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RADIATION SURVEY OF THE AGS RING USING THE EBERLINE SMART PORTABLE MODEL ESP-2

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Technical Note

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Introduction

The Main Ring of the AGS is periodically surveyed for residual radiation levels for the purposes of radiation work planning and to determine beam loss patterns from an operating cycle. The survey includes a total of 478 locations, 238 outside, and 240 inside the Ring. Typically, the sample location is in the downstream magnet gap, but in the straight sections the highest level is recorded. Historically the survey required three persons, two data collectors, and a scribe. Recently, several improvements have been incorporated to eliminate the need for the scribe and improve the data quality.

Instrumentation

The new device that is now used to perform the Ring survey is an Eberline Smart Portable Model ESP-2. The ESP-2 is a data logging microprocessor based portable radiation survey instrument that can store up to 500 independent readings. The data can then be outputted into a serial printer or to a personal computer (PC). When the data is sent from the instrument memory to a PC, the user has the option to generate an ASCII file or a file that is compatible to read directly

into a Lotus 1-2-3 spreadsheet. Some of the other features of the instrument are:

1. Three different instrument configurations can be stored in memory.

2. Floating or scientific notation.

3. Ratemeter or scaler mode.

4. Automatic time response as a function of count rate.

In addition to the new data logging aspect of the survey, the radiation detector used to perform the survey has also been improved. In the past, a 12" ruler was taped on the end of the detector to establish the measurement geometry. This technique has been replaced with fixed geometry probes specially designed for the Ring survey. Another improvement is the elimination of the subjectivity which results when the operators, heretofore, were required to read an analog meter movement on a logarithmic meter face. It is assumed that letting the computer take the readings will reduce the measurement error.

Documentation

After transferring the data into a Lotus spreadsheet, some minor editorial changes are manually made to align the data to the location designations. Then, the results are ready to be displayed in tabular form. A portion of the table is shown in Attachment 1. Next, 22 bar graphs are created from the data, one for each superperiod, the entire Ring, and the entire Ring without E-20. The entire Ring without E-20 was done because E-20 is by far the hottest spot in the Ring (by definition) and it artificially causes the data display to be compressed. By omitting E-20 the structure of the data becomes clearer.

For each graph, the inside and outside data is displayed side by side for each sampling location. A color graph is generated for the histogram of the entire Ring so the reader can distinguish inside and outside data from a very "busy" plot. See Attachment 2, 3, and 4 for examples of the bar graphs. In addition to hard copy of the table and bar graphs, a copy of the spreadsheet with the graphs will also be saved on a floppy disk for archival and distribution purposes.

Conclusions

This method now provides a means to simplify machine loss studies by making the survey data readily available to a computer via spreadsheet or ASCII format and thereby make it more accessible to those performing studies. In the future, if retrospective studies are required the documentation is more comprehensive.

The results are presented in a more user friendly manner for use by supervisors in radiation work planning.

Reference

Eberline Smart Portable Technical Manual, Eberline Instrument Corporation, Santa Fe, New Mexico.

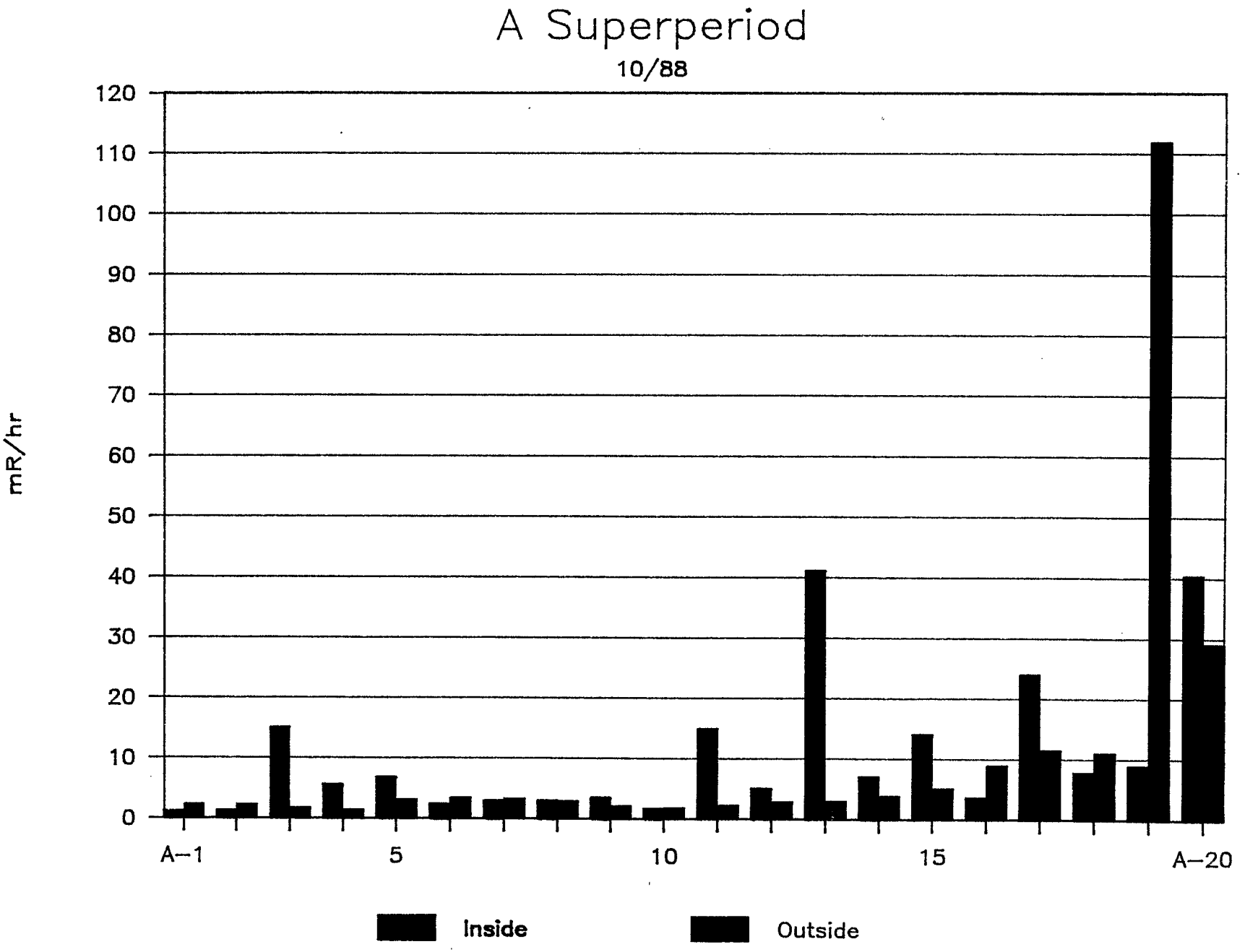
ESP-2 VER 2.1
10/21/88 1725
INSTRUMENT # 000375
USER I.D. # 000007268
DETECTOR INFO: #1 HP-290SHORT
OPERATING MODE: RATEMETER
CALIB. CONSTANT 4.00E+06
DEAD TIME (SEC) 3.00E-05
HIGH VOLTAGE 5.46E+02

LOC.	mR/h	STAT.

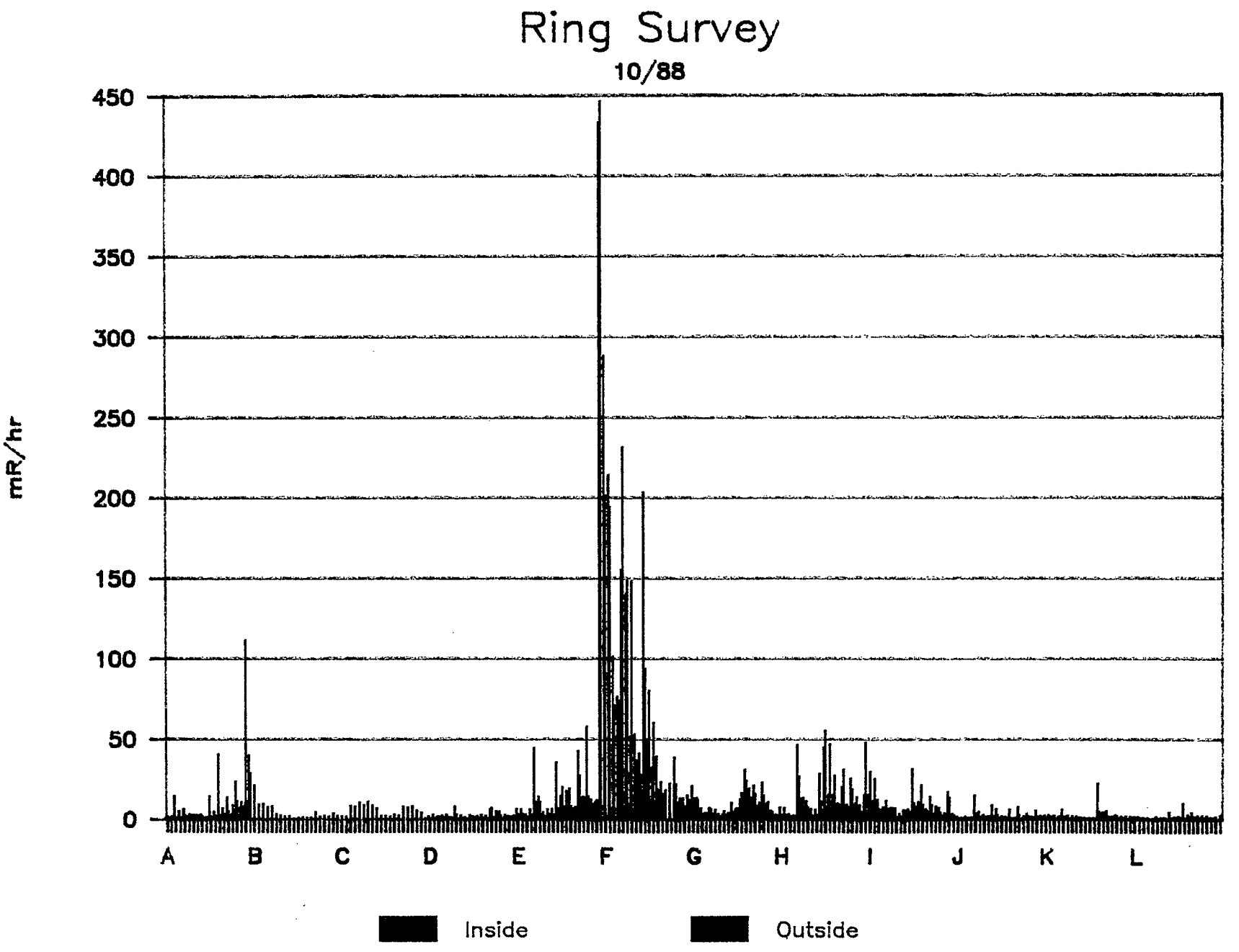
Location	Location	Inside (mR/hr)	Outside (mR/hr)
A-1	A	1.15	2.35
		1.24	2.3
		15.1	1.78
		5.6	1.4
5		6.78	3.16
		2.39	3.52
		2.98	3.27
		2.95	2.95
		3.48	2.15
10		1.63	1.85
		15	2.29
		5.05	2.9
		41.1	3.02
		7	3.89
15		14.1	5.19
		3.59	9.03
		24	11.6
		7.72	11.1
		8.92	112
A-20		40.4	29.1

Attachment #1

Attachment #2



Attachment #3



Attachment #4