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BALTIMORE APPLICATIONS PROJECT FIFTH ANNUAL REPORT

I. INTRODUCTION

The Baltimore Applications Project (BAP) was originally designed as a two year experimental effort to assist the government of the City of Baltimore in applying technology to the solution of municipal problems. The BAP started in May 1974. In 1976 and 1977 the project was extended for one year at the request of the City. In 1978 the Mayor of Baltimore requested that a continuing relationship between Baltimore and Goddard Space Flight Center be established. That continuing relationship has been the basis for operation since 1978. A tabular update of the tasks during this interim is shown in Table 1.

II. BALTIMORE ENERGY CONSERVATION PROGRAM

The work performed by the Baltimore Energy Conservation Program will not be reported here. However, as a result of Goddard's participation in this program, the Mayor created the position of Energy Coordinator in his Office. Mr. Herbert Fivehouse, a recent retiree from Goddard, has been named by the Mayor to fill this position. The position is funded entirely by the City of Baltimore.

III. STATUS OF BAP ACTIVITIES

The last report cited sixteen tasks. Seven were transferred to the Energy Coordinator. Three were discontinued; one was completed; one was inactive. Four were active tasks. One task (Data Collection Platform Experiment) has been reactivated at Goddard. Three new task areas have been added: Coal Gasification Study, Hazardous Materials, and Emergency Vehicle Sensing. All the tasks and their present status are described in the Appendix.

Table 1

Active BAP Tasks as of June 1979

<u>Continuing</u>	<u>New</u>
Asphalt Recycling	Coal Gasification
Data Collection Platform	Emergency Vehicle Sensing
Emergency Traffic Routing	Hazardous Materials
Fire Department Dispatch System	
Health Department MIS	

IV. PLANS FOR THE NEXT PERIOD

The problem identification phase of BAP activities is essentially complete. Participation has become more detailed; the implementation phase has arrived. Meetings with city officials are now

on a scheduled basis. New problems are elicited through regular contact with Mr. Bernard Berkowitz, the Mayor's Physical Development Coordinator, and through irregular contact with Department Heads, Bureau Chiefs, and others in the City government. Participation in Baltimore activities is expected to be as described in each detailed task description in the Appendix.

Following the suggestion of the panel organized by the National Academy of Public Administration (NAPA) to evaluate the BAP, the National Needs Office has established similar technological relationships with Hagerstown, Greenbelt, Mt. Airy and Westminster, Maryland. During the next year plans are to carry out activities similar to those in Baltimore in these Maryland cities.



APPENDIX A

1. Asphalt Pavement Recycling

During this period BAP has continued to monitor developments in asphalt pavement recycling. Contacts were made with the Demonstration Projects Division of the U.S. Federal Highway Administration, the Asphalt Recycling and Reclaiming Association, and several recycling equipment manufacturers. Information on equipment and techniques for asphalt recycling was acquired. As the price of asphalt has climbed and the cost and availability of virgin aggregates have become a problem, much more attention is being given to recycling as a beneficial alternative.

Much of the recent emphasis by recycling equipment manufacturers has been on surface recycling equipment which economically removes a predetermined thickness of pavement for subsequent recycling. Several types of cold planers or pavement milling machines are now available, as are accessory loaders and crushers for on-location crushing of the removed material. Additional integrated hot surface recycling equipment which meets current pollution control standards is also available for complete on-site recycling/resurfacing. Asphalt pavement recycling will continue to get increased attention by all levels of government in the future.

During this period BAP investigated the use of microwave power as a heat source for hot surface planing. Based on the meager information available this technique does not appear feasible for this application because of the high power required and the slow planing speed attainable. The microwave heating technique may be feasible for crack repair rather than resurfacing.

BAP will continue to monitor the asphalt recycling technology for possible application in the City.

2. Data Collection Platform/Water Quality Monitoring

A simple, essentially unattended, long-term test of the Martek Mark V sensors and the data collection platform (DCP) was performed during this period. The purpose of the test was to check long term stability of the system, need for sensor cleaning, battery life, etc. and to acquire these data for possible future application of the system.

The Mark V instrument which monitored water temperature, conductivity, dissolved oxygen, and pH, and the Landsat DCP were installed in the Goddard lake in June 1978. The Bowie State College Chemistry Department, which performs work under contract for the Quality Assurance Division at Goddard, was responsible for monitoring the test, collecting data, cleaning the sensors when necessary, and making calibrations and performance checks. Early in the test it was determined that the battery drain of the sensor's stirring motor discharged the batteries in about 10 days. The installation of solar panels eliminated this problem and maintained the batteries at near full charge for the remainder of the test, which was concluded in May 1979.

In addition to monitoring the outputs of the four Martek sensors, two battery supply voltages and two reference voltages were monitored. On the basis of the test results, the Landsat data collection and processing system is reliable and very stable. The Landsat data printouts accurately represent the outputs of the Martek sensors. However, accurate wet chemistry water quality measurements for comparison with the data printouts are not presently available. A Bowie State Chemistry Department report, now in preparation, may provide additional information.

3. Digital Emergency Traffic Routing

No progress was made on this task during this period. This task is being discontinued until future circumstances make it desirable and feasible to reactivate it.

4. Fire Department Communications and Dispatch System

The Baltimore City Fire Department is proceeding with the replacement of its communications and dispatch system. BAP has been the Department's technical advisor and a member of the City's project team since the beginning of this project. Assistance provided by BAP has included the development of a project plan; research on computer-aided-dispatch systems in other fire departments throughout the country; development of a statement of work for a study contract, covering a requirements analysis, conceptual system design, cost benefit analysis, preparation of performance specifications, and preparation of an implementation plan; and evaluation of proposals in response to the City's Request for Proposals (RFP) for a replacement system. In addition, BAP has been a member of the City's team during contractual negotiations for the implementation of this project.

On November 7, 1978 the citizens of Baltimore approved a bond issue of \$1.3M to fund phase one of the project. The City also received approval from the Maryland State Legislature for a phase two bond referendum of \$1.7M for November 6, 1979. On June 13, 1979 the Baltimore City Board of Estimates approved the negotiation of a three-phase contract, totaling approximately \$4.0M, with Motorola Incorporated, with the individual phases to be implemented on a funds-available basis. During the negotiation phase, an agreement was reached with Motorola which will result in a considerable cost saving to the City. The City will purchase directly from suppliers those major system components which can be drop-shipped to the installation site. These direct purchases will be made to Motorola specifications. Further, Motorola retains full turn-key responsibility for the installation and performance of the overall system.

On June 12, 1979 the Baltimore City Board of Fire Commissioners and the Chief of the Fire Department awarded Certificates of Appreciation to Messrs. Philip Yaffee, National Needs Office (Code 702), and Harold Theiss, Network Engineering Division (Code 810), for "the outstanding contribution you are making toward the success of the Fire Department's Communications Modernization Program."

5. Health Department Management Information System

Discussions with senior Health Department personnel early in this period indicated a renewed interest in exploring the applicability of management information systems (MIS) to the operations of the Department. Thus, BAP undertook a review of MIS applications in ambulatory health care delivery.

A detailed organization chart of the Health Department was drawn up and a preliminary matrix of information needs versus organizational elements was developed. A program plan was then generated in flow chart and outline form, with the major elements under the program definition, requirements analysis, and implementation phases itemized. These planning documents were provided to the Health Department in March 1979, together with comments on MIS implementation based upon the review noted above. It was suggested the the Department embark on an MIS implementation program cautiously, