

Quivira Mining Company

40-8905

RETURN ORIGINAL TO PDR, HQ.

August 2, 1990

Mr. Pete Garcia
Uranium Recovery Field Office
U. S. Nuclear Regulatory Commission
Box 25325
Denver, Colorado 80225



Re: MILDOS-AREA Computer Code

Dear Mr. Garcia:

For your information and as per our telephone conversation today, I have attached a copy of the description of the updated version of the computer modelling program "MILDOS-AREA". I will be contacting the suggested sources to try and obtain a copy of the program.

Sincerely,

Bill Ferdinand

Bill Ferdinand, Manager
Radiation Safety, Licensing
& Regulatory Compliance

xc: file

DESIGNATED ORIGINAL

Certified By *Mary C. Hook*

9011140291 900802
PDR ADOCK 04008905
C PDC

LF02
11

90-0713

1. IDENTIFICATION AND KWIC TITLE - MILDOS-AREA
MILDOS-AREA, radiological impact airborne U238
2. COMPUTER FOR WHICH SOFTWARE IS WRITTEN AND OTHER MACHINE VERSIONS AVAILABLE - IBM PC, PS/2, Compaq
3. DESCRIPTION - MILDOS-AREA estimates the radiological impacts of airborne emissions from uranium mining and milling facilities or any other large-area source involving emissions of radioisotopes of the uranium-238 series.
Wind frequency data are provided by the user. The transport model includes the mechanisms of dry disposition of particulates, resuspension, radioactive decay and progeny ingrowth, and plume reflection. Deposition buildup and ingrowth of radioactive progeny are considered in estimating surface concentrations, which are modified by radioactive transformation, weathering, and other environmental processes. MILDOS-AREA allows the user to vary the emission rates of the sources as a step-function of time. Impacts to humans through such pathways as inhalation, external exposure, and ingestion are estimated based on calculated annual average air concentrations of nuclides. Individual dose commitments, total individual dose commitments, and annual population dose commitments are calculated with conversion factors derived from recommendations of the International Commission on Radiological Protection (ICRP) and Oak Ridge National Laboratory. Age-specific dose factors are calculated.
4. METHOD OF SOLUTION - A sector-averaged Gaussian plume-dispersion model is used to compute concentrations of radioactive materials from fixed-point sources. Area sources are calculated either with the original MILDOS virtual-point method or a finite-element integration method. A choice of vertical-dispersion coefficients is available; the Briggs dispersion coefficients are most appropriate for a tall source, such as a power-plant stack, while the Martin-Tickvart coefficients provide a more realistic representation for near-source receptors.
5. RESTRICTIONS ON THE COMPLEXITY OF THE PROBLEM - Maxima of -
300 nodes
48 individual receptors
10 sources (point or area)
10 time steps
The current version is applicable only to uranium-238 series nuclides.
6. TIMING - 2 to 10 minutes on an IBM PS/2 Model 80

7. UNUSUAL FEATURES OF THE SOFTWARE - A validation study of MILDOS-AREA was conducted using measured Rn-222 concentration and flux data from the Monticello, Utah uranium mill tailings impoundment. The results of this study demonstrated that use of MILDOS-AREA can result in generally good agreement between model-generated and measured Rn-222 concentrations.
8. RELATED AND AUXILIARY SOFTWARE - MILDOS-AREA is a revision of the MILDOS code, incorporating enhanced capabilities for handling large and updated dosimetry calculations. MILDOS, which was designed to compute environmental radiation doses from uranium recovery operations, is an adaptation of the UDAD (NESC 824) uranium dispersion and dosimetry code.
9. STATUS - Abstract first distributed September 1989.
IBM PC version submitted June 1989.
10. REFERENCES - Y. C. Yuan, J. H. C. Wang, and A. Zielen, MILDOS-AREA: An Enhanced Version of MILJOS for Large-Area Sources, ANL/ES-161, June 1989.
D. L. Strenge and T. J. Bander, MILDOS - A Computer Program for Calculating Environmental Radiation Doses from Uranium Recovery Operations, NUREG/CR-2011 (PNL-3767), April 1981.
MILDOS-AREA, NESC No. 9460, MILDOS-AREA Flexible Disk Cartridge Directories and Implementation Information, National Energy Software Center Note 89-90, September 7, 1989.
11. HARDWARE REQUIREMENTS - An IBM PC or compatible computer with 500 Kbytes of memory, math coprocessor, and a hard disk. A printer capable of producing 132-column output is needed.
12. PROGRAMMING LANGUAGE - Lahey FORTRAN 77 v3.0
13. OPERATING SYSTEM - MS-DOS 3.1.
14. OTHER PROGRAMMING OR OPERATING INFORMATION OR RESTRICTIONS -
15. NAME AND ESTABLISHMENT OF AUTHOR OR CONTRIBUTOR -
Y. C. Yuan
Energy and Environmental Systems Division
Argonne National Laboratory
16. MATERIAL AVAILABLE -
Source (3849 lines)
Executable (MILMAIN.EXE 440,969 bytes, PAGER.EXE 75,502 bytes)
Sample problem (401 lines)
Machine-readable documentation (10,112 bytes)
Control information (19 lines)
Reference reports and NESC Note

The computer-readable material is distributed on three 5.25-inch, double-sided, double-density flexible disk cartridges written in DOS 3.3 BACKUP format.

17. CATEGORY - R
KEYWORDS - dispersions, radionuclide migration, radiation doses, uranium mines, dose rates, uranium 238, MILDOS codes, UDAD codes
18. SPONSCR - DOE Office of Nuclear Energy,
Office of Remedial Action and Waste Technology