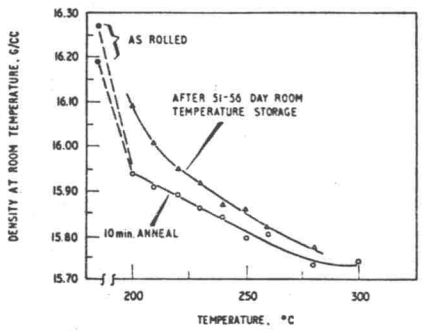
leading to an explana-

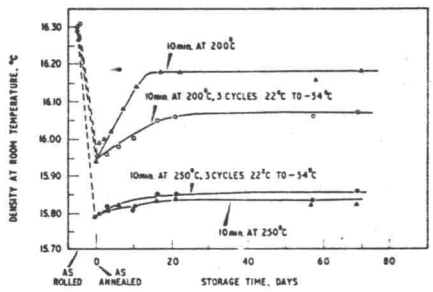
wt.-% Ga alloy, cold
n this study and contain-
neals at temperatures
, obtained at room temp-
ith increasing annealing
C, where the normal delta
The following mechanism
ved relationship. At
phase originally present
us delta phase. The
way is related to temp-
he proportion of beta or
creases until at approxi-
omplete. During cooling
s below 280°C, the remain-
back to alpha phase while
ta or gamma remains delta
of density determination.
se in density of the
higher the anneal temper-
nsity.

indicated earlier, is the
and cooled alloy during
gly, the specimens given
stored at room temperature
C anneals, specimens were
old treatment from room
initial density decrease,
or 16.95 g/c.c., indicates
s present at room tempera-
the 250°C anneal, however,
. The rate of density
r after the 200°C anneal
ing that a larger amount
eta phase at 200°C was
s annealing temperature is

increased from 200 to 250°C, sufficient gallium diffusion to the gallium poor areas apparently occurs to substantially decrease the amount of delta phase capable of exhibiting metastable behaviour during room temperature storage. This was considered reasonable since the areas low in gallium in the cored alloy have the greatest tendency to exhibit metastable delta to alpha transformation. The three cold treatment cycles improved stability after the 200°C anneal, but did not measurably affect stability after the 250°C anneal.




6-F




6-G

Fig 6-F Effect of Anneal Temperature and Storage Time on Density of Plutonium-0.94 wt.-%, Cold Rolled, Cored Alloy

Fig 6-G Effect of Anneal Temperature, Cold Treatment and Storage Time on Delta to Alpha Transformation in Plutonium-0.94 wt.-% Ga Alloy.

3.4.6 Looking again at Fig 6-F, the densities obtained after 51-56 days of room temperature storage are expressed as a function of anneal temperature. The decrease in density after storage with increasing anneal temperature up to 280°C is further evidence for the proposed effect of diffusion.

3.4.7 Homogenized alloy - Since the instability of annealed alpha-delta phase mixtures is related to the amount of low gallium area in the cored grains, it was decided to study the stability of annealed alpha-delta mixtures in homogenized systems. To produce large and varying amounts of alpha phase in homogenized alloy during the application of pressure, the series of plutonium-gallium alloys ranging from 0.37 to