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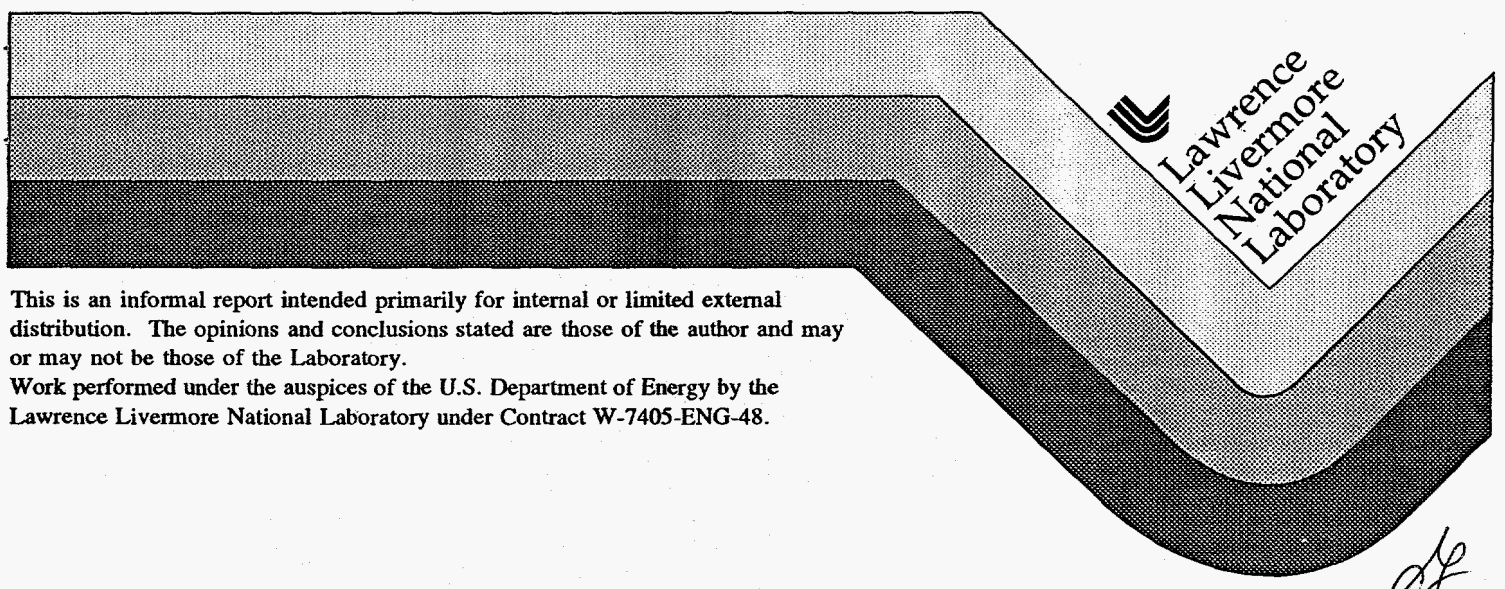
X-Ray Analysis of Samples from LH84-2

P. L. Wallace
D. F. Del Giudice

August 4, 1982



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TO: L. W. Hrubesh

FROM: P. L. Wallace/D. F. Del Giudice

SUBJECT: X-Ray Analysis of Samples From LH84-2

Your Sample Nos.	X-Ray Analysis Nos.
BG-4-6 (Vanadium)	G00100
BG-4-7 (Scale)	G00104

INTRODUCTION

Each of these samples was analyzed using automated, scanning x-ray diffractometry. The blue vanadium surface was run in the as-received condition, while a new method of sample preparation was used for the scale. This new method involved (1) grinding the sample in a conventional fashion, (2) mixing the sample with collodion to form a castable slurry, (3) pouring and spreading the mixture on a taut, clean sheet of plastic film, and (4) then covering the resultant sample with a second plastic film layer to form a sandwich-type assembly. Only a few milligrams of sample are needed for this procedure, and the resultant data is much more accurate than that obtained by the previously-used Debye-Scherrer technique.

RESULTS

Figure 1 shows the diffraction spectrum for the blue vanadium surface. The phase analysis for this sample finds vanadium as the major constituent and minor constituents of V_2C and a surface contaminent, PuO_2. Although the source of carbon in this case could be either the carbon susceptor in the RF furnace or the added CO_2, the finding of V_2C does indicate that carbonaceous materials will react with the vanadium.

