VIII-18. 100 KBAR PRESS FOR TIME-OF-FLIGHT NEUTRON DIFFRACTION. By R. B. Bennion, H. G. Miller and W. R. Myers, Idaho Nuclear Corporation, Idaho Falls, Idaho 83401 and H. T. Hall, Brigham Young University, Provo, Utah 84601

A high pressure system employing Bridgman anvils and capable of attaining pressures in excess of 100 kbar has been constructed at the Materials Testing Reactor for use in the high pressure neutron (time-of-flight) diffraction program. The system consists of a 600 ton hydraulic press using Al_2O_3 anvils with 1.0 inch diameter faces, allowing for a sample volume of approximately 0.05 cm^3.

The neutron beam is directed along the axis of the press through the hollow rams and the alumina anvils which have 0.25 inch diameter holes along their axes to within 1.0 inch of the anvil faces. Neutrons which are scattered from the sample at $2\theta=90°$ pass through a gasket surrounding the sample and are detected by counters places at various distances from the sample on the Debye-Scherrer ring. Crushable gaskets made of a sulfur-alundum cement mixture or a high strength aluminum alloy provide the lateral pressure seal with relatively little attenuation of the scattered neutrons. The diffraction patterns selected by the sample from the incident white neutron beam are analyzed by time-of-flight methods. A statistical neutron chopper has been built to augment the conventional time-of-flight methods in experiments with low signal-to-noise-ratios. The sample temperature will be variable from approximately -50°C to 600°C by heat transfer through the anvils.