BAUXITE HYDROLOGY UPDATE

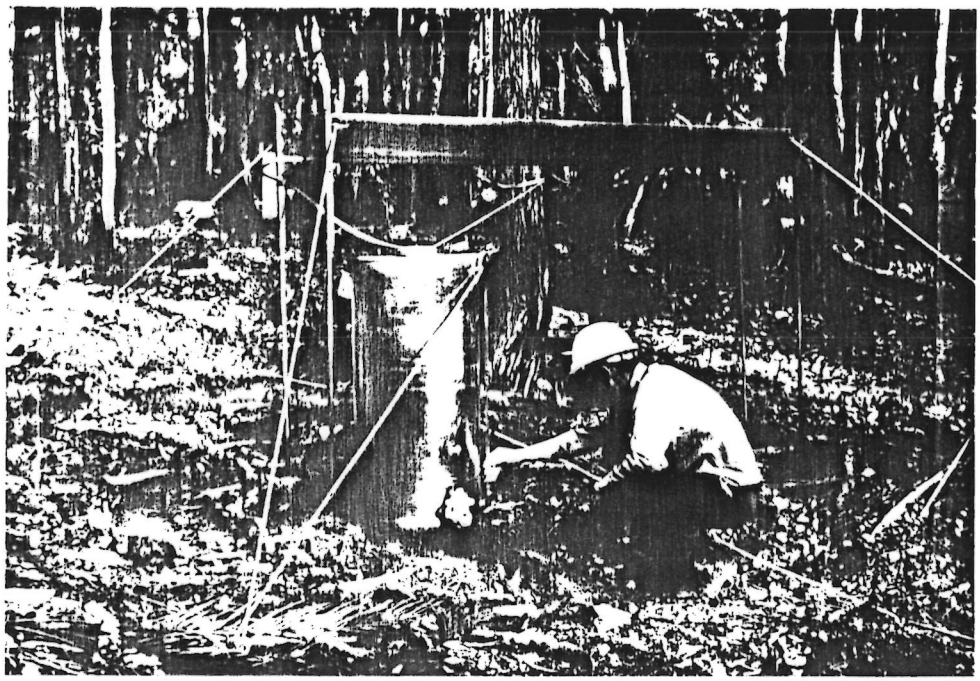
(Public Works Department of Western Australia)

Issue No. 1 4th February 1985

This newsheet provides a 3-monthly update of the activities of the Bauxite Hydrology Group of the Public Works Department of Western Australia. Distribution is direct to personnel involved in research into Bauxite Mining and Rehabilitation in the Jarrah Forest and to interested parties in Government Departments, Tertiary Institutions and elsewhere. Those wishing to receive the newsheet should contact the Editor.

Hillslope Studies

Hydrological monitoring of the Del Park Research Catchment hillslope experiment commenced in June 1984 and is continuing through the summer. Measurements include rainfall, throughfall, stemflow, soil water content (by the neutron probe method), soil water potential (by mercury manometer tensiometers and gypsum blocks) and piezometric levels. Processing of the 1984 winter data is in progress and some data analysis and interpretation is now complete. A report reviewing the first year's results is currently being written and should be completed by April.



Frank Davies reading a throughfall gauge on the Del Park hillslope

Martin Hodnett from the Soil Physics Section of the Institute of Hydrology is presently working with the Group for a period of three weeks (17.1.85 - 8.2.85). The main purpose of his visit is to provide advice and comment on installation techniques, data retrieval, quality control and data interpretation of soil water instrumentation.

On Feburary 8th the Hillslope Processes Group is holding a seminar for the dual purpose of presenting initial results on the Del Park hillslope study and secondly to establish the basis of its 1985 research programme.

Catchment Studies

The selection of the trial mining catchment and control catchment in the intermediate rainfall zone is now complete.

The trial mining catchment chosen is Yarragil North. In addition there are two control catchments in the Yarragil catchment (6C and 5D) and two additional control catchments in the Pindalups. Gauging stations were installed on the Pindalup catchments in 1984 and new gauging stations are under construction for Yarragil North and 5D. The 6C catchment is to be upgraded.

Nine potential sites for rainfall and saltfall gauges on the Yarragil North catchment have been identified. However, only four sites within the catchment boundary will be selected for the installation of temporary gauges. These gauges will be operated during the winter of 1985, and will provide data for the assessment of the accuracy of mean rainfall and saltfall estimates.

A computer program (RSNET) which calculates the variance of mean rainfall or saltfall using a covariance factor among gauges has been written and tested against a set of published rainfall guaging network data. The program can also be used to decide the number of gauges needed to estimate the mean rainfall or saltfall with a given confidence level to achieve a specified accuracy. The rainfall/saltfall data can be for any time period, for example, hourly, daily, monthly or annual. It is envisaged that RSNET will enable the rational construction of rainfall and saltfall gauging designs for the Yarrigal North, 5D and 6C catchments, and the assessment of existing rainfall gauging networks for other catchments within Aloca's Mining Lease.

David Williamson from the Groundwater Research Division of CSIRO has supplied to the Bauxite Hydrology Group a storage saltfall gauge and valuable information on the measurement of saltfall.

Members of the Group are now compiling a list of suitable manufacturers and estimated costs for the saltfall gauges.

Hydrography

Field investigation, planning and design for the weir and associated works at the Yarragil North gauged catchment has been completed and quotations will soon be received. Preliminary field inspection has been carried out on the catchment for siting the initial rainfall network. Investigation is complete and planning and design work is well advanced for a gauging installation to replace the Forests Department's 5D gauging site. The new gauged catchment - Yarragil East - will provide the "control" for future trial mining and forest experiments in the immediate area. Plans are complete for the upgrading of recording facilities and instrument housing at the Forests Department's "6C" gauging site. Details of the instrumentation for the new sites have been forwarded to enable appropriate preparations to be made for their supply. Routine visiting and maintenance on installations at gauged catchments has continued as planned.

Monitoring of the instrumentation at the Del Park Hillslope has continued at an appropriate frequency. Good progress has been made with collation of the 1984 data from the Hillslope measurements and methods are being developed, in consultation with Mr Hodnett from the Institute of Hydrology, for the processing and analysis of some of the more complex parameters.

Preliminary assessment has been made of the most suitable method for recording rainfall solute concentrations. Similarly methods are being investigated for the continuous recording of some parameters measured on the Del Park Hillslope.

Publications

Recent publications by the Bauxite Hydrology Group are listed below.

Steering Committee for Research on Land Use and Water Supply (1984). Bauxite Mining in the Jarrah Forest : Impact and Rehabilitation, Dept. Conserv. and Environ. W.A., Bulletin No. 169.

Loh, I.C., Hookey, G.R. and Barrett, K.L. (1984). The Effect of Bauxite Mining on the Forest Hydrology of the Darling Range, Western Australia, Public Works Dept. W.A., Water Resources Branch, Rep. No. WRB 73.

Schofield, N.J. and Stokes, R.A. (Editors) (1984). Seminar on Hydrological Models Applicable to the Darling Range. Public Works Dept. W.A., Water Resources Branch, Rep. No. WRB 100.

Steering Committee for Research on Land Use and Water Supply (1985). The Joint State Government and Alcoa Research Programme into the Effects of Bauxite Mining on Water Resources in the

Northern Jarrah Forest : Research Planning and Methodology, Public Works Dept. W.A., Eng. Div., Rep. No. WRB 106.

Seminars

A seminar presented by the Hillslope Processes Group will take place on February 8th entitled 'Progress on the Del Park Hillslope Study'. Attendance is by invitation only.

Contributors

to this Update were Nick Schofield (Editor), Bryson Bates and Kelvin Baldock.