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In Figure 2, the spectrum for the ground-up scale is presented. In this pattern, the major phases are δ-Pu and PuO_2 with secondary amounts of α-U and PuO. At this time, we have no explaination of why metallic phases (δ-Pu and α-U) are present in the scale. Although this analysis doesn't indicate it, some earlier preliminary work seemed to say the zeta PuU phase might also be present. This spectrum doesn't confirm the earlier work.

P L Wallace

Peter L. Wallace
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cc: 1/A J. Bergin
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3/A M. Schwab
4/A L. Hrubesh
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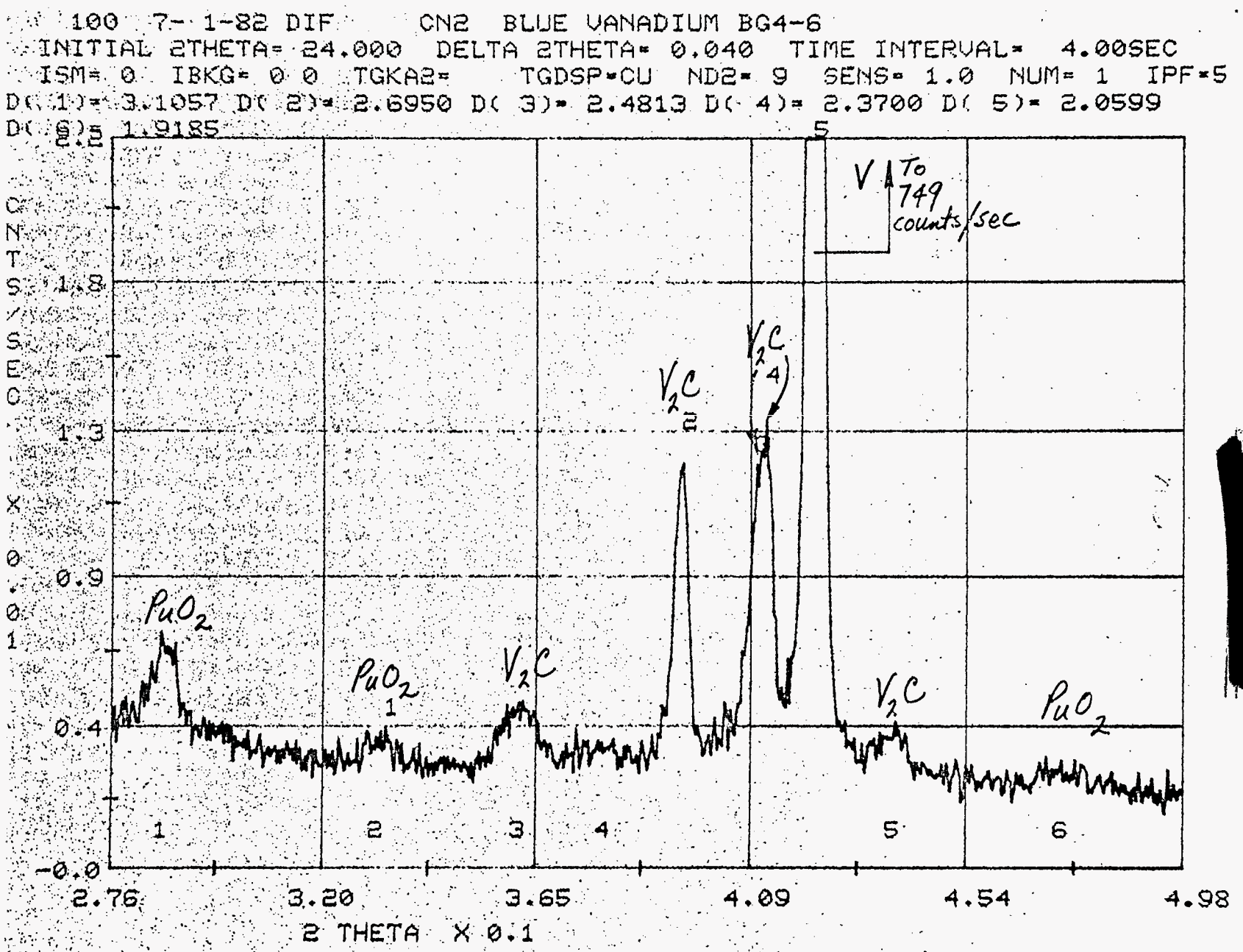

Figure 1: Diffraction spectrum obtained from a blue surface on vanadium from Test LH84-2. This spectrum provides confirmation of the reaction of vanadium w/carbon in this test. The sample designation is BG4-6.

