

# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 694

#### Western Phosphate Rock

This Standard Reference Material (SRM) is intended for use in validating analytical methods and in calibrating instruments used in the analysis of phosphate rock, fertilizers, and similar materials. A unit consists of 90 g of <math>< 150 \mu\text{m}</math> (100 mesh) powdered material.

The certified concentrations of the constituents and their uncertainties are listed in Table 1. These concentrations are the mean concentrations calculated from the interlaboratory analyses of the material; except for uranium, the uncertainties represent two standard deviations of these means.

Table 1. Certified Concentrations of Constituents

Constituent	Concentration, <sup>1</sup> Wt %*	Constituent	Concentration, <sup>1</sup> Wt %
Al <sub>2</sub> O <sub>3</sub>	1.8 ± 0.1	MnO	0.0116 ± 0.0012
CaO	43.6 ± 0.4	Na <sub>2</sub> O	0.86 ± 0.04
CdO	0.015 ± 0.003	P <sub>2</sub> O <sub>5</sub>	30.2 ± 0.1
F	3.2 ± 0.1	SiO <sub>2</sub>	11.2 ± 0.4
Fe <sub>2</sub> O <sub>3</sub>	0.79 ± 0.06	U	0.01414 ± 0.00006 <sup>2</sup>
K <sub>2</sub> O	0.51 ± 0.02	V <sub>2</sub> O <sub>5</sub>	0.31 ± 0.07
MgO	0.33 ± 0.02		

<sup>1</sup>Based on a minimum sample size of 0.5 g dried at 105 °C for 2 h.

<sup>2</sup>The uncertainty of the uranium concentration is greater than two standard deviations of the mean and includes an allowance for systematic error.

\*Wt % = mg/kg x 10<sup>-4</sup>

This certification is valid for five years from date of shipment from NIST. Should it be invalidated before then, purchasers will be notified by NIST.

Statistical evaluation of the data was done by R.C.Paule, NIST National Measurement Laboratory.

*This Certificate of Analysis has undergone editorial revision to reflect program and organizational changes at NIST and at the Department of Commerce. No attempt was made to reevaluate the certificate values or any technical data presented on this certificate.*

The technical and support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by R. Alvarez. Revision of this certificate was coordinated through the Standard Reference Materials Program by J.S. Kane.

Gaithersburg, MD 20899  
September 27, 1993  
(Revision of certificate dated 7-21-84)

Thomas E. Gills, Acting Chief  
Standard Reference Materials Program

(over)

## ADDITIONAL INFORMATION ON THE COMPOSITION

The constituents listed in Table 2 are not certified but are included for information only.

Table 2. Noncertified Concentrations of Constituents

Constituent	Concentration, Wt %
Cr <sub>2</sub> O <sub>3</sub>	(0.10)
TiO <sub>2</sub>	(0.11)
ZnO	(0.19)

## PREPARATION, TESTING, AND ANALYSIS

The material for this SRM came from the Dry Valley Ridge in Southeastern Idaho and was provided by Beker Industries Corp., Conda, ID, through the courtesy of N.K. Christensen. At NIST, the material was screened and that portion passing through a 150  $\mu\text{m}$  (100 mesh) sieve was retained. The retained material was then blended and bottled.

Homogeneity testing was performed by A. Marlow and P.A. Pella, NIST Inorganic Analytical Research Division, using X-ray fluorescence spectrometry.

Analyses were performed in the following laboratories:

Beker Industries Corp., Conda, ID, N.K. Christensen.

Cominco, Kimberley Fertilizer Operations, Kimberley, B.C., Canada, K.J. McKenzie.

FMC, Phosphorus Chemicals Div., Pocatello, ID, C.D. Holmes.

Intermountain Analytical Services, Inc., Pocatello, ID, G.R. Pattie.

Monsanto Co., Soda Springs, ID, G.W. George.

National Institute of Standards and Technology, Gaithersburg, MD, J.W. Gramlich, L.A. Machlan, A. Marlow, and P.A. Pella.

Western Cooperative Fertilizers Ltd., Calgary, Alberta, Canada, J.A. Simala.

J.R. Simplot Co., Helm Plant, Helm, CA, L.S. Boyer.

J.R. Simplot Co., Pocatello, ID, G. Esplin.

J.R. Simplot Co., Minerals and Chemical Div., Pocatello, ID, J.R. Felkey.

Stauffer Chemical Co., Lefe, WY, J. Linford.