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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 621
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REF:WL-LC

MAR - 5 1993

Honorable Richard M. Matsuura
Senator
Second District, State of Hawaii
State Office Tower, Room 404
Honolulu, Hawaii 96813

Dear Senator Matsuura:

Puna Geothermal Venture
KS-9 Geothermal Production Well

In response to your February 17, 1993 letter to Mr. Manabu Tagomori inquiring into the condition of the Puna Geothermal Venture (PGV) KS-9 production well, we provide the following comments:

1. During the flow testing of PGV's KS-9 well, the 13-3/8" casing deformed by expanding approximately 3/8" in circumference.
2. This deformation was caused by extremely high pressures resulting from the vaporizing of moisture which had accumulated in the annular space between the 9-5/8" casing and 13-3/8" casing strings and clogging of the 1/2" vent line.
3. Since the wellhead is connected to the 9-5/8" casing string, a rupture at the point of deformation would have only resulted in venting the annular space which has no contact with the resource.
4. The steam in the annular space does not contain any hydrogen sulfide gas.
5. PGV has submitted a detailed written workover plan to replace the deformed part of the wellhead.

The following comments are provided to respond to your specific questions regarding the workover plan:

1. A workover rig will be used to complete the replacement of the deformed portion of the 13-3/8" casing. The rig is smaller in size than the Parker 231 rig now being used by PGV for the drilling of KS-10. Although smaller in size, the workover rig has similar capabilities as the larger rig and is used specifically to work on wells that are under geothermal resource pressure. This rig is intended to be used for the long-term operation and maintenance of the well field.

Honorable Richard M. Matsuura

MAR - 5 1993

Page 2

2. PGV will use their current on-site contractors, who has extensive experience on KS-8 and in California and Nevada, to do the remedial work. No additional third-party contractor is anticipated at this time. We are working with PGV to ensure that all necessary personnel, equipment and materials are on-site before they are allowed to proceed with the remedial work.
3. As explained above, the deformation of the 13-3/8" casing could not result in an uncontrolled venting of the well. A report is being prepared documenting the event and our findings. A copy will be forwarded to you when it is finalized.
4. The deformed casing is being replaced to dispel any perception regarding the safety of the well.
5. The risk of an uncontrolled flow occurring will be eliminated by setting a cement plug. A similar procedure was used to change the master valves on the KS-8 production well which is similar in pressure and temperature.
6. The well will not be killed with water. Cement plugs, totalling 300 linear feet, ranging from 200 to 500 feet in depth, will be used to seal the wellbore to contain the resource. Once the integrity of the cement plugs have been verified, the remedial work will then be allowed to proceed. The cement plugs will be monitored constantly during the workover procedure.
7. A continuous monitoring procedure will be maintained by the Department of Land and Natural Resources and PGV staff. A contingency plan to kill the well will be on standby and will be implemented if the cement plug fails to contain the resource.
8. The use of a cement plug was used previously to change the master valve on KS-8. In other areas, a bridge plug is normally used to prevent the well from flowing during maintenance on wellheads. However, due to the higher pressure and temperature of this well, a cement plug will be used.

In summary, we have reviewed the workover procedure for KS-9 and are confident of its success. In addition, we will be monitoring the situation and take immediate action to eliminate the risk of an uncontrolled venting.

Very truly yours,



JOHN P. KEPPELER II
Acting Director