

DESCRIPTION AND EVALUATION OF THE INFORMATION TRANSFER

WORKSHOP SERIES: "COAL HYDROLOGY IN VIRGINIA".

by Peter W. Hufschmidt

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UNITED STATES DEPARTMENT OF THE INTERIOR

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GEOLOGICAL SURVEY

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## CONTENTS

	Page
Abstract . . . . .	1
Introduction . . . . .	2
Acknowledgments . . . . .	2
Organization . . . . .	3
Topical Coverage . . . . .	3
Logistics . . . . .	3
Recommendations . . . . .	6
Conclusions . . . . .	7
References . . . . .	8

## ILLUSTRATIONS

	Page
Figure 1. Diagrams showing attendance by profession and location . . . . .	4
2. Diagram showing approximate work schedule for workshop series . . . . .	5

## APPENDICES

Appendix 1. Table of contents page from the Information Transfer Handbook . . . . .	9
2. Announcement flier. . . . .	11
3. Evaluation by Professor Robert H. Giles, Jr., Virginia Polytechnic Institute and State University. . . . .	16

DESCRIPTION AND EVALUATION OF THE INFORMATION TRANSFER WORKSHOP  
SERIES: "COAL HYDROLOGY IN VIRGINIA".  
by Peter W. Hufschmidt

ABSTRACT

A series of workshops was conducted in September, 1982, by staff of the Virginia Office, Mid-Atlantic District of the U.S. Geological Survey for the benefit of coal operators, consultants, and resource managers in the coal-producing area of southwest Virginia. The purpose of the workshop series was to present hydrologic information and data by the U.S. Geological Survey collected during four years of study of the coal hydrology of Virginia. The workshop series was held one day a week for three weeks at two locations within southwest Virginia in order to reduce travel time and overnight travel costs for participants. Results of an independently conducted questionnaire indicate the series was a success. The report summarizes the workshop preparation, organization, and presentation, and gives general conclusions and suggestions for those interested in conducting workshops.

## INTRODUCTION

Information transfer in its basic form, the dissemination of information, has long been an activity of the U.S. Geological Survey. The current effort of the Survey in this area is an experiment to facilitate the transfer of information gained by earth scientists to the persons who need it most -- decision makers and managers of natural resources. Historically, the Geological Survey has been known for its unbiased presentation of information, but getting the information to the public has sometimes been a slow process.

Since 1980, to increase the usefulness of hydrologic studies, the Geological Survey has produced popular reports and workshops based on existing projects.

In Virginia, the coal-mining industry is faced with the difficult task of assembling the detailed hydrologic information required to obtain mine permits. Much of this information has already been collected by the Geological Survey in ongoing and recent studies. Information-transfer workshops will help inform the coal industry of Geological Survey studies, provide required data, and information on how to obtain it, and avoid duplication of effort.

The Geological Survey has been involved in studies of coal hydrology in Virginia since 1978. The work has progressed from a basic reconnaissance and data-collection program to one of greater complexity, utilizing computer-modeling techniques to analyze the surface-water and ground-water systems and the geochemical processes affecting mine drainage. In order to make the information gained in these studies readily available to prospective users, a series of workshops was held. Lecturers included Geological Survey hydrologists, and a professor and graduate student from Virginia Polytechnic Institute and State University.

### Acknowledgements

The author thanks the following people for their help and thoughtful contributions to the project: Robert H. Giles, Jr., Gary Anderson, Charles Blankenship, Terry Danielson, Randell Laczniak, Bill Langley, Jerry Larson, Alan Lumb, John Powell, Byron Prugh, Ken Suter, Tony Zagar, and Chet Zenone.

## ORGANIZATION

The information-transfer workshop series was conducted in September, 1982, coincident with the conclusion of several hydrologic studies in the coal mining area of Virginia. Early in the project, personnel of the Geological Survey met with potentially interested groups (mining professionals and regulatory personnel) to foster interest in the workshop series. The series included three separate sessions one week apart. The same series was presented at two locations in order to reach a larger audience by reducing travel time for the participants. Clinch Valley College, in Wise, Virginia, and Southwest Virginia Community College, in Richlands, Virginia, provided meeting rooms and audio-visual equipment.

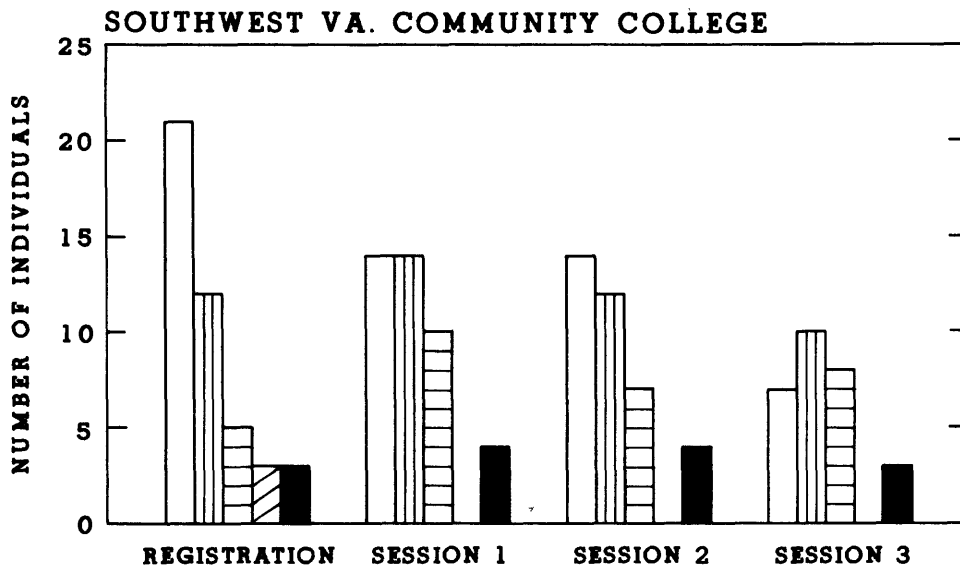
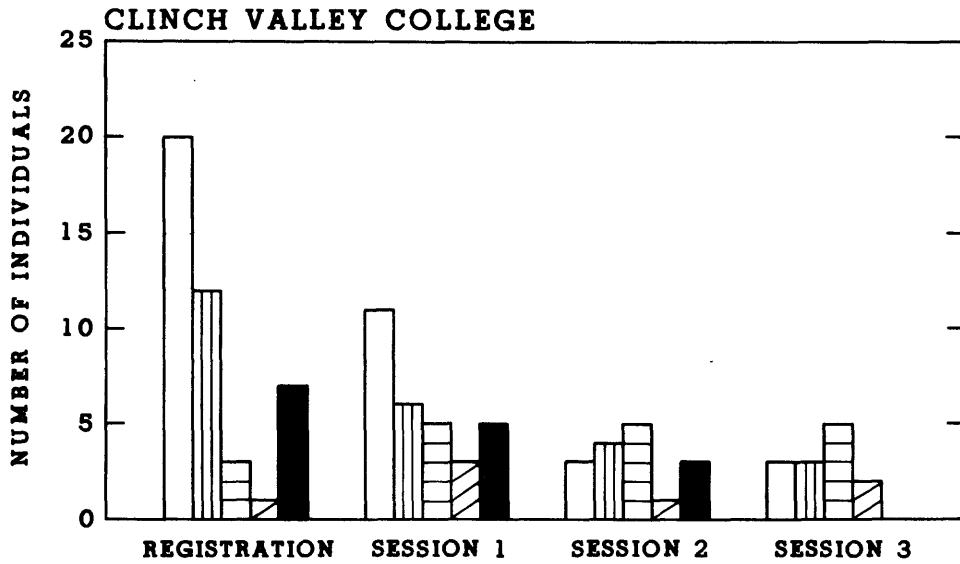
The workshops presented broad hydrologic concepts with emphasis on methods of interpretation as they apply to the coal mining area of southwest Virginia. Survey personnel prepared a handbook to provide background information to the diverse participants. Professor Robert H. Giles, Jr., Virginia Polytechnic Institute and State University (VPI & SU), assisted with aspects of the presentation and in the evaluation. The content of the handbook was similar to that of the Primer series of the Geological Survey (Baldwin and McGuiness, 1963; Swenson and Baldwin, 1965; Leopold and Langbein, 1960). See Appendix 1 for the table of contents of the workshop handbook.

