AIR POLLUTION TECHNICAL INFORMATION SURVEY

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AIR POLLUTION
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SURVEY

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A Survey of Air Pollution Technical Information Requirements and Resources

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SUMMARY

In January of 1964, the Office of Science and Technology, Executive Office of the President, assigned government-wide responsibility for assuring full and adequate handling of scientific information in air pollution prevention and control to the Department of Health, Education and Welfare. The assignment was based on both the Weinberg report, "Science, Government and Information," and the Clean Air Act of 1963.

The responsibility was further redelegated to the Division of Air Pollution, U. S. Public Health Service, which then began the establishment of a National Air Pollution Technical Information Center. The Center is to assure the bibliographic control of and availability of both the open literature and the report literature on air pollution research, and provide a service which can assimilate, digest, and review research results in the field. Its services will be available to the public, the scientific community, and industry, as well as to officials of other government agencies.

As an initial step in establishing the Center, the Division of Air Pollution commissioned this survey of the technical information requirements of the diverse sub-populations making up the air pollution "community", and of the resources presently available for meeting their needs. The objective is to provide a basis for recommending operational concepts and organization of the Center.

This report is based on the findings from 70 personal interviews and 228 mail questionnaires obtained from various categories of potential users. Emphasis was placed on State and local control agencies, research investigators, and industrial officials responsible for plant engineering and operation from the standpoint of air pollution control. Major information resources were also inventoried and evaluated--both those which specialize in the air pollution area, and those whose coverage is general but includes significant amounts of information relevant to air pollution.

The user survey is keyed around four general questions:

- What are your specialized subject interests?
- What are your principal present information sources?
- What are your difficulties in securing needed air pollution information?
- What services can the Center provide to better meet your needs?

In the process the interests, sources and desires essentially common to the "community" were identified, as well as those characteristic of particular sub-populations.

Taking the population as a whole, four subjects are given the highest importance rating:

Ambient air standards	Sampling methods
Emission standards	Analytical methods

Of these, information on standards is considered to be difficult to obtain; that on methods, relatively easy.

Information on human health effects is considered highly important, but difficult to obtain, by State and local agency officials and by industrial technologists.

The most generally-used information sources are the APCA Abstracts, prepared and published under Division of Air Pollution contracts with the Library of Congress and the Air Pollution Control Association, and the Journal of the Association. Usage patterns of other journals and abstracting services and personal contacts as information sources are reviewed. The volume of abstracts published by the major Federal document clearinghouses appears to inhibit effective use by the air pollution community, even though substantial amounts of relevant information are contained in these resources.

Problems or deficiencies that were mentioned sufficiently often to be defined as characteristic attitudes included:

The wide variety of sources of air pollution information and the excessive effort required to keep up with these sources.

Difficulty in finding specific information or, in the case of bibliographic searching, being confident of reasonably complete coverage.

Time lags in publication and further time lags in abstracting or other forms of general announcement.

Inadequate coverage of foreign work.

Substantial amounts of information in various types of files but which, for one reason or another, is not pulled together and published.

Dearth of authoritative reviews or critical monographs summarizing the best available information in particular areas.

Of the services which might be provided or sponsored by the Center, the five receiving the highest "desire ratings" are:

- Abstracts, with increased coverage and indexing.
- Accession lists of references acquired, as an "express" current awareness medium and specialized announcement service.
- Bibliographic search services.
- Periodic state-of-the-art reviews.
- Critical monographs, as warranted.

The first three are generally desired by all groups. Of the last two, the governmental and industrial groups express the greater preference for reviews, while the research community prefers critical monographs.

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A Survey of Air Pollution Technical Information Requirements and Resources

Introduction

In common with other scientific and technological fields, workers concerned with air pollution control research and application problems have been faced with the massive growth of relevant technical information. How to acquire and utilize the information efficiently, including that from related scientific disciplines, has become a major question. The difficulties are compounded by the wide range of scientific, engineering, and industrial fields involved; by the diversity of the groups whose interests are affected; and by the health, economic, political, and sociological implications of air pollution problems and their solutions.

Stemming from the original Air Pollution Act of 1955, the Division of Air Pollution, U. S. Public Health Service, has been concerned with this problem, and has supported indexing, abstracting, translating and bibliographic services. In addition, it has been instrumental in distributing air pollution technical information to individuals, organizations, and institutions throughout the country.

Three events, occurring in 1963 and early 1964, are destined to have a major impact in this area. These are the publication of the Weinberg report by the President's Scientific Advisory Committee in early 1963; passage of the Clean Air Act of 1963 in December of that year; and assignment to the Department of Health, Education and Welfare of government-wide responsibility for assuring full and adequate handling of scientific information in air pollution prevention and control.

The Weinberg report, "Science, Government, and Information,"[1] exhaustively explored the problems of information handling in the current situation and presented a series of recommendations as guiding policies. Two are particularly applicable to the present program; the "delegated agent" concept, whereby a single government agency is assigned responsibility for coordinated handling of scientific and technical information in a designated field; and the establishment of specialized information centers conceived to function as the accepted retailers of information through acquiring, switching, interpreting and processing information from the large central depositories and archival journals.

The Clean Air Act of 1963 authorizes the Secretary of the Department of HEW to "collect and make available, through publications and other appro-

priate means, the results of research and other activities, and other information," and to "collect and disseminate, in cooperation with other public or private agencies, institutions, and organizations having related responsibilities, basic data on chemical, physical, and biological effects of varying air quality and other information pertaining to air pollution and the prevention and control thereof." This authorization reaffirmed and expanded the similar clause in the original Air Pollution Act of 1955.

Largely through the impetus of the Weinberg report and its endorsement of the "delegated agent" concept, the Office of Science and Technology, Executive Office of the President, assigned responsibility in these terms, in January of 1964:

> "....the Department of Health, Education and Welfare (will) take the necessary steps to assume this government-wide responsibility for handling the results of research in air pollution prevention as a companion to the legislative directive for the conduct of research and development in air pollution.
>
> "The minimal requirements....(are:)
>
> (a) the bibliographic control of and the availability of both the open literature and the report literature resulting from research activities in air pollution; and
>
> (b) the establishment of at least one information evaluation center in air pollution where research results would be assimilated, digested, and reviewed.
>
> "Other than these requirements there are no stringent guidelines for establishing a focal point for information services in a specialized area of science or technology. The character of the service would be the prerogative of the Department of Health, Education and Welfare."

A press release announcing the delegation went on to state:

> "The Department of Health, Education and Welfare will collect data and information from both government and non-government facilities significantly involved in air pollution research and will organize this information, consolidate it, and provide state-of-the-art summaries. The service will be available to the public as well as to officials of other government agencies."

Subsequently, this responsibility was redelegated to the Division of Air Pollution, where action was taken to develop a specialized center for the acquisition, storage, and retrieval of air pollution technical information, to provide appropriate information services to industrial, national and local government, academic, and general users.

The Technical Information Survey

The general concept of a technical information center is well expressed in the definition used by the Elliot Committee:

> "Technical Information Center - An organization for acquiring, processing, and disseminating technical information. A technical information center may include a library; a staff of scientists and engineers for extracting, indexing, and evaluating technical literature; facilities such as centers for documentation, referral, and information evaluation; a roster of consultants on call; and capabilities for writing reports, handbooks, and reviews."[2]

Effective application of this concept in a particular field, however, requires specific information, keyed around the identified needs of those whom the center is to serve--in this case, users of air pollution technical information. The basic questions include:

What are the sub-populations involved?

- By institutional affiliation, e.g., local control agencies, industrial firms, universities and research institutions, Federal agencies, etc.
- By functional responsibility, e.g., research and development, surveillance and enforcement, technical assistance, plant operating management, etc.
- By scientific or technical field, e.g., chemical, biological, medical, agricultural, engineering, etc.

What types of information are used, or needed, by each? For what purposes? In what forms?

What are the individual's present sources for such information?

What are recognized deficiencies in satisfying specific needs? In accessibility? In form? In timeliness? In completeness?

What are the present organized sources or repositories of scientific and technical information relevant to air pollution prevention and control? Their scopes, access channels, and potential contributions to an information center program?

The purpose of this study, then, is to develop answers to these questions, as a basis for recommending operational concepts and organization of the proposed Center.

The Study Plan

The project plan utilizes techniques successfully employed in similar previous studies in other fields.[3,4] This approach involves:

Preliminary analysis of the field and tentative identification of subpopulations and areas of interests.

A series of individual interviews, in depth, with representative members of user groups. These lead to verification or adjustment of the original assumptions, tentatative conclusions as to substantive answers to the questions posed above, and development of a mail questionnaire for testing or modifying these conclusions.

Selection of the target sample for the mail questionnaire and solicitation of participation.

Concurrently, inventorying and evaluating potential information sources and repositories.

Finally, tabulating and analyzing the responses.

The User Population Sample

Details of sample acquisition and the survey procedure are discussed in more detail in Appendix A, which also contains samples of the printed materials used.

Prospective participants, both for the interview phase and for the mail inquiry phase, were acquired from a variety of sources, including:

Directories of Government air pollution agencies (State and local), and Air Pollution Control Association membership.

Public Health Service grantees and contractors.

Air pollution committees of professional and trade associations.

Suggestions from Federal agencies with air pollution interests.

Suggestions obtained during discussion with Division of Air Pollution representatives and individual interviews.

Inquiries received in response to project announcements in journals.

In the interview phase, 70 interviews primarily emphasizing information usage were conducted, using an extensive check list developed in cooperation with the Division of Air Pollution. Those interviewed represented the various categories of potential users, with emphasis on State and local control agencies, research investigators, and industrial officials responsible for plant engineering and operation from the standpoint of pollution control.

An additional 46 interviews were conducted in connection with evaluation of resources, securing leads for particular categories of potential recipients of the mail questionnaire, and general problem discussions. The mail questionnaire was then developed, based on experience gained during the interviews. It is similar in scope to the interview check list, but represents a considerable condensation and refinement.

The final returns from the mail survey were:

Questionnaires mailed	445 addressees
Responses	
Full Questionnaires	219
Short Comments	11
No current requirement	35

The respondents who submitted full questionnaires were categorized, based on their organizational affiliations and reported functions and interests, as follows:

State and Local Agencies - 61

Industrial - 44

Control (Responsibility for plant design, engineering or operation to minimize pollutant emission. Includes industrial consultants.)	26
Equipment (Development or production of equipment for pollution control, including instrumentation and automotive exhaust emission control.)	18

Technical Assistance - (Public Health Service) - 18
(Includes Regional Air Pollution Program Directors and Sanitary Engineering Center personnel with assistance or training functions.)

Research - 102

Universities	41
Institutes	26
Public Health Service	19
Other Federal Agencies (e.g., Weather Bureau, Department of Agriculture, Bureau of Mines, etc.)	16

"Civic" - 3
Individuals with air pollution interests but without direct technical responsibilities in air pollution control. Includes municipal and county executives, planning and zoning officials, civic groups, etc.)

By scientific discipline, the research category was represented by:

Chemistry, chemical engineering - 52	
Basic	12
Applied	14
Both	26
Biomedical - 17	
Meteorology - 14	
Agricultural - 18	
Plants	15
Forestry	3
Economics - 1	

The extent and distribution of responses display the diversity of the air pollution "community." The number of returns in principal categories was sufficient to lend significance to differences reported in use or preference when categories were compared.

Results of the Study

The following discussion summarizes the principal findings concerning interests, information sources, and service desires of the respondents who submitted complete questionnaires--essentially those directly concerned with air pollution problems. Further details are presented in the appendixes noted. The opinions expressed in the short form responses--generally from planning and other civic officials--will be discussed later.

The responses within the sub-populations defined by institutional affiliation showed a high degree of (1) internal consistency, and (2) differentiation from other sub-populations. Therefore, the institutional breakdown has been used for analysis of most of the factors covered in the survey. In a few cases a further disciplinary breakdown within the research population was found meaningful.

Specialized Air Pollution Subject Interests

Participants were first asked to rate a series of specialized air pollution technical information subjects as to the relative importance in their work, and the ease of obtaining needed information. Three levels of rating were used for each factor, weighted in analysis as follows:

Relative Importance	Weight	Difficulty of Obtaining	Weight
High	4	Difficult	4
Moderate	2	Varies	2
Little	1	Easy	1

Using these values and considering only those who rated the item ("No Answers" disregarded), weighted averages were calculated for each subject as rated by each sub-population. These, together with percentages of positive response in each case, are given in Appendix B.

Taking the population as a whole, four subjects were given the highest importance rating:

Ambient air standards	Sampling methods
Emission standards	Analytical methods

These were rated "high" by over half of those expressing an opinion, and "moderate" by most of the rest. The industrial control group rated sampling, analysis, and emission standards somewhat lower than the other groups, as did the industrial equipment group for ambient air standards.

A median importance group of subjects included:

Human health effects	Atmospheric reactions
Applied meteorology	Economic losses
Monitoring methods	Effects on plants
Legal aspects	Effects on materials

Typical rating ranges were 50-25% "high", 25-50% "moderate", and 10-25% "little". The subject of human health effects was given a particularly high rating by State and local agency personnel, the industrial control group, and research workers at universities.

The lowest importance ratings, over all, were given to:

Effects on visibility	Planning and zoning
Effects on animals	Radioactivity

Except for the State and local agency and technical assistance groups, the response, i.e., the proportion of participants expressing an opinion, was relatively low for planning and zoning, and radioactivity. Throughout the study there is a general pattern of low percentage response on subjects where those who do respond give a low importance rating. Meteorologists and Department of Defense respondents and, to a lesser degree, workers at research institutes were the only ones to attach significant importance to radioactivity information.

Information on economic losses was rated the most difficult to obtain, by each group. Ratings were high and nearly equal for all groups but industrial equipment. Except for the latter, all groups gave over 50% "difficult" responses with the remainder "varies". For the industrial equipment group the responses were approximately 25% "difficult", 50% "varies", and 25% "easy".

Five subjects were rated quite difficult with a definite grouping at the upper levels. Ratings approaching those for economic effects were assigned by the groups indicated.

	Rated Very Difficult By			
Ambient air standards	SL	TA	IC	OG
Emission standards	SL	TA		OG
Human health effects	SL	TA	IC	
Atmospheric reactions	SL	TA	IC	
Planning and zoning		TA	Un	Inst

Legend - SL - State and local agency
TA - PHS technical assistance
IC - Industrial control
OG - Other government (non-PHS) research
Un - University research
Inst - Institute research

Subjects rated moderately difficult over all, but showing a fairly wide spread in the ratings by individual groups were:

Effects on animals	Applied meteorology
Effects on materials	Radioactivity
Effects on visibility	Legal aspects

Relatively easy subjects, in descending order of difficulty were:

Effects on plants

Monitoring

Analysis

Sampling

To a considerable degree, the highest difficulty ratings tend to be assigned to subjects on which limited research has been conducted or, at least, published, and subjects difficult to document with measurements that are straightforward and generally applicable. Examples are economic losses, ambient air and emission standards, and planning and zoning. The difficulty attached to obtaining information on human health effects by the "practitioner" groups--State and local agencies, technical assistance, and industrial control--is believed to reflect their need for firm, evaluated conclusions, rather than detailed research data.

Information Sources used by Respondents

In this portion of the survey, respondents were asked to indicate the principal journals used, and the relative importance of various types of personal contacts, government documents, and specialized abstracting services in their work.

Journals

A total of 100 primary journals were listed by the 228 respondents submitting questionnaires. The ten most frequently mentioned are:

	Times Cited
Journal of the Air Pollution Control Association	177
International Journal of Air and Water Pollution	38
American Industrial Hygiene Association Journal	37
Air Engineering	34

	Times Cited
Chemical Engineering	25
Analytical Chemistry	23
Industrial and Engineering Chemistry	19
Air/Water Pollution Report	18
Archives of Environmental Health (AMA)	18
Chemical Engineering Progress	11

The Journal of the Air Pollution Control Association and American Industrial Hygiene Journal were rather uniformly cited by all groups. International Journal of Air and Water Pollution was most heavily listed by the research workers, particularly at the universities. The industrial, State and local, and technical assistance (PHS) groups are the heaviest users of the engineering journals, and the Air/Water Pollution Report. Journals characteristically cited by these groups, in addition to those listed above include:

Clean Air
Coal
Combustion
Contamination Control
Mechanical Engineering
Power
Staub

Analytical Chemistry is emphasized primarily by State and local agencies, and research respondents. University and PHS research workers are the principal users of the Archives of Environmental Health.

A number of discipline-oriented journals were listed by particular research groups, in accordance with their special interests. Significant examples include:

Chemistry, Chemical Engineering

Journal of the American Chemical Society
Specialized ACS journals

Health Physics

Journal of Chromatography

Meteorology

Journal of Atmospheric Sciences

Journal of Applied Meteorology

Journal of Geophysical Research

Agricultural

Phytopathology

Plant Physiology

Biomedical

Journal of the American Medical Association

Clinical specialty journals, especially American Review of Respiratory Diseases

Appendix C gives a complete listing of journals mentioned, together with their frequency.

Among the foreign journals, 8 British journals, 2 German, and one each Canadian, Swedish, Russian, and Dutch, were mentioned.

Other Information Sources

In reporting on personal contacts, Government publications, and specialized abstract services the respondents rated each potential source as of "high," "moderate," or "little" importance in their own work. In order to reflect both the degree of importance and the number sufficiently concerned to express an evaluation, weights were assigned as follows:

Rating	Weight
High importance	4
Moderate Importance	2
Little Importance	1
No Answer	0

Weighted average scores were then computed in each case as a basis for comparison among sub-populations and between different information sources. Scores are tabulated in Appendix C.

Personal Contacts

In this category "Air pollution meetings, conferences, and symposia" received consistently high ratings, with the highest assigned by industrial control equipment representatives and Public Health Service technical assistance personnel.

Contacts with individual technical specialists rated as follows, in descending order, after meetings:

"Within my organization"

"Outside my organization" (Other than consultants)

"Consultants"

Public Health personnel, both research and technical assistance, rated contacts within the organization especially high.

Government Reports

Public Health Service reports received the highest acceptance, particularly by State and local agencies. State and local agency publications rated next in this category, with State and local respondents giving the highest rating of any of the sub-population groups. Reports of other Government agencies, e.g., Bureau of Mines, Weather Bureau, etc., rated distinctly lower for most groups. It may be hypothesized that this is due to the more specialized nature, and the smaller number, of publications in this class.

Specialized Abstracting and Announcement Services

Overall, these services were rated in the following order of descending importance:

APCA Abstracts

Public Health Engineering Abstracts

Chemical Abstracts

Government Research Reports (Federal Clearinghouse)

Other Federal services--Nuclear Science Abstracts (AEC), Technical Abstract Bulletin (DOD), and Scientific and Technical Aerospace Reports (NASA).

Index Medicus (National Library of Medicine)

The APCA Abstracts is evidently a major source, receiving a rating of "high" importance by 57% of all respondents, and "moderate" by an additional 27%. These ratings were consistent among the sub-populations, and compared with "high" and "moderate" ratings of 15% each for the next highest abstract source, Public Health Engineering Abstracts.

The APCA Abstracts find their greatest use, however, as a current awareness medium. Frequent comments related to the difficulty in retrospective search for specific information or bibliographic entries, via the cumulative subject index.

Chemical Abstracts was considered a relatively important source by the research groups, but is little utilized by the others.

Government Research Reports, the Federal Clearinghouse announcement publication, was cited more often than the total of the three remaining Federal services. These latter tended to be cited by specialist groups, particularly meteorologists, and generally carried "high" importance ratings when cited. The general reaction to all four of these services, as expressed in interviews, was that each carried information of value to the air pollution field but that the individual effort required for screening is excessive.

As might be anticipated, Index Medicus received little emphasis except among the research workers in the biomedical field. This group, however, gave it a "high" rating, somewhat higher than that for the APCA Abstracts.

Information Service Needs

From the standpoint of providing guidance in developing the Air Pollution Technical Information Center (APTIC) the survey has two important objectives:

Identifying recognized deficiencies in present technical information availability, and

Determining the services most desired by the air pollution community.

During the interview phase, problems or deficiencies that were mentioned sufficiently often to be defined as characteristic attitudes included:

The wide variety of sources of air pollution information and the excessive effort required to keep up with these sources.

Difficulty in finding specific information or, in the case of bibliographic searching, being confident of reasonably complete coverage.

Time lags in publication and further time lags in abstracting or other forms of general announcement.

To varying degrees, lack of critical evaluation in accepting papers for publication and in abstracting.

Inadequate coverage of foreign work.

Substantial amounts of information in various types of files but which, for one reason or another, is not pulled together and published.

Dearth of authoritative reviews or critical monographs summarizing the best available information in particular areas.

Indexing problems involved in maintaining personal files.

Desire for Specific Services

To evaluate new or expanded services which might be provided by the Center to serve these needs better, the survey respondents were asked to rate a series of such services, according to the following scale:

	Weights Assigned for Analysis
A - Highly desirable	4
C - More desirable than means now available	2
F - Less desirable than means now available	-1

Using the weights indicated (and "0" for "No answer") averages* were calculated to arrive at the group value judgements of the sub-populations, and rank correlations were established. Table 1 summarizes the relative ranking by the entire sample, and the services given the highest ratings by each of the sub-populations.

Abstract bulletins, available at one- to two-month intervals, are the most generally desired service. In the light of a number of comments received concerning present abstract services, provision was made for expressing opinions as to possible improvements. Responses from the total samples were as follows:

"The present APCA Abstracts are satisfactory for my purposes" 33%

"They would serve me better if they had:

"Greater coverage of topics in (suggestions by respondents) 32%

"More detailed categorization as published 13%

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* As an aid to interpretation, typical examples of averages derived from a range of response patterns would be:

A	90%	66%	50%	43%	34%	21%
C	10	20	28	31	12	16
N/A	--	10	16	18	44	47
F	--	4	6	8	10	16
Weighted Av.	3.8	3.0	2.5	2.0	1.5	1.0

Table 1

INFORMATION SERVICE DESIRES - RANK CORRELATION

(Weighted Averages)

	Overall Rank	Governmental		Industrial		Research			
		State and Local	PHS Technical Assistance	Control	Equipment	PHS	Other Government Agencies	Universities	Institutes
Abstracts	1	2.4	3.1	2.0	2.6	2.0	2.5	2.3	2.5
Accession Lists	2	2.4	3.8	1.6	1.9	2.5	3.0	1.9	2.3
Bibliographic Searches	3	2.4	2.3	1.0	1.7	2.6	2.4	2.0	2.2
State-of-the-art Reviews	4	2.0	2.9	2.0	2.5	1.7	1.4	1.7	2.2
Critical Monographs	5-6	1.2	2.4	1.5	.8	2.0	1.9	2.2	2.3
Technical Newsletters	5-6	2.1	2.0	1.9	1.4	1.7	1.7	.9	1.5
Professional Specialist Services	7	1.6	1.7	.9	1.4	2.3	1.9	1.1	1.1
Data Compilations	8	1.3	1.6	.5	.8	1.0	.8	.8	1.0

0.0 - The three highest-rated services by this sub-population.

0.0 - The fourth and fifth-highest ratings by this sub-population.

Weights Assigned

Highly desirable	4
More desirable than means now available	2
No answer	0
Less desirable than means now available	-1

"More detailed cumulative indexing	16%
"Index terms, keywords, or descriptors printed along with the abstracts"	20%

The suggested topics for greater coverage are summarized in Appendix D. These indicate areas for increased attention in the planned abstracting operations.

Accession lists of titles and reference identifications as they are acquired by APTIC are also generally desired. These could serve as an "express" current awareness medium and a specialized announcement service, particularly useful in identifying pertinent references appearing in the broad Federal announcement services such as the Federal Clearinghouse, NASA, and the National Library of Medicine.

Bibliographic compilations on requested topics receive the heaviest emphasis by research workers and State and local agency personnel.

On the next three services, respondents were asked to suggest subjects for coverage and, in the case of reviews and technical newsletters, the preferred frequency of issue. State-of-the-art reviews (recommended to issue every 6 to 12 months) are emphasized by the industrial and governmental groups; critical monographs, as warranted, by the research workers. Technical newsletters (issuing at 1 to 2 month intervals) are principally desired by the industrial control group, and State and local agencies. Opinions as to frequency of issue and subjects suggested for coverage are detailed in Appendix E.

Professional specialist services, i.e., providing answers to particular technical questions as distinguished from furnishing documents or bibliographic citations, are most desired by research workers in government agencies and by the industrial equipment group. This is a capability which can be developed from the basic resources essential to providing the other services desired.

Data compilations, as such, received a relatively low desire rating. Other than measurements of the type published by the National Air Sampling Network, the subjects suggested were generally appropriate for inclusion in a state-of-the-art or critical monograph form of publication.

The results of this portion of the study can guide development of APTIC, both as to priority in service development and in subject areas to be particularly stressed.

Users Without Direct Control Responsibilities

Both the interview phase and the mail survey yielded a number of thoughtful and provocative responses from municipal officials, particularly those involved in city planning, leaders of scientific and civic organizations, and others who are concerned about air pollution problems. The mail responses were usually in the form of the short questionnaire (Exhibit A 4 to Appendix A).

The five responses from city planning officials reflect an increasing awareness of air pollution problems in planning. It was noted also that the professional associations such as American Society of Planning Officials and American Institute of Planners are giving increased attention to these aspects.

Representative replies to the two questions in the short form questionnaire include:

My involvement with air pollution problems consists of

"Considering present and possible future air pollution, together with possible methods of control, as one set of factors to be considered in comprehensive planning for the urban physical environment."

"As director of a metropolitan agency concerned with comprehensive planning.....research which reconnoiters the nature of the problem and its effects, aimed at eliciting necessary public and political action to establish appropriate legislation and programs."

"Prohibiting expansion of industries which are objectionable due to air pollution."

The new Center could help serve my information needs by

"Serving as a centralized source concerning research and operational programs in this field.....We note the real paucity of information concerning the relationship of air pollution to land use planning."

"Providing information on:

1. Present and future rates of air pollution generation related to population and land use
2. Prospects for, and adequacy of, air pollution control techniques.
3. Performance standards and measurement techniques applicable to land use control."

Almost without exception, planning and other municipal officials indicate reliance on their local control agencies for technical information. One, for instance, replies that the Center could help serve his needs by, "Having information available to the Control District."

Another theme which runs through these and other comments is the need for educating and informing the general public, a point stressed by Haagen-Smit[5] in a recent lecture. Other respondents commenting specifically on this aspect included the executive secretary of a municipal Air Control League, a university extension specialist, and an official of a local health association. The work of the AAAS Commission on Atmospheric Conservation, and the program of the Scientists' Institute for Public Information reflect the concern of the community of scientists, in their capacities as citizens, for this problem. The Center can provide valuable support to educational activities, both private and governmental, as a source of basic technical information.

Congressional needs for air pollution information fall into two categories: that required by committees for their legislative functions; and that needed to reply to a variety of questions from constituents. Interviews with senior staff members of the two committees dealing with air pollution legislation indicate complete satisfaction with the established services of Public Health Service liaison officials for legislative needs. Inquiries to individual congressmen from constituents are usually referred to the Information and Education Branch, Division of Air Pollution, for handling. In many cases sending an existing publication is an appropriate reply. In others, specific information must be obtained. The proper role for the Center appears to be one of effective support to the responsible officials, rather than direct participation.

Information Resources

The largest single body of identified air pollution technical information consists of nearly 12,000 references contained in the Technical Library of the Bay Area Air Pollution Control District. Duplicate sets of index cards and microfilms have been purchased by three State control agencies, one university, and the Division of Air Pollution. These sets are updated semiannually by the addition of newly indexed references.

The 6531 items in the APCA abstract series (as of March 1965) constitute the next largest body. This resource has the advantages of wide distribution and availability, and of providing abstracts as well as bibliographic references. There is naturally a considerable degree of duplication between this source and the Bay Area collection. However, preliminary checks indicate that this is less than might have been anticipated.

Other major sources include Public Health Engineering Abstracts, the 2-volume Air Pollution Bibliography prepared by the Library of Congress, and specialized bibliographies such as the compilation on health effects, prepared by the Kettering Laboratory.

The collections cited above constitute a basic resource from which the APTIC "reservoir" of information can be assembled. The process involves identification of duplication, evaluation for inclusion, acquisition of text and/or abstracts, and "deep-indexing" into the storage and retrieval system. It can proceed concurrently with the acquisition of currently produced material and the refinement and implementation of the retrieval system.

An important source of information relevant to air pollution problems is provided by the major Federal document clearinghouses and associated abstracting and announcement services. Survey results indicate that these have not been fully utilized in the past. Such agencies include:

National Library of Medicine (NLM)

National Library of Agriculture (NLA)

Defense Documentation Center (DDC)

National Aeronautics and Space Administration (NASA)

Atomic Energy Commission (AEC)

Science Information Exchange (SIE)

Clearinghouse for Federal Scientific and Technical Information (CFSTI) -- Department of Commerce

Bibliographies (demand and retrospective), abstracts, indexes, and relevant documents forwarded to the Center can contribute to an active acquisition program for newly announced documents which might otherwise be missed.

A brief description of the scope and functions of each of these resources is contained in Appendix F.

Implementation Recommendations

The first emphasis in developing the Air Pollution Technical Information Center to a fully operational status must be on gaining early and adequate cognizance of the air pollution literature, i.e., "to insure bibliographic control and availability." This involves:

- Expanding and strengthening the screening and acquisition channels.
- Completing the development of an effective information storage and retrieval system.
- Indexing and incorporating current material as received.
- Evaluating and indexing selected material retrospectively.

In the screening and acquisition activity, both the previously existing channels and additional sources identified during the study should be systematically utilized and exploited. Particular attention should be given to identifying material relevant to air pollution in the general Federal announcement services, previously noted. This can efficiently bring to the attention of the air pollution community much information that might otherwise be buried in the report literature, or not be readily identifiable in the medical literature. At the same time, continuing attention must be given to insuring that reports resulting from Public Health Service support, either by contract or by other government agencies, are made available to the public through the Clearinghouse for Scientific and Technical Information.

Effective access to the air pollution literature, in support of the services which the APTIC should provide, will require a comprehensive information storage and retrieval system. This will necessitate indexing to a considerably greater depth than systems now in operation, as well as a degree of automation appropriate to the size of the collection anticipated.

As the indexing and retrieval system is developed and refined, it can be applied and tested in indexing and incorporating current material as received. This will not only contribute to a practical system, but will also give an early capability on current information.

Similarly, the references in present collections of air pollution information must be reviewed for duplications, evaluated as to currently significant content and selected items indexed and incorporated into the system.

The resulting store of information and the system for its retrieval and use constitute the base upon which effective user services must be built. From

the results of the user survey, it is concluded that the most desirable services to be developed initially would include:

- Prompt announcement of new references via an accession list or similar medium.
- Strengthening abstract services in terms of coverage, currency, categorization and indexing.
- Providing "on demand" specialized search services, which would yield either bibliographic compilations or specific information, as required.
- Preparing, or arranging for the preparation of state-of-the-art summaries or critical monograph publications in areas of identified need.

In its acquisition, announcement, and summarization activities, the Center should stress the subject areas for which there is the greatest demand, as reflected by the topics listed in Appendixes D and E covering desired services.

In all of its operations, the APTIC must be "service-oriented" and of clearly professional caliber. An important element in achieving and maintaining this orientation is frequent and continual contact between the professional personnel of the Center and the users, as well as the producers, of air pollution information. The experience of other specialized information centers[6] underscores the importance of this point. Frequent field visits, to maintain sensitivity to changing user needs, to make potential users aware of the services such a center can provide, and to sustain and improve the flow of information to the center, have been found to be critically important.

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3. A Quantitative Technique for Designing a Technical Information Center. Myatt, D. O. and Upham, T. E. J. Chem. Doc. 1, 18 (1961).

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5. Public Apathy is Greatest Air Pollution Problem. Haagen-Smit, A. J. Chem. & Eng. News. April 12, 1965. p. 99.

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Science Communication
Washington, D. C.
Contract PH 86-65-13

APPENDIX A

Sampling and Survey Procedure

Science Communication
Washington, D. C.
Contract PH 86-65-13
26 April 1965

APPENDIX A

Sampling and Survey Procedure

The objective, in both the personal interview and the mail questionnaire surveys, was to obtain a sufficient sample of each sub-population to give confidence that the results adequately reflected the opinions of that group. This, we believe, was achieved.

On the other hand, the proportional representation of each sub-population in the total sample is not necessarily the proportion of that sub-group in the total air pollution population. It is probable that the research group is somewhat over-represented due to high interest and a correspondingly high ratio of response by addressees. The industrial and "civic"* groups are probably under-represented in the total, because of a lower ratio of response.

In the final sample, the ratio of Air Pollution Control Association members to non-members is approximately 60/40.

Sample Acquisition

Prospective participants for the interview phase were acquired through discussions with Division of Air Pollution representatives, recommendations of consultants, attendance at national meetings of the American Chemical Society and American Institute of Chemical Engineers, and referrals received during interviews.

Participants for the mail survey phase were acquired from:

Directory of Government Air Pollution Agencies (APCA)
(for State and local air pollution officials)

APCA Membership Directory

Public Health Service grantees and contractors

---

* "Civic"- Individuals with air pollution interests but without direct technical responsibilities in air pollution control. Includes municipal and county executives, planning and zoning officials, civic groups, etc.

Air Pollution committees of professional and trade associations

American Chemical Society

American Institute of Chemical Engineers

American Institute of Planners

American Society of Mechanical Engineers

American Society of Planning Officials

Automobile Manufacturers Association

Manufacturing Chemists Association

National Association of Counties

National Coal Association

National League of Cities

Rosters of Public Health Service personnel

Suggestions from Federal agencies with air pollution interests

Agricultural Research Service

Bureau of Mines

Department of Defense

Public Health Service

Weather Bureau

Suggestions obtained during individual interviews

Inquiries received in response to project announcements in journals

Survey Operations

As a preliminary step, a general announcement (Exhibit A 1) was sent to representative air pollution publications and other related technical journals. It was published in whole, or in part, by the following:

Journal of the Air Pollution Control Association

Air/Water Pollution Report

Environmental Health Letter

Prentice-Hall Executive Report

Science Information Notes (NSF)

Ten inquiries resulted from this announcement, including one from the National Chemical Research Laboratory, Pretoria, South Africa.

In the interview phase, 70 interviews addressed primarily to information usage were conducted, using an extensive check list developed in cooperation with the Division of Air Pollution. Those interviewed represented the various categories of potential users, with emphasis on State and local control agencies, research investigators, and industrial engineers and officials responsible for plant engineering and operation from the standpoint of pollution control.

An additional 46 interviews were conducted in connection with evaluation of resources, securing leads for particular categories of potential recipients of the mail questionnaire, and general problem discussions.

The mail questionnaire (Exhibit A 3) was developed, based on experience gained in the interviews. It is similar to the interview check list, but represents a considerable condensation and refinement.

By transmittal letter (Exhibit A 2), questionnaires were sent to 445 addressees, selected from the sources listed above. An extra copy was enclosed, for retention for reference, or for passing on to another interested individual in the same organization. About 50 of the 228 questionnaires returned appear to have originated via referral by the original addressee. For those tentatively classified as "Civic" (see breakdown below) an alternate short form (Exhibit A 4) was provided, encouraging general comments if the recipient felt that the full questionnaire was not well suited to describing his situation. Thirteen of the responses were in this or a similar form.

In the first three weeks following the initial distribution, 154 responses were received. A follow-up return postcard (Exhibit A 5) was then sent to all who had not previously replied. This ultimately brought in an additional 92 questionnaires, as well as several requests for another copy in lieu of one misplaced. In addition, 37 of the original addressees replied that their current involvement in air pollution problems was not such as to require specific technical information. Of these, about one-third were research workers whose interests were peripheral or who were no longer engaged in air pollution projects, and one-third were either local government officials whose air pollution responsibilities are minimal, or technicians primarily engaged in routine sampling and inspection. The remainder assigned a variety of miscellaneous reasons.

As questionnaires were returned the results were transcribed to specially-designed edge-notched cards (Exhibit A 6). These were later code-punched to facilitate analysis and comparison.

The final results are summarized as follows:

Survey interviews	70	
General interviews	46	
Questionnaires mailed	445	addressees
Questionnaire responses		
Full questionnaires	228	
Short comments	13	
No current requirement	37	

The short-comment responses comprised:

Planning officials	5
Civic groups	3
State and local air pollution control officials	5
	13

The respondents who submitted full questionnaires are categorized, based on their organizational affiliations, reported functions and interests, and research disciplines on pages 6-7 of the report.

Science Communication
Washington, D. C.

EXHIBIT A1

Technical Information Needs of Air Pollution Workers to be Studied

A comprehensive survey of technical information requirements and resources in the field of air pollution prevention and control has been started by Science Communication, Inc., under a contract from the Division of Air Pollution, U. S. Public Health Service. Science Communication is a Washington-based consulting organization specializing in studies of the communication and use of scientific and technical information.

The survey, combining personal interview and questionnaire techniques will identify the particular information requirements and information use patterns of the various groups concerned with air pollution control. These include scientists and engineers engaged in basic and applied research; control "practitioners"--in industrial organizations and in Federal, state, district, and municipal units; public administrators and legislators--Federal, state, and local; and technical societies and trade associations with interests in air pollution problems.

Concurrently, the study will provide a comprehensive inventory and characterization of information resources in the air pollution field, looking toward the supplementing of these resources where the need is evident.

Workers with special technical information needs or problems in the air pollution field are encouraged to communicate with the Project. Correspondence should be addressed to Air Pollution Information Project, c/o Science Communication, Inc., 1079 Wisconsin Avenue, N. W., Washington, D. C., 200 07.

The project is part of the program carrying out the air pollution information responsibilities of the Department of Health, Education and Welfare, assigned in January of this year by the Office of Science and Technology, Executive Office of the President. Under this assignment, the Department will collect data and information from both government and non-government facilities significantly involved in air pollution research, and will organize this information, consolidate it, and provide state-of-the-art summaries. The service will be available to industry and the public as well as to other government agencies.

EXHIBIT A2

Science Communication, Inc.
Washington, D. C. 200 07 Tel. FEderal 3-1343

1079
Wisconsin
Avenue, N.W.

What technical information do you use in your air pollution work?

What additional information would you use if you could obtain it at reasonable cost and effort?

To serve your needs most effectively, how should the new Air Pollution Technical Information Center be designed and operated?

Science Communication, Inc. has been commissioned by the Division of Air Pollution, U.S. Public Health Service to conduct a user study to develop answers to those questions. Concurrently we are to inventory and characterize the principal information resources already serving the air pollution field.

The Center will bear the responsibility within the Federal Government for scientific information relating to air pollution prevention and control. Information from both government and non-government sources will be organized and consolidated. State-of-the-art reviews and similar summary studies will be developed as found useful. The service will be available to private and government organizations, technical groups and individuals, and the public.

Your candid answers to the enclosed check list will help create a service equipped with practical resources for meeting the working needs of individual users. Your reply also will help assure that the special needs of your own field are known while the service design is being developed. Because air pollution concerns many fields and specialties, this second factor has required a list of some length. However, we believe you can readily and rather rapidly identify the portions bearing on your own interests, and relate them to the question of service design.

We suggest you treat this inquiry on a "do it and get rid of it" basis. Partial replies will be used and thankfully received! A second copy is enclosed for forwarding to another interested professional in your organization, or for your own retention. Thank you for your contribution to the project.

Sincerely,

SCIENCE COMMUNICATION, INC.

Victor C. Searle

Victor C. Searle
Principal Investigator

EXHIBIT A3

Science Communication
Washington, D. C. 200 07

Budget Bureau No. 68-6457
Approval Expires 6/3/65
Contract PH 86-65-13

AIR POLLUTION TECHNICAL INFORMATION SURVEY

User Checklist

Date _____

Name _____

Organization _____

Address _____

Position Title _____

My Formal Education

Highest degree _____ Year _____ Major Subject _____

My Employment in Air Pollution Related Activities

With present organization _____ years.

Prior to present organization _____ years.

Membership in Professional Societies or Trade Associations with Air Pollution Interests

_____ _____

_____ _____

My Personal Work in Air Pollution Concerns:
(Please circle all appropriate items and specify where needed)

Industrial: _____ (Industry)	Management	Engineering	Operations
Control Agencies:	Surveillance	Inspection	Enforcement
Research:	Basic	Applied	_____ (disciplines or fields)
Technical Services:	Education	Training	Technical Assistance
Control Equipment:	Development	Design	Application
Administration or Legal:	Legislation	Planning	Zoning

Other Topics or Activities: _____

_____

If your air pollution activities are almost entirely related to specific effluents, please list them here:

_____

_____

I Use Air Pollution-Related Specialized Technical Information of the Following Nature:

	Relative Importance			Ease of Obtaining		
	High	Moderate	Little	Generally Easy	Varies	Difficult
1. Pollution Measurement Methods						
a. Sampling	___	___	___	___	___	___
Comments _____						
b. Analysis	___	___	___	___	___	___
Comments _____						
c. Monitoring	___	___	___	___	___	___
Comments _____						
2. Pollution Effects On:						
a. Human Health	___	___	___	___	___	___
Comments _____						
b. Materials, e.g. soiling, corrosion	___	___	___	___	___	___
Comments _____						
c. Plants	___	___	___	___	___	___
Comments _____						
d. Animals	___	___	___	___	___	___
Comments _____						
e. Visibility	___	___	___	___	___	___
Comments _____						
3. Standards						
a. Ambient Air	___	___	___	___	___	___
Comments _____						
b. Emission	___	___	___	___	___	___
Comments _____						
4. Economic Losses	___	___	___	___	___	___
Comments _____						
5. Atmospheric Reactions	___	___	___	___	___	___
Comments _____						
6. Applied Meteorology	___	___	___	___	___	___
Comments _____						

I Use Air Pollution-Related Technical Information of the Following Nature:	Relative Importance			Ease of Obtaining		
	High	Moderate	Little	Generally Easy	Varies	Difficult
7. Radioactivity	___	___	___	___	___	___
Comments ___						
8. Legal Aspects	___	___	___	___	___	___
Comments ___						
9. Planning and Zoning	___	___	___	___	___	___
Comments ___						
10. Other (Specify) ___	___	___	___	___	___	___
___						

My Information SOURCES Are:

	Relative Importance			Purpose	
	High	Moderate	Little	Current Awareness	Specific Information
A. Personal Contacts					
1. Air Pollution Meetings, Conferences, Symposia	___	___	___	___	___
Comments ___					
2. Individual Technical Specialists					
a. Within my organization	___	___	___	___	___
b. Consultants	___	___	___	___	___
c. Others outside my organization	___	___	___	___	___
Comments ___					
B. Primary Publications, Reports, and Documents					
1. Journals (specify)					
a. ___	___	___		___	___
b. ___	___	___		___	___
c. ___	___	___		___	___
d. ___	___	___		___	___
e. ___	___	___		___	___
Comments ___					

My Information SOURCES Are:	Relative Importance			Purpose	
	High	Moderate	Little	Current Awareness	Specific Information
2. Government Agency Technical Reports					
a. Public Health Service	___	___	___	___	___
Comments_____					
b. Other Federal Agencies (specify)	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
c. State and Local Agencies (specify)					
_____	___	___	___	___	___
_____	___	___	___	___	___
3. Ordinances, Decisions, and other Legal Documents	___	___	___	___	___
Comments_____					
4. Other _____	___	___	___	___	___

C. **Specialized Abstracts, Indexes or Information Center Services**

1. Air Poll. Control Assoc. Abstracts	___	___	___	___	___
Comments_____					
2. Index Medicus	___	___	___	___	___
Comments_____					
3. Public Health Engineering Abstracts	___	___	___	___	___
Comments_____					
4. Bay Area Air Poll. Tech. Info. Library	___	___	___	___	___
Comments_____					
5. Chemical Abstracts	___	___	___	___	___
Comments_____					
6. Government Research Reports (Abstracts) (Office of Technical Services)	___	___	___	___	___
Comments_____					
7. Nuclear Science Abstracts (AEC)	___	___	___	___	___
Comments_____					

My Information SOURCES Are:	Relative Importance			Purpose	
	High	Moderate	Little	Current Awareness	Specific Information
8. Scientific & Tech. Aerospace Reports (NASA)	___	___	___	___	___
Comments _____					
9. Technical Abstract Bulletin (Defense Documentation Center)	___	___	___	___	___
Comments _____					
10. Other (Specify) _____	___	___	___	___	___
_____	___	___	___	___	___

D. My Own Reference Files

☐ I do not keep a personal reference file

☐ I keep a personal reference file

☐ It is indexed

Brief description of my index system: _____

_____

_____

FOLLOWING ARE MY ESTIMATES OF THE USEFULNESS--TO ME--of new or expanded services which might be provided by an Air Pollution Technical Information Center:

(Please circle to indicate rating)

A - Highly desirable

C - More desirable than means now available to me

F - Less desirable than means now available to me

	Desirability
1. Accession lists (titles, etc., of documents acquired by the Center) issued every ( ) week(s).	A C F
2. Abstract bulletins, issued every ( ) month(s).	A C F

☐ The present Air Pollution Control Association Abstracts are satisfactory for my purposes

OR

☐ They would serve me better if they had:

a. Greater coverage of topics in _____

_____

_____

Desirability

b. ☐ More detailed categorization as published.

c. ☐ More detailed cumulative indexing.

d. ☐ Index terms, keywords, or descriptors printed along with the Abstracts.

Comments _____

3. State-of-the-art reviews.

Periodically, every ( ) month(s). A C F

Critical monographs, as warranted. A C F

Suggested topics _____

_____

_____

4. Technical newsletter, issued every ( ) month(s). A C F

Suggested emphasis _____

_____

_____

5. Data compilations A C F

Subject areas _____

_____

_____

6. Bibliography compilations on request, on topics I specify. A C F

7. Professional-technical specialist services on request. A C F

OTHER SERVICES OR FACTORS THAT WOULD HELP ME meet my technical information needs in my air pollution work: _____

_____

_____

Desirability

SERVICES SUCH AS THOSE DESCRIBED, have the following relative value for me, assuming they:

1. Are "customized" to a subject interest profile I had supplied. A C F
2. Are general, spanning across the field of air pollution. A C F

(If your preference varies with the type of service, please comment:)

_____

_____

WHEN I HAVE A SPECIFIC NEED FOR INFORMATION I MUST obtain from others, I need it:

1. The same hour, in ____% of the instances
2. The same day, in ____% of the instances
3. In a week or 10 days in ____% of the instances;
4. No deadline problem in ____% of the instances.

IN SUMMARY, the technical information significantly useful for my air pollution work is generally:

☐ Easy to obtain.

☐ Not easy to obtain.

☐ Available, but I have special problems with some of it.

(Please add any further comments that will contribute usefully to this inquiry. Thank you!)

_____

_____

_____

_____

EXHIBIT A4

Science Communication
Washington, D. C.

Note to Civic Officials, Planners and Citizens' Groups

As you will see, the enclosed check list was designed for a person whose major activities are directly concerned with air pollution problems. We hope, of course, that you will answer all the applicable questions in it even though your specialized needs may be small.

However, if the list may not be well suited to describing your situation, would you simply fill out the attached self-characterization sheet and give us your comments below?

My involvement with air pollution consists of:_____

_____

_____

_____

_____

_____

The new Center could help serve my information needs by:_____

_____

_____

_____

_____

_____

_____

_____

(If you can pass on the full questionnaire to someone more directly involved, please indicate his name and position below.)_____

_____

_____

Science Communication
Washington, D. C.
Contract PH 86-65-13

EXHIBIT A5

FOLLOW-UP POST CARDS

TO PARTICIPANTS IN THE AIR POLLUTION
TECHNICAL INFORMATION SURVEY

We are now compiling and evaluating the check-lists from survey participants.

The response to date has been gratifying and informative, but for statistical validity and proper representation of your specialty, we need your report for our final analysis.

Could you advise, via the attached card? Thanks,

Victor C. Sealy

AIR POLLUTION TECHNICAL INFORMATION STUDY

I returned my check-list about _____.
or
I expect to return it about _____.
or
My association with air pollution problems, which is_____

_____

_____

_____

does not require specific technical information.

_____
Signed

EXHIBIT A3

Ind. M E O _____

CA S I E

Res. B A _____

TS E T TA

CE Dv. Ds. A

A/L L P Z

Oth. _____

Effl. _____

Category

_____

_____

_____

Interests

1aS	___/___	3aAmb	___/___
bA	___/___	bEm	___/___
cM	___/___	4 EL	___/___
2aH	___/___	5 AR	___/___
bM	___/___	6 AM	___/___
cP	___/___	7 R	___/___
dA	___/___	8 LA	___/___
eV	___/___	9 PZ	___/___

10 Oth. _____

Sources

A1	___/___			B3	Ord ___/___
2a	___/___			B4	Other ___/___
2b	___/___			C1	APA ___/___
2c	___/___			2	IM ___/___
B1	APCA ___/___			3	PHEA ___/___
_____	___/___			4	BAL ___/___
_____	___/___			5	CA ___/___
_____	___/___			6	GRR ___/___
_____	___/___			7	NSA ___/___
B2a	PHS ___/___			8	STAR ___/___
2b	Fed ___/___			9	TAB ___/___
2c	Loc ___/___			10	Other ___/___

_____

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Desires

1. Acc. _____ wk. _____
2. Abs. _____ mo. _____
   OK ☐ Bet. ☐
   a. _____
   _____
   b. ☐ c. ☐ d. ☐
3. SOAR _____ mo. _____
   Crit. Mon. _____
   _____
   _____
4. Tech. NL _____ mo. _____
   _____
   _____
5. Data Comp. _____
   _____
   _____
6. Bibliography _____
7. Prof. Search _____

Files

No ☐ Yes ☐ Indexed ☐

_____

Relative Value

Res. _____ Gen. _____

Time

Hr. _____% Day _____%
Wk. _____% ND _____%

Summary

E ☐
NVE ☐
A, but ☐

_____
_____
_____
_____
_____
_____
_____
_____

Science Communication
Washington, D. C.
Contract PH 86-65-13

APPENDIX B

Specialized Air Pollution Subject Interests

Science Communication
Washington, D. C.
Contract PH 86-65-13
26 April 1965

APPENDIX B

Specialized Air Pollution Subject Interests

In assessing "relative importance" in their work, and "difficulty of obtaining" information on selected specialized air pollution subjects, participants rated each of these factors on three levels. These, together with the weights used in analysis are:

Relative Importance	Weight	Difficulty of Obtaining	Weight
High	4	Difficult	4
Moderate	2	Varies	2
Little	1	Easy	1

Consideration was given to scoring a "No answer" as "0", but variations in the proportions answering on different subjects and from different sub-populations tended to obscure the "importance" and "difficulty" opinions reported by those who replied. Therefore, the averages shown in Exhibit B-1 reflect only those who answered on the particular subject. As a secondary indication of importance to a given sub-population, the percentages answering are also shown.

Respondents indicating the importance of a subject as "little" and also indicating a "difficulty" rating are assumed to make some use of the subject and are included in the scoring. On the other hand, those who reported a "little" rating unaccompanied by a "difficulty" rating on a series of subjects are assumed to make no use of these subjects and are omitted from the averages.

As a general trend, a low percentage of response is accompanied by a low importance rating by those who did respond. Ratings where the response is less than 50%, particularly for the smaller sub-populations, should be regarded as merely indicative, because of the small number represented.

As an aid to interpretation, typical examples of averages derived from a range of response patterns would be:

Importance/Difficulty					
High/Difficult	75%	60%	40%	20%	5%
Moderate/Varies	25	20	30	40	35
Little/Easy	--	20	30	40	60
Weighted Average	3.5	3.0	2.5	2.0	1.5

SPECIALIZED AIR POLLUTION SUBJECT INTERESTS

EXHIBIT B-1

(Weighted Averages)

Imp = Importance Rating
% = Percent Answering
Dif = Difficulty Rating

		GOVERNMENTAL				INDUSTRIAL				RESEARCH											
		State & Local Agencies			PHS - Tech. Assist.			Control			Equip-ment			PHS			Other Govt. Agencies			Univer-sities			Institutes		
Number in Group		61			18			26			18			19			16			37			26		
		Imp	%	Dif	Imp	%	Dif	Imp	%	Dif	Imp	%	Dif	Imp	%	Dif	Imp	%	Dif	Imp	%	Dif	Imp	%	Dif
Sampling Methods	Imp	3.4			3.4			2.6			3.1			2.9			3.1			3.1			3.3		
	%		95			100			77			94			84			75			81			96	
	Dif			1.8			1.8			1.9			1.7			1.7			2.0			1.9			1.8
Analysis Methods	Imp	2.9			2.8			2.3			3.4			3.0			3.2			3.1			3.1		
	%		89			100			73			94			84			75			80			83	
	Dif			1.9			2.1			2.0			1.9			2.0			2.4			1.8			1.8
Monitoring Methods	Imp	3.0			3.2			2.6			2.3			2.7			3.0			2.9			2.6		
	%		79			100			73			50			47			63			61			83	
	Dif			1.9			2.0			2.0			1.8			1.7			2.2			2.1			1.6
Human Health Effects	Imp	3.1			2.6			3.1			1.9			2.8			2.7			3.1			2.7		
	%		97			100			81			39			84			56			68			88	
	Dif			2.7			3.1			2.5			2.3			2.3			2.4			2.3			2.0
Effects on Materials	Imp	2.8			2.4			2.4			2.4			1.4			2.1			2.8			2.2		
	%		91			100			54			39			37			44			45			71	
	Dif			2.4			2.7			2.7			2.7			1.9			2.6			2.1			2.2
Effects on Plants	Imp	2.3			2.1			2.4			1.3			2.0			2.8			2.9			2.3		
	%		81			94			63			39			37			69			69			67	
	Dif			2.2			2.4			2.4			1.7			1.5			2.4			1.6			2.3
Effects on Animals	Imp	2.0			2.0			2.3			1.3			2.7			2.3			2.5			1.9		
	%		77			94			45			39			74			44			51			58	
	Dif			2.4			2.6			2.5			2.0			1.9			2.9			2.1			2.3
Effects on Visibility	Imp	2.4			1.9			2.1			2.5			1.9			1.9			2.4			2.4		
	%		87			100			54			45			39			56			46			54	
	Dif			2.3			2.3			1.9			2.6			2.0			1.6			2.8			2.3
Ambient air Standards	Imp	3.1			3.2			3.1			2.1			2.8			3.3			3.3			3.2		
	%		89			94			78			53			72			62			67			78	
	Dif			2.8			3.1			2.9			2.3			2.4			2.7			2.3			2.1
Emission Standards	Imp	3.5			2.9			2.6			4.0			3.2			3.5			3.1			3.4		
	%		90			94			88			95			68			63			49			71	
	Dif			2.7			2.9			2.1			1.9			2.0			2.7			2.1			1.9
Economic Losses	Imp	2.5			2.3			2.3			2.6			1.8			2.4			3.0			1.6		
	%		78			94			63			50			47			63			63			54	
	Dif			2.9			3.1			2.9			2.3			2.9			3.0			3.2			3.2
Atmospheric Reactions	Imp	2.2			2.0			2.1			2.9			2.9			2.8			3.1			2.8		
	%		81			88			54			61			58			75			66			67	
	Dif			2.9			2.7			2.9			2.4			2.3			2.4			2.2			2.1
Applied Meteorology	Imp	2.8			2.6			2.7			1.4			1.7			3.1			2.6			2.8		
	%		78			100			65			45			33			56			67			71	
	Dif			2.4			2.0			2.3			2.5			1.7			1.7			2.4			2.0
Radioactivity	Imp	1.7			1.7			1.8			1.4			1.4			4.0			1.9			2.3		
	%		87			71			19			50			28			37			35			44	
	Dif			1.7			2.4			2.8			2.2			1.8			1.8			1.8			1.7
Legal Aspects	Imp	2.7			2.9			2.8			2.1			1.7			2.8			1.9			1.8		
	%		78			82			61			78			17			37			36			46	
	Dif			2.5			2.3			2.1			1.8			1.7			2.2			2.4			2.4
Planning and Zoning	Imp	2.4			2.1			2.0			2.0			1.3			2.5			2.1			1.7		
	%		71			88			42			39			17			37			39			42	
	Dif			2.3			2.7			2.2			1.7			1.3			1.8			3.2			3.0

APPENDIX C

Information Sources Used by Respondents

APPENDIX C

Information Sources Used by Respondents

Journals

A total of 100 primary journals were listed by the 228 respondents submitting questionnaires. The ten most frequently mentioned are shown on page 10 of the report. A complete listing of the primary journals, with frequency, is given in Exhibit C-1. The ranking of the highest ten is included parenthetically. Publications of State and local control agencies are omitted, since in many instances they were not indicated by name.

Disciplinary abstract journals mentioned by the respondents in addition to Chemical Abstracts include:

Analytical Abstracts
Biological Abstracts
Current Contents
Forestry Abstracts
Fuel Abstracts
Meteorological Abstracts
Review of Applied Mycology

Other Information Sources

In reporting on personal contacts, Government publications, and specialized abstract services the respondents rated each potential source as of "high", moderate", or "little" importance in their own work. In order to reflect both the degree of importance and the number sufficiently concerned to express an evaluation, weights were assigned as follows:

Rating	Weight
High importance	4
Moderate importance	2
Little importance	1
No Answer	0

Weighted average scores were then computed in each case as a basis for comparison among sub-populations and between different information sources. Scores are tabulated in Exhibit C-2.

Typical examples of averages derived from a range of response patterns would be:

Importance						
High	75%	60%	45%	30%	15%	10%
Moderate	25	25	25	30	30	20
Little	--	10	20	20	30	20
No Answer	--	5	10	20	25	50
Weighted Average	3.5	3.0	2.5	2.0	1.5	1.0

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EXHIBIT C-1

JOURNAL	Frequency
Air in the News	7
Air Repair	1
Air Engineering (4)	34
Air/Water News	1
Air/Water Pollution Report (8)	17
American City	2
American Engineer	1
American Industrial Hygiene Association Journal (3)	37
American Journal of Botany	1
American Journal of Pathology	2
American Journal of Public Health	8
American Review of Respiratory Diseases	3
American Society for Testing Materials Bulletin	1
American Society of Mechanical Engineers, Transactions	7
American Society of Planning Officials	1
Analytical Chemistry (6)	23
Archives of Biochemical Biophysics	1
Archives of Environmental Health AMA (9)	18
Archives of Industrial Hygiene and Occupational Medicine	1
Archives of Pathology	1
ASHRAE Journal	3
Automotive Industries	1
Botanical Gazette	1
British Chemical Engineering (Brit.)	1
British Medical Journal (Brit.)	1
Canadian Journal of Biochemistry (Canada)	1
Cancer Research	1
Chemical Engineering (5)	25
Chemical and Engineering News	10
Chemical Engineering Progress (10)	11
Chemical Week	6
Coal	3
Coal Age	1
Combustion	5
Combustion/Flame	1
Compost Science	1
Contamination Control	10
Diseases of Chest	3

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EXHIBIT C-1

JOURNAL	Frequency
Electroencephalography and Clinical Neurophysiology	1
Energie (Germany)	1
Engineering News Record	1
Environmental Health Letter	1
Experimental Cell Research	1
Fueloil and Oil Heat	1
Health Physics	5
Industrial and Engineering Chemistry (7)	19
Industrial Hygiene Digest	2
Industrial Water and Wastes	1
Instrument Society of America, Journal	1
International Journal of Air and Water Pollution (2)	38
Iron Steel Engineering	1
Journal of Air Pollution Control Association (1)	177
Journal of the American Chemical Society	5
Journal of the American Medical Association	3
Journal of Applied Chemistry (USSR)	1
Journal of Applied Meteorology	9
Journal of Atmospheric Sciences	7
Journal of Biological Chemistry	3
Journal of Chemical Physics	3
Journal of Chromatography (Holland)	1
Journal of Colloid Science	3
Journal of Gas Chromatography	3
Journal of Geophysical Research	2
Journal of Industrial Hygiene Quarterly	1
Journal of Inorganic Chemistry	1
Journal of Institute of Fuel (Brit.)	2
Journal of Optical Society of America	1
Journal of Pharmacology and Experimental Therapeutics	1
Journal of Physical Chemistry	3
Journal of Public Hygiene	1
Journal of Sanitary Division, American Society of Civil Engineers	3
Journal of Scientific Instrumentation (Brit.)	1
Lancet (Brit.)	1

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EXHIBIT C-1

JOURNAL	Frequency
Machine Design	1
Mechanical Engineering	6
Microchemical Journal	1
Mining Engineering	1
Nucleonics	2
Pharmocologic Review	1
Physiological Reviews	1
Phytopathology	10
Plant Disease Reporter	2
Plant Physiology	5
Power	9
Proceedings, American Petroleum Institute	1
Proceedings, American Society for Horticultural Science	1
Proceedings, Federation of American Societies for Experimental Biology	2
Public Health Reports	4
Public Works	2
Quarterly Journal of Royal Meteorological Society (Brit.)	3
Radiological Health Data	2
Science	10
Sewage and Industrial Waste Disposal	1
Smokeless Air (Brit.)	1
Society of Automotive Engineers, Journal	3
Staub (Germany)	6
Technical Association of Pulp and Paper Industrial Journal	1
Tellus (Sweden)	1
Thorax (Brit.)	1
Toxicology and Applied Pharmacology	1

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EXHIBIT C-2

INFORMATION SOURCES USED BY RESPONDENTS
(Weighted Averages)

	Govt.		Industrial		Research			
	State and Local	PHS - Tech. Assistance	Control	Equipment	PHS	Other Govt. Agencies	Universities	Institutes
Personal Contacts								
Air Poll. Meetings, Etc.	2.6	3.0	2.3	3.2	2.3	2.1	2.4	2.5
Specialists								
Within Organization	2.2	3.7	1.6	2.1	2.8	2.6	1.8	2.2
Consultants	1.7	1.6	1.2	1.3	1.0	1.6	1.0	1.2
Others Outside	2.2	1.6	1.5	1.6	2.2	2.3	2.0	2.4
Government Reports								
Public Health Service	3.3	3.8	2.0	2.2	2.8	2.7	2.4	2.1
Other Federal Agencies	0.9	1.4	0.9	0.3	0.7	2.0	0.8	0.3
State and Local Agencies	1.8	1.4	0.9	1.1	0.9	0.8	1.0	0.0
Specialized Abstracts, Indexes, etc.								
APCA Abstracts	2.9	3.2	2.6	3.1	2.8	2.6	3.0	3.1
Index Medicus	0.3	0.5	0.1	0.1	0.9	0.0	0.6	0.4
Public Health Eng. Absts.	1.7	1.4	0.5	0.4	1.2	0.4	1.1	0.5
Chemical Abstracts	0.7	1.0	0.4	0.2	1.8	0.9	2.5	2.0
U. S. Govt. Res. Repts.	1.0	0.5	0.6	0.8	1.3	0.5	1.2	0.9
STAR-NSA-TAB	0.5	0.5	0.5	1.3	0.5	0.8	0.5	0.7

APPENDIX D

Abstract Service Suggestions

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APPENDIX D

Abstract Service Suggestions

The expressed desires on frequency of issue of abstract bulletins divide:

Monthly	51%
Bimonthly	13%
Quarterly	27%
Semiannually	8%
Annually	1%

While it is a minority preference, the 40% acceptance of the 2-3 month interval was unexpected, in view of criticism of delay in receiving current information. Two possible factors may explain this response. First, there may be a feeling that lags are inherent in abstract preparation and publication, and a dissemination schedule involving an additional one or two months delay for some item is of little real consequence. Second, some of the answers may have been in anticipation of establishment of an accession list or technical newsletter service to fulfill the "current awareness" function, with abstracts then becoming more of a "look-up" reference tool.

More detailed categorization of the abstracts as published is rated as desirable by 13% of the respondents. Comments indicate that this is related to ease of scanning for current awareness, particularly for individuals with specialized interests. In addition it has implications in retrospective search for specific information.

Sixteen percent recommend more detailed cumulative indexing than the APCA Abstracts now provide. This again is consistent with comments on difficulties in locating specific information, or all relevant information, with assurance.

A total of 18% of all respondents desire index terms, keywords, or descriptors to be printed along with the abstracts. This question was included to evaluate the impression received from several comments concerning

indexing problems in maintaining personal files. Responses broken down by categories were:

74% of respondents maintain personal reference files
61.5% of these are indexed by various systems
18.5% of those with indexed files ask for index-term publication.

38.5% are not indexed
12.5% of these respondents ask for index-term publication.

26% of respondents do not report personal files, but;
24% of them ask for index-term publication.

In addition to the utility of terms in indexing personal files, some of the responses may reflect use of the terms in facilitating scanning, or in the case of those not maintaining files, value of the terms in indexing and retrieval by library facilities within their agencies.

Among subjects in which greater abstract coverage is desired, control equipment installation and application is the most frequently cited. It is mentioned by 19 out of the 75 respondents who recommend greater coverage. Those listing this subject comprise about one-sixth of each of the following groups: State and local agencies, technical assistance, and industrial. Typical entries include:

"Practical control applications"

"Effectiveness of specific installations"

"Engineering details"

"Abatement devices"

"Control techniques for specific sources"

Next most frequently requested is control testing methods - sampling, monitoring, and analytical techniques and instrumentation. This is mentioned by 14, again predominantly from State and local agencies.

Health and medical effects is cited by 8, primarily from the research groups but including 2 State and local respondents. In addition, more basic biomedical coverage is requested in terms of respiratory pathology (2), toxicology of pollutants, neurophysiology, neuropharmacology, and "biosciences" (1 each).

Emission standards are mentioned by 4 State and local and one industrial control respondent.

Greater coverage of plant and agricultural subjects is desired by 5, with 2 of these stressing plant biochemistry.

Planning and zoning, including the effects of air pollution on land use, is cited by 2.

Seven emphasize greater coverage of foreign work, especially control applications. This is consistent with frequent comments received during the interview phase and in other sections of the questionnaire concerning the difficulty in keeping up with foreign work.

Other subjects, mentioned once each, are:

- Aerosols and particulates
- Combustion effects
- Economics
- Effects on animals
- Effects on materials
- Equilibrium and kinetic data
- Field surveys
- Foundry emissions
- Instrumental analysis
- Meteorology
- Organic analysis
- Regional problems
- Separation of organics

APPENDIX E

Summary Publication Desires

APPENDIX E

Summary Publications

To provide guidance in developing the review-evaluation function of the Center, respondents were asked to rate the desirability of four types of summary publications:

Periodic state-of-the art reviews

Critical monographs, as warranted

Technical newsletters

Data compilations

They were also asked to suggest subjects for coverage (or emphasis, in the case of the technical newsletter) as well as frequency of issue for state-of-the-art reviews and for a newsletter.

Reviews and Monographs

In scope and format, this type of publication ranges from a periodically-recurring recapitulation of new literature of interest to a sector of a field, to a critical review and analysis of a major technique or area of developing knowledge at a definitive point in its history. The biennial review of air pollution analytical developments in Analytical Chemistry is an example of the first; "Photochemistry of Atmospheric Pollution," by Leighton, illustrates the second. Another type is represented by the reviews of the pulp and paper industry and the iron and steel industry in the Environmental Health series, published by the PHS Sanitary Engineering Center.

Frequency-of-issue suggestions for state-of-the-art reviews divide as follows:

1 - 2 months	22%
3 - 5 (mostly 3)	24%
6 - 12	51%
24-26	3%

Reviews, in the sense defined, would appear to be impractical at intervals of less than 6 months, with annual issue preferable. Subjects suggested by a

number of respondents who indicated the greater frequency would be more suitable for the technical newsletter discussed below.

Subjects suggested for reviews and monographs are grouped as follows: (Parenthetical numbers indicate frequency of citation.)

Sampling and Analysis

Sampling and analysis (3)
Analytical methods (4)
Sampling equipment and techniques (3)
New or improved methods in fields such as chromatography, automatic sampling, etc. (1)

Monitoring

Equipment, automatic instrumentation, standards, performance evaluation (3)
Planning automatic and manual networks (2)
Data reduction techniques, survey evaluation (2)

Pollutants

Sulfur dioxide - sources, levels, effects, prevention (3)
Sulfur oxides (2)
Nitrogen oxides (2)
Carbon oxides, ozone, hydrocarbons, lead, particulates (1 each)

Effects

Vegetation, crops, trees (9)
Human health (4)
categorized by pollutants (2)
Materials (3)
Animals (1)
Economic losses (2)

Control Equipment

Particle removal equipment, e.g., scrubbers, precipitators, etc. (4)
Efficiencies vs. various sources (2)
Research and development on new equipment and processes (2)

Control of Emissions from Specific Processes

Methods and equipment (3)
Incinerators (3)
Chemical processes (1)
Coal power plants (1)
Emissions from various sources; cupolas, non-ferrous foundries, oil burners (4)
Auto exhaust review (2)
Odor measurement and control (2)
Fluoride emissions (1)

Meteorology

Theoretical and applied (3)
Diffusion and transport of effluents (5)

Research and Theoretical

Aerosol research,sampling, analysis (2)
Atmospheric chemistry, photochemistry, of air pollution (5)
Reaction rates, constants (2)

Standards

Ambient air (3)
Community (3)
Emission (3)

Miscellanous

New legislation (1)
New programs - city and state (1)

Technical Newsletters

A technical newsletter is essentially a "current awareness" medium, announcing new technical developments and activities.

Suggestions on frequency of issue divide:

Monthly	51%
2 - 3 months	39%
4 - 6 months	10%

Technical areas suggested for emphasis include:

Development of Control Methods and Equipment

New developments (9), phrased as:
"New control developments - procedures, equipment processes"
"Summary of developments, new techniques, etc."
"Advances in methods of control"
"Latest control methods"

Applications (7)
"Controls installed - costs, effectiveness"
"Source control methods and equipment"
"Factual information from finders of specific control equipment"
"Specific adequate controls"
"Particularly successful applications"
"Solved problems, pushing back frontiers of unsolved problems"

Research Fields

Health (3)
"Health effects"
"Health effects being studied, epidemiological findings"
"Research in biomedical field"
Atmospheric chemistry (2)
Relation to meteorology (1)
Life cycles of pollutants (1)
Industrial emissions and controls (2)
Measurement (2)
"Measurement data and means"
"Mass data handling techniques"
Auto exhaust control (4)

Measurement, Sampling and Analysis

Sampling and analysis (3)
"Collection techniques"
"New or improved instruments"
"New or improved analytical methods"
Measurement (2)
"Measurement data and means"
"Mass data handling techniques"

Standards

Standards adopted (3)
Emission standards, criteria (2)

Current Activities

"Current activities of various workers" (2)
"Projects at various laboratories, with recent developments" (2)
"State and local developments in air pollution activities" (1)
"Progress on government-sponsored projects" (1)
"Control district research projects" (1)
"Air pollution activities in industry" (1)

Legal and Administrative

"Current legislation" (5)
"New regulations" (2)
"Legal requirements" (1)
"National trends" (1)

General suggestions include:

"Technical results not suitable for a full paper, or in advance of formal publication."

"Conferences and technical meetings partly or wholly related to air pollution, scheduled for the next 3 months."

"Rotate monthly on effects of specific contaminants all for faster output of information - perhaps like Science."

Data Compilations

As noted in the survey report (p. 17) many of the subjects suggested for data compilations are more appropriate for inclusion in reviews or monographs. The subjects listed for reviews cover these adequately. The remaining subjects, appropriate for data compilations, fall into five general groups:

Air Quality Measurements

"Ambient air quality"
"Long-term data - urban areas and isolated industrial locations"
"Dust fall records"
"Air monitoring reports and analyses of data"

Emissions

"Emission rates from various sources"
"Composition of emissions from sources in large metropolitan areas"
"Dust emissions - weight, composition, particle sizes"

Health Effects

"Toxicity"
"Threshold limits"
"Odor threshold limits"

Theoretical

"Reaction kinetics"
"Reaction mechanisms"
"Rate constants"
"Equilibrium (phase) data"

Industrial

"Plant locations (by industry), production figures, fuel usage"
"Emission factors related to horsepower requivalent, or value added by manufacture"

APPENDIX F

Information Resource Descriptions

APPENDIX F

Information Resource Descriptions

In addition to the journal and abstract literature discussed in Appendix C, two broad categories of air pollution information resources exist--those which are specialized in the field, and those which are general in coverage but contain significant amounts of information related to air pollution. Most of them are both "reservoirs" of previously-published information and continuing sources of currently-published information. Brief descriptions of each follow.

Specialized Resources

APCA Abstracts

This series, supported by the Division of Air Pollution, is published as a monthly supplement to the Journal of the Air Pollution Control Association. In addition to the membership of the Association, it is sent to some 800 addressees specified by the Division. The Association prepares abstracts of papers in English language journals, primarily in the physical science and engineering fields. Under a separate contract the Library of Congress covers the health and agricultural effects of air pollution as well as the non-English air pollution literature generally. These abstracts, identified by the symbol "LC", are published in the APCA series.

Cumulative subject indexes, author indexes, and journal lists are published annually. The 6531 abstracts (as of March 1965) in this series constitute one of the major sources of identified air pollution information for development of the APTIC "basic stock."

Technical Library of the Bay Area Air Pollution Control District

This collection, containing nearly 12,000 references, was developed and is presently maintained under contract with the Division of Air Pollution. The references are indexed in a Uniterm system designed for manual search by comparison of term cards. Most of the material, with the exception of books, is stored in microfilm form.

Duplicate sets of index cards and microfilms have been purchased by:

New York State Air Pollution Control Board

Pennsylvania Department of Health, Division of Air Pollution Control

Province of Ontario

University of West Virginia

Division of Air Pollution

These sets are updated semiannually by the addition of newly indexed references. The index cards at the New York State Board are being converted to punched-card form to permit rapid search by machine methods.

Public Health Engineering Abstracts

A monthly publication prepared by the Robert A. Taft Sanitary Engineering Center, this journal carries abstracts of articles from more than 800 domestic and foreign sources in the field of environmental health. A section on "Atmospheric Pollution" averages 35 abstracts per month. An annual index is published.

Atmospheric Pollution Bulletin

For some years, the Warren Spring Laboratory of the British Department of Scientific and Industrial Research (DSIR) has published periodic abstracts of air pollution literature. Although there is a considerable degree of duplication of the APCA Abstracts, these publications can also serve as an additional check on acquisition and a source of additional abstracts, particularly of foreign work.

Abstract Compilations

The specialized sources discussed above can represent a continuing input to the APTIC. In addition, there are a number of abstract or bibliographic compilations to be considered in developing its "basic stock." Examples include:

Air Pollution Bibliography, Volumes I and II, covering publications appearing from 1952 to 1958. Prepared by the Library of Congress with Public Health Service support.

The Effect of Atmospheric Pollution on the Health of Man--An Annotated Bibliography. Prepared by the Kettering Laboratory, Cincinnati, Ohio, under a PHS research grant, 1957.

Air Pollution Publications. Bureau of Mines, 1964.

Selected Bibliography of Air Pollution Publications, 1955-1963. Division of Air Pollution, 1964.

Sulfur Oxides and Other Sulfur Compounds. Division of Air Pollution, 1965.

General Coverage Sources

The major Federal document clearinghouses, with their associated announcement and abstracting services, provide both current and retrospective access to the report literature, as distinguished from the journal literature.

Defense Documentation Center, Defense Supply Agency

The Center (DDC), formerly ASTIA, is a repository and distribution agency for all reports on DOD-supported research, both in-house and contract. Its report collection contains over 750,000 titles and is increasing at a rate in excess of 45,000 per year. A semimonthly publication, "Technical Abstract Bulletin," provides abstracts of both classified and unclassified accessions, with a separate index volume. Bibliographic searches are provided to authorized users on request. DDC services are available, without cost, to other government agencies, DOD contractors, and to contractors of other government agencies at the request of their sponsors.

Clearinghouse for Federal Scientific and Technical Information

A Department of Commerce agency (formerly OTS), the Clearinghouse is the sales point for all government research reports available to the general public, except for those sold by the Government Printing Office. Its semimonthly publication, "U. S. Government Research and Development Reports," publishes abstracts and prices for all unclassified and unlimited DDC reports, as well as reports of civilian government agencies. The Clearinghouse also publishes "Technical Translations" twice each month, listing and abstracting translated technical literature available from the Clearinghouse, the Special Libraries Association, and other sources.

National Aeronautics and Space Administration

Through its Scientific and Technical Information Facility, NASA publishes "Scientific and Technical Aerospace Reports," a comprehensive abstracting and indexing journal covering worldwide report literature in the fields of space and aeronautics. "International Aerospace Abstracts," published by the American Institute of Aeronautics and Astronautics in cooperation with NASA, gives similar coverage of the book and journal literature. In addition to bibliographic searches on demand, NASA provides a selective dissemination service based on interest profiles established by the using agency. These utilize both the report literature and the open literature covered by AIAA. The types of air pollution information covered by these services are primarily meteorology, analytical methods, and health effects.

Atomic Energy Commission

"Nuclear Science Abstracts," prepared by the Division of Technical Information, AEC, covers the international literature on nuclear science and technology. It is naturally a primary source for air pollution information related to radioactivity, and in addition provides material on meteorology, sampling methods, and air filtration.

Comments obtained during interviews, screening of current issues, and a number of demand searches secured by the Division of Air Pollution and the contractor during the survey, all confirm that these Federal clearinghouse services contain substantial amounts of air pollution information. The sheer volume of their publications, however, makes it impractical for the individual to screen them all routinely for relevant material.

Another type of Federal resource, concerned with the open literature rather than the report literature, is represented by the National Library of Medicine and the National Library of Agriculture.

National Library of Medicine

In its monthly publication, "Index Medicus," the Library indexes the bibliographic references obtained from its coverage of nearly 2500 of the 6000 biomedical journals published world wide. In addition, some 150 journals, such as Science, Nature, etc., are selectively screened for papers of biomedical interest. Each paper is "deep-indexed", with as many as 12 "tracings" or subject headings, which are then fed into the MEDLARS

computer system. While "Index Medicus," which is prepared by the computer, only publishes each citation under two or three subject headings, all "tracings" are in the system for use in searching. Bibliographic searches, both demand and recurring, are available. The computer presently contains all journal citations published in "Index Medicus" since April 1963.

National Library of Agriculture

This library is a principal resource for information on air pollution as it relates to crops, forestry, and plants in general, as well as to animals. Its monthly "Bibliography of Agriculture" is an index to the world's literature on agriculture and related sciences, as received in the Library. Items are listed under appropriate subjects. Its extensive card catalog permits manual search, but the Library does not currently have a computerized search capability. Expansion in this area is under consideration. The Pesticide Information Center, recently established at the Library, should also be a source of certain types of air pollution-related information.

Science Information Exchange

This agency, administered by the Smithsonian Institution with support from the National Science Foundation, differs from the others discussed in that it is concerned with research in progress rather than published research results. SIE has some 70,000 current research projects registered and indexed in the computer. The file for each contains the name of the agency supporting the research, a short title, names of all investigators, location of the work, and a 200 word summary of the work in progress. Most of the information is on work performed by or supported by Federal agencies, but registration of university and industrial projects is encouraged. Coverage of work in the biological and medical fields is relatively complete, and coverage in the engineering and physical sciences is increasing. Any research worker in a recognized scientific laboratory, and any government agency, may use the services of the Exchange without charge.