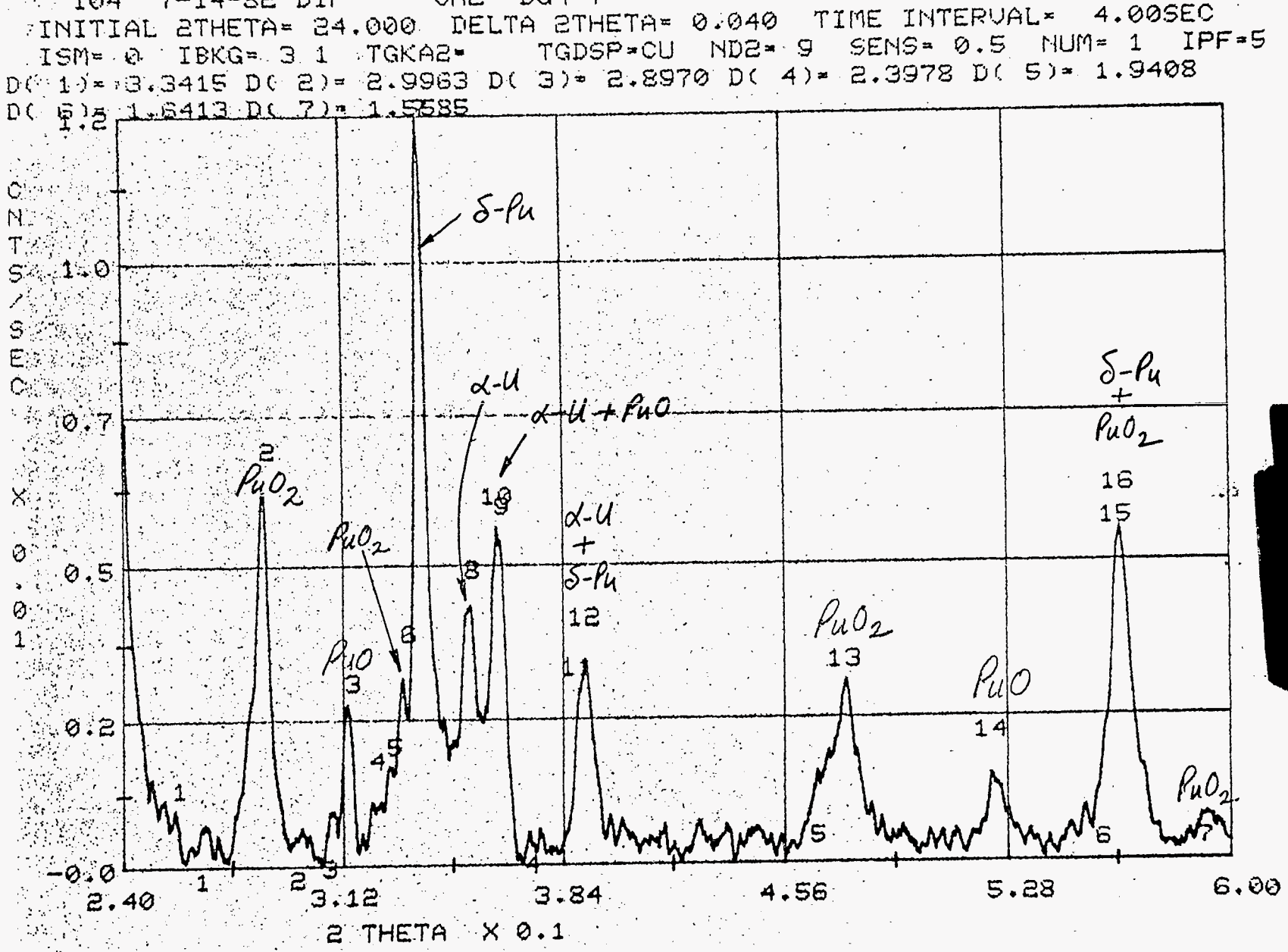

Figure 2: Diffraction spectrum for ground-un scale (designated BG4-7). Beside the exnected oxides, two metallic phases (δ-Pu and α-U) were found in this material.