threaded ends of the studs. To insure level baseplates, steel shims are placed underneath the baseplates, near the studs. There are no procedures detailing the proper size, shape or placement of these shims. After the baseplate has been torqued down onto the shims, grout is added underneath the baseplate.

The problem with this installation procedure is the question of what part of the assembly is the bearing surface, because calculations of seismic displacement are calculated from the bearing surface.

From the installation method as it is being done, it is the shims which actually bear the weight. But if the shims are the bearing surface there should be specifications as to the size and placement of the shims. If, on the other hand, the grout is intended to be the bearing surface, the installation has been done improperly because the plate is not torqued against the grout pad.

This question of which part of the assembly is the bearing surface is far from being merely academic, because I know that at other plants from other inspectors that work done in this fashion has had to be completely re-done. The fact that there were no procedures or specifications for the location of the shims at Diablo Canyon raises serious questions about the reliability of some of the seismic calculations, and, separately, raises serious questions about the extent to which principles of QA/QC were followed in the construction of the plant.

These issues are serious examples of QC breakdown, but they are only a few examples of a more pervasive problem. The fact that both the QA/QC department function and the construction function itself are within the same company creates great pressure on the QA/QC department not to make waves. Perhaps due to these pressures, there have been a number of decisions made that compromise quality. For instance, a memorandum was sent to QC inspectors directing us not to inspect welds done offsite by vendors, unless there is a crack that can be seen with the naked eye. QC inspectors are, in effect, supposed to wear blinders; if an inspector is inspecting one piece of work, the QC department doesn't want him to notice any problems in other areas of the plant.

I have read the above 10-page affidavit, and it is true and correct to the best of my knowledge and belief, executed under penalty of perjury, and the foregoing was executed January 16, 1984 at San Luis Obispo, California.

Subscribed and sworn to me this 16th day of January, 1984.

Lisa R. Wenter
Notary Public

OFFICIAL SEAL
LISA R. WENTER
NOTARY PUBLIC - CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires May 9, 1986

My Commission expires 5/9/86