## TOPICAL COVERAGE

The information transfer workshop series drew considerable interest from persons with diverse backgrounds (see fig. 1). In order to help everyone to comprehend complex topics, workshop leaders provided detailed background information. In the first session, they discussed the basic principles of hydrology, ground water, surface water, and water quality, then they presented the rudiments of surface-water and ground-water modeling. The second session began with a brief review of previous material, followed by discussions of geochemical modeling, literature-search systems, data-base management, and specific case studies. For the case studies, information was presented from hydrologic investigations of water-quality, surface-water, and geochemical modeling, and from a study of ground-water/surface-water relationships in the coal producing area of Virginia. In the final session, previous material was reviewed, followed by presentations of computer systems, computer graphics, and an extended "hands-on" session for the workshop participants. The "hands-on" session gave the participants an opportunity to use some of the simple ground-water, geochemical, and water-quality models developed for desktop computing equipment, and used in hydrologic studies. The session also served to reinforce the material previously presented and to allow for participants to work with the speakers individually on a one-to-one basis. Finally, VPI & SU staff evaluated the series. The evaluation is summarized in Appendix 3.

## LOGISTICS

Coordinating the logistics of the workshop was a major task. Ten persons contributed to the workshop handbook and spoke during the workshop series. Eight hundred fliers and more than 100 confirmation letters were sent out. Preparation of the handbook and coordinating the lectures also were large tasks. Figure 2 shows the approximate schedule of the workshop series.



#### EXPLANATION

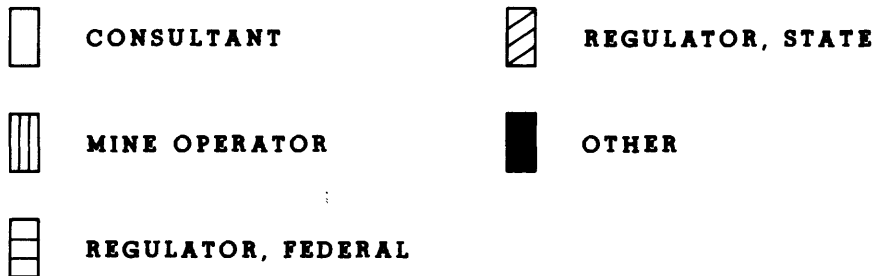


Figure 1. - Attendance by profession and location.



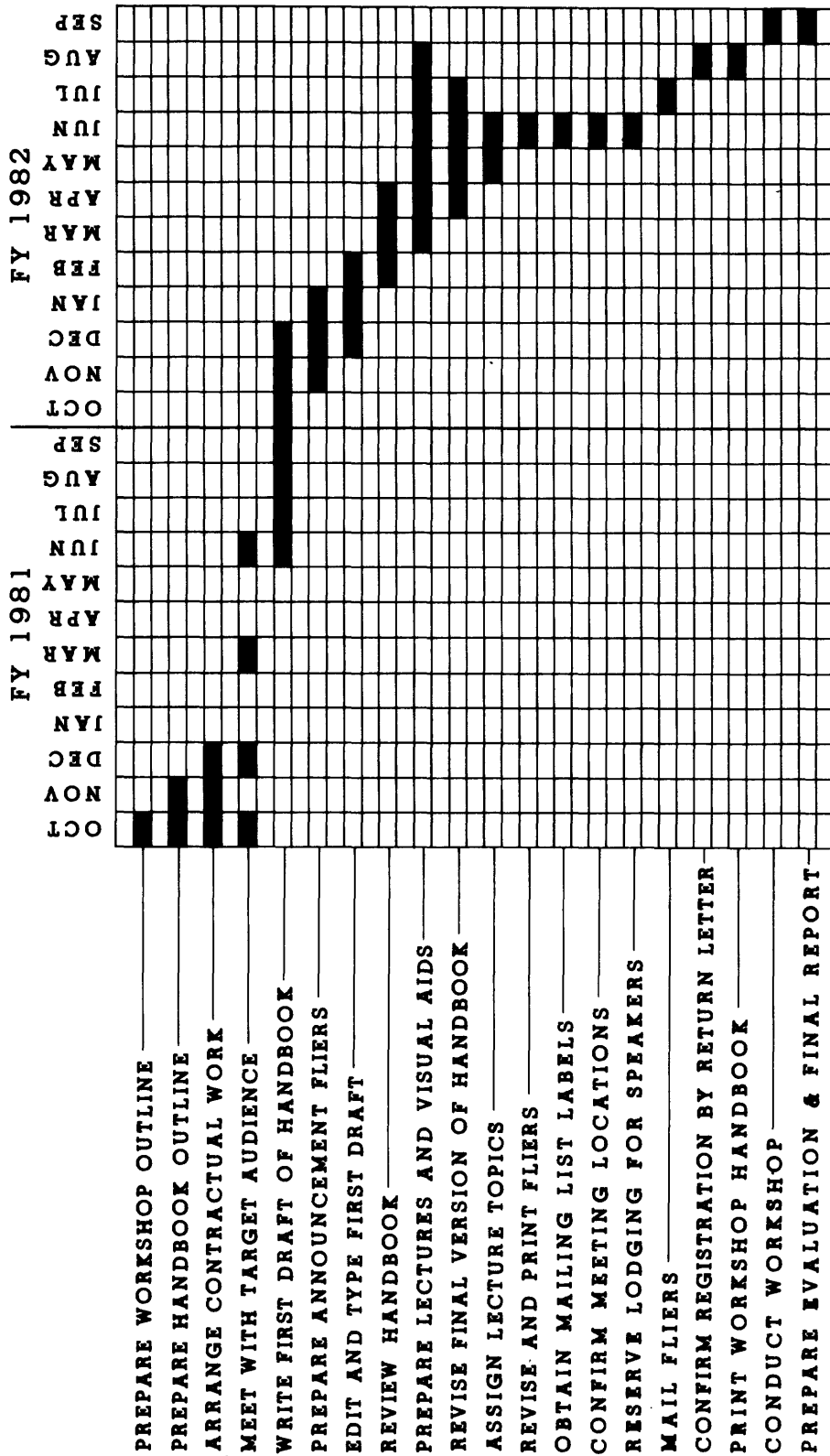


Figure 2. - Approximate work schedule for workshop series.

## RECOMMENDATIONS

The following is a list of recommendations that were suggested by many of the persons involved in the project:

- The workshops are very time consuming--They should be included in project plans for this, especially so that sufficient time can be allotted toward the end of the project.
- Information transfer should be planned from the start of a project, incorporating appropriate staff and funding. A problem is that an information-transfer effort may be made several years into a project, when funding has dried up!
- Get to know the needs of the audience--this may allow more time for technical discussions rather than review of basics.
- Three separate sessions works well, but is only applicable to an audience that is locally concentrated (short driving distances).
- Separate sessions were inconvenient for the people putting on the workshop series, but allowed time to readjust strategy, beef-up certain presentations, and cope with unanticipated events.
- The coordinator should get as many speakers as possible so that he/she can concentrate on the workshop rather having to devote than the considerable time required to prepare lectures.
- Encourage the speakers to get the group involved (this makes for more lively discussions, and better rapport with the audience).
- Provide appropriate handouts, reports, and circulars.
- Provide attendance lists so that the participants can contact each other after the workshop (registration and sign-up sheets will help).
- Send confirmation letters after receipt of registration forms. This serves to remind the participant to attend and allows the coordinator to announce any unexpected schedule changes.
- Provide two breaks, and an adequate time for lunch (at least 1 hour).
- Make use of public facilities, schools, universities, planning districts, municipal buildings. These are often free and the staff there will usually be very cooperative.
- Keep schedule flexible to allow time for important, scheduled discussions.
- Have speakers practice their talks in front of their District colleagues. Consider review and helpful criticism from non-technical staff.

## CONCLUSIONS

The response to the workshop series was positive. About 100 people attended the first session of the workshop, representing a more than 10 percent response to the 800 fliers mailed. This response is large according to persons familiar with conducting workshops (Tim Lewis, 1982, personal communication). Most attendants appreciated the workshop format of three separate sessions opposed to a single three-day workshop. Many said that they would not have been able to attend a three-day workshop.

Audience participation and attendance differed at the 2 locations (see figure 1). The Wise group, at Clinch Valley College was less actively involved than the Richlands group, at Southwest Virginia Community College. The Wise group had fewer participants in discussions and asked fewer questions than the Richlands group. Attendance decreased with each succeeding session at both locations. The differences in participation between the groups are difficult to explain. Attendance may have decreased because attendees had other commitments or lost interest. Also attendants may have made the contacts they needed, and gotten necessary materials at the first sessions, since many were not able to attend three days.

The workshop series benefitted the Geological Survey and the attendees. The Survey identified several potential new projects and areas of research as a result of the exchange of information. For example the lecturers increased their awareness of the needs of the coal operators, regulators, and other state and federal agencies. Likewise, the attendees learned more about the activities and capabilities of the U.S. Geological Survey, at both the District and National level.

#### REFERENCES

- Baldwin, H. L., and McGuinness, C. L., 1963, A Primer On Ground Water: U.S. Geological Survey, 26p.
- Leopold, L. B., and Langbein, W. B., 1960, A Primer On Water: U.S. Geological Survey, 50p.
- Swenson, H. A., and Baldwin, H. L., 1965, A Primer On Water Quality: U.S. Geological Survey, 27p.

**APPENDIX 1**

Appendix 1--Table of contents page from the Information Transfer Handbook.

CONTENTS

	Page
Abstract.....	1
Introduction.....	2
Resource setting.....	3
Origin of coal.....	3
Geology.....	5
Hydrologic concepts.....	8
Hydrologic cycle.....	8
Ground-water concepts.....	10
Basic elements.....	10
Infiltration and recharge.....	11
Porosity and permeability.....	11
Transmissivity and storage.....	13
Ground-water development.....	14
Determination of aquifer characteristics.....	17
Surface water.....	18
Movement.....	18
Streamflow measurements.....	22
Streamflow characteristics.....	25
Water quality.....	28
Effects of mining on hydrology.....	30
Ground water.....	30
Water quality.....	31
Geochemical processes.....	32
Flow alteration.....	35
Sedimentation.....	36
Detecting changes in the hydrologic system.....	36
Physical data.....	38
Chemical data.....	39
Literature search systems.....	41
Information systems.....	44
Systems for the small operator.....	44
Using information systems.....	49
Computer systems.....	50
USGS Data collection program.....	52
Coal hydrology in Virginia.....	52
Hydrologic parameter estimation techniques.....	55
Correlation techniques.....	57
Regression techniques.....	59
Water quality regression techniques.....	60
National Water Data Exchange (NAWDEX).....	64
Sources of additional information.....	65

**APPENDIX 2**

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WATER RESOURCES DIVISION



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INFORMATION TRANSFER  
REGIONAL APPLICATION  
OF  
HYDROLOGIC INFORMATION  
COAL HYDROLOGY IN VIRGINIA  
WORKSHOP SERIES  
SEPTEMBER, 1982  
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RICHLANDS, VIRGINIA  
WISE, VIRGINIA

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

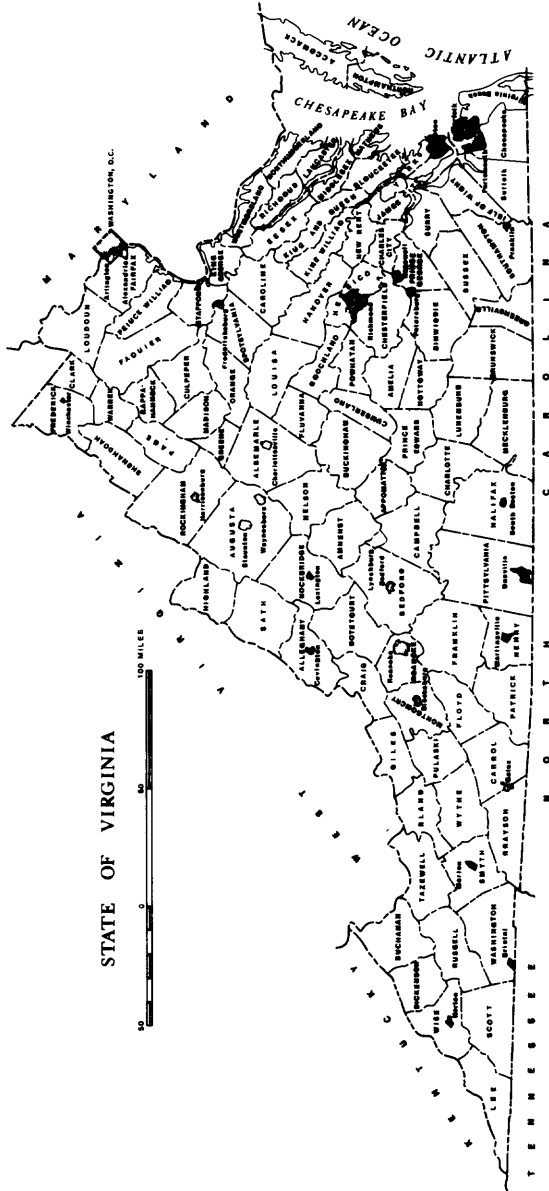
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ATTENTION: Peter Hufschmidt

Regional Application  
of  
Hydrologic Information

Workshop Series  
Coal Hydrology in Virginia

INTRODUCTION

To increase the usefulness of its work to resource managers and the public, the Water Resources Division of the U.S. Geological Survey has initiated a program to sponsor information transfer through popular reports, user workshops and other possible outlets. Information transfer has long been an activity of the Water Resources Division.

The major goal of the program is to increase the communication of information to the public to enhance decision-making on critical resource problems. The program focus is the development and application of approaches for effective transfer of the meaning of land and water resources information to decision makers. There are no plans to foster evaluation of conjunctive social issues. Moreover, consistent with past policy, we plan to avoid taking sides or entering into the decision-making process.

WORKSHOP SERIES

The purpose of this particular workshop series is to present to the attendees a concise description of the methods and techniques used by the USGS when conducting hydrologic investigations, as well as a feeling for the limitations to extending these interpretations. The USGS, Virginia District is currently conducting three major hydrologic studies in the coal mining area of southwest Virginia. These projects are primarily modeling efforts in the fields of ground-water hydrology, surface-water hydrology, and geochemical modeling. The workshop series will present details of interpretive techniques and findings.

The workshop series will be held in three sessions, each one week apart. The first session will cover basic hydrology and modeling concepts. The second session will go into greater detail, the concepts of geochemical and ground-water modeling as well as an explanation of the modeling studies currently in progress. The final session will serve as a review, and will provide the attendees an opportunity to participate "hands-on" in interactive mini-computer programs. The workshop and accompanying text is being completed with cooperation of Virginia Polytechnic Institute and State University.

WORKSHOP AGENDA

Day 1	September 8 & 9, 1982
9:00	Introduction
9:15	Basic Hydrology as it relates to coal mining in southwest Virginia.
10:00	Break
10:15	Surface-water concepts
11:00	Ground-water concepts
11:45	Lunch
12:45	Water-quality concepts
1:30	Surface-water modeling
2:15	Break
2:30	Ground-water modeling
3:15	Correlation/regression techniques
4:00	Adjourn
Day 2	September 15 & 16, 1982
9:00	Introduction and review
9:15	Geochemical modeling
10:00	Break
11:00	Data base management
11:45	Lunch
12:45	Literature searches
1:30	Mining effects on hydrology general considerations
2:15	Break
2:30	Case study--Geochemical processes affecting the quality of mine drainage
3:15	Case study--Ground water and surface water relationships
4:00	Adjourn

Day 3      September 22 & 23, 1982  
 9:00      Introduction and review  
 9:15      Computer systems and hydrologic data access  
 10:00      Break  
 10:15      Hands-on session--manipulation of pH and geochemical models  
 11:45      Lunch  
 12:45      VPI&SU--computer graphics and ground-water hydrology  
 2:15      Break  
 2:30      Interactive computer session  
           Question/answer session  
 4:00      Adjourn

**REGISTRATION INFORMATION**

The workshop series will be held in Wise and Richlands, Virginia. In Wise, the workshop will be held at the Clinch Valley College on September 8, 15, and 21. In Richlands, it will be held at the Southwest Virginia Community College on September 9, 16, and 22. There will be no registration fee, however, early registration is encouraged. Please send your preference of location and registration information to:

Peter Hufschmidt  
 U.S. Geological Survey  
 200 West Grace Street, Room 304  
 Richmond, Virginia 23220-5081

REGIONAL APPLICATION OF HYDROLOGIC INFORMATION  
 COAL HYDROLOGY IN VIRGINIA WORKSHOP SERIES

SESSION 1	Clinch Valley College, Wise, Va.	9/8/82
	S.W. Va. Community College, Richlands, Va.	9/9/82
SESSION 2	Clinch Valley College, Wise, Va.	9/15/82
	S.W. Va. Community College, Richlands, Va.	9/16/82
SESSION 3	Clinch Valley College, Wise, Va.	9/22/82
	S.W. Va. Community College, Richlands, Va.	9/23/82

NAME AND TITLE \_\_\_\_\_  
 ORGANIZATION \_\_\_\_\_  
 ADDRESS \_\_\_\_\_

I WISH TO ATTEND THE SESSION AT WISE \_\_\_\_\_ RICHLANDS \_\_\_\_\_  
 NO FEE FOR WORKSHOP. PLEASE RETURN REGISTRATION BY 8/15/82.

**APPENDIX 3**

Appendix 3 Evaluation by Professor Robert H. Giles, Jr., Virginia Polytechnic Institute and State University.

A General Evaluation of the USGS Regional Application of Hydrologic Information, Coal Hydrology in Virginia Workshop Series, September, 1982.

by Robert H. Giles, Jr.<sup>1</sup>

Two series of seminars were held in Wise, Virginia at the Clinch Valley College and in Richlands at the Southwest Virginia Community College. Outlines of the content, handouts, and lists of attendants are available from U.S. Geological Survey, Room 304, 200 West Grace Street, Richmond, VA 23220-5081. This analysis is based on a compilation of responses from questionnaires (see p. 31-32) completed by workshop participants. It can be used to help plan future workshops and information-transfer programs.

---

<sup>1</sup> Professor, VPI & SU, Blacksburg, VA

### Analyses

Seven (7) evaluation forms were received from the Clinch Valley College group (hereinafter called Clinch), 23 from the Southwestern Virginia Community College group (hereinafter, SWVCC). The numbers are insufficient for statistical analyses, but have been given a generalized interpretation. Respondents were asked to score the items on the basis of 5 high, 3 mid, and 1 low.

### Attendance

Among the 7 respondents in the Clinch group, all but one attended all three sessions. In the SWVCC group, 19 (83%) attended 3 sessions and four (4) did not indicate how many they had attended. Therefore, differences among responses can not be analyzed on the basis of attendance.

The distribution of occupations and interests of the groups of respondents was:

	<u>Clinch</u>		<u>SWVCC</u>	
	No.	Percent	No.	Percent
Federal Agency	2	28	5	22
State Agency	2	28	2	9
Mining Company	1	14	9	39
Consulting Group	2	28	5	22
Other			2	9
-----				
Totals (with rounding error)	7	98	23	101

Several people from citizen groups and local governments attended the first workshop sessions but were not present at the last session when evaluations were requested.

### Speed of Presentation and Effectiveness of Visual Aids

The first two items on the evaluation form were designed to address the highly varied types of presentation (lecture, demonstration, question-answer, and interactive computer-aided instruction).

	<u>Clinch</u>	<u>SWVCC</u>
Speed of Presentation	3.0	3.6
Effectiveness of Visual Aids	4.3	4.0

The first two workshops were identical (>95%) at both sites. The last one was identical in content, but time devoted to each topic was different; more time was spent on computer equipment in the SWVCC presentations.

The different scores reported may represent differences in the attention, participation, and interest in the presentations between the two groups.

### Newness

The responses of the two groups to the newness item were similar, Clinch 4.3 and SWVCC 4.0

One of the reasons for technology transfer and continuing education is to teach or acquaint people with new ideas, to allow them to retool as their jobs change, and to meet demands for information that is new to them (not necessarily new to science and technology).

As assure high scores in this area in future programs, it will be important to select materials carefully to meet the needs of the participants. The scores ranged from 1 to 5 on this item, the several lower scores being given by mining and consulting group respondents.

As one respondent said, the first seminar was mostly review for him/her but was probably necessary for most people. One giving a low score to newness, added "with exception of Dr. Giles's presentation". This further emphasizes the need to screen students and design programs or subunits to meet special needs. One score of 3 was given with a comment "some new, some old" emphasizing the difficulty of teaching (and evaluation). See Table 1.

### Practicability

The workshops were not designed for immediate direct practical applications rather, they were efforts to enhance awareness, appreciation, or general understanding. Nevertheless, the scores were relatively high, 3.1 for the Clinch group, 3.3 for the SWVCC group.

### Ease of Understanding

Responses to this item are related to the complexity of the information, the backgrounds of the participants, and the skill of the lecturers. The scores given by the Clinch group were 3.4 and by the SWVCC group, 3.9.

The rating for speed of presentation may be related to the ease of understanding, as expressed by the Clinch group.

Table 1. Summary of responses to evaluation items from 7 out of \_\_ respondents from the Clinch Valley College workshop group and 23 from the Southwest Virginia Community College group. Scores or weights were requested as (5 high, 3 mid, and 1 low).

	<u>Clinch</u>	<u>SWVCC</u>
Speed of presentation	3.0	3.6
Effectiveness of visual aids	4.3	3.9
Newness	4.3	4.0
Practicality	3.1	3.3
Ease of understanding	3.4	3.9
Relevance	3.4	3.8
Usefulness to me personally	3.3	3.5
Usefulness to company or agency	3.5	3.5
Overall quality compared to similar workshops attended	4.0	4.2

Relevance

Relevance for the Clinch group was 3.5; for SWVCC it was 3.8. These scores probably reflect that direct application of workshop information is not immediate.

The workshop leaders used examples, stimulated questions and discussions, and related workshop content to the problems of the attendees. Like "practicality", however, the relevance may not be evident until the future.

Table 2. Scores on two items by the two workshop groups.

	<u>Clinch</u>	<u>SWVCC</u>
Relevance	3.4	3.8
Practicability	3.1	3.3

Usefulness

Like practicability and relevance, usefulness scores reflect as differences among people and their roles in agencies and organizations. The same scores, 3.5, were obtained from both groups. The Clinch group rated the workshops slightly less useful.



One person mentioned that the information in the workshop was needed for use under the Permanent Regulations program. A consultant noted that contacts, names, etc. were valuable, in addition to the content. Several people thought access to the software was valuable and would be a practical result of the workshops. Another noted new access to literature. One commented on the potential of computer aids in the mining permit process.

#### Overall Quality

A wide variety of seminars and workshops are held and comparing them is difficult. An item asked for a general comparison of quality. The scores were high: 4.0 for Clinch, 4.2 for SWVCC.

The instructors noticed conspicuous differences in the two groups. There were much fewer questions, interactions, and less "vitality" in the Clinch group. This may be a result of differences in group size, room size, and backgrounds of participants. The differences in scores show less positive attitude and less positive results from the smaller group. Nevertheless, average scores for all responses to all items were high. Only 29 out of 270 possible ones (10%) were rated 1 or 2, indicating low to moderately low value for a few participants. The responses for the group show that the three workshops, covering a wide range of materials, were viewed as well presented and useful.

\*Note: Some "drop-outs" may have rated the workshop low-quality.

#### Future Workshops

Twenty-six of 30 respondents (87%) said they liked the three separate meeting dates. This is consistent with their responses to desirability of consecutive workshops over two or three days. Seventy percent said "no". One person commented on the high costs of travel to three separate meetings. Another said three consecutive days could become "tiresome". Conversely, another suggested 4 or 5 days.

All but one respondent said they would attend a similar workshop next year.

#### Desired Additional Information

The list of items from respondents, only slightly modified, is:

1. More about calculating transmissivity
2. How to condense data and to predict hydrologic conditions in smaller basins in short periods of data collection
3. How (highwall elimination?) influences ground water
4. Geologic studies in southwestern Virginia (3)
5. Results of recent studies
6. Greater emphasis on hydrology of coal vs general hydrology
7. Information on costs for services and monitoring
8. More information from other coal-producing states

9. Solutions to field operations and maintenance problems
10. Limitations of various models
11. Exact means for accessing local data on mineralogy, lineaments, etc. for small areas in a county, (2) including how to interact from terminal with main frame.
12. Overall summary of data now collected, (2) and how mining affects these factors and surface and ground water (3)
13. Sampling ideas
14. Surface water modeling with more hands-on work
15. More data and examples of each of the models presented
16. How models can be used by company or agency without writing their own programs.

### Suggestions for Improvement

Suggestions were:

1. Provide a service (presumably of data analysis and use of software) so that companies or agencies can use it.
2. Adjust time spent on topics. Too much was spent on some, too little on others. [No specifics were given, however a comment was made that some speakers were "cut short" which occurred only on the last day in one workshop].
3. Provide more time for hands-on use of computers, especially with USGS models, (2)
4. Use more demonstrations and present less theory.
5. Reduce coverage of topics and content...just too much.
6. Provide a more detailed explanation of the workshop initially.
7. Hand out before each session to each participant cards with short questions and for comments. These are turned in at end of each day. Cards can provide instant feedback to improve the sessions.
8. Hold the workshops for non-Virginia consultants at Arlington, Alexandria, or Reston.
9. Work on improving speaking ability of instructors.
10. Target participants better. (Some of the material was too basic).
11. Find an alternative to displaying maps (presumably computer maps) for they were difficult or impossible to see.
12. Be more specific in dealing with problems that mining companies have with runoff, water quality, etc. (1)
13. Reduce programming costs. [This evidently was a miscommunication for many statements were made about free access to software. The parallel may be in suggestion No. 1].
14. Provide more examples of how coal companies can set up monitoring with lower costs.
15. Show how data can be inexpensively collected and retrieved.
16. Teach about VDMR information on geology and structure controls.
17. Teach how to store and readily retrieve information on overburden and how data can be gleaned from the permits files of the DMLR.

18. Give two presentations, one for regulatory group and focus on large scale issues; one for industry and consultants and focus on the small scale issues and how they fit into the overall picture.
19. Make displays larger and better and have someone at the back of the room signal to increase speakers loudness or adjust presentations.
20. Put a cover page on the evaluation sheet so other people cannot see how a person marks the page.
21. Present more actual data and measurements, e.g. transmissivity and permeability by rock types.
22. Present information comparing surface and ground water with undisturbed and disturbed-but-reclaimed areas.
23. Include completed relevant projects as well as ongoing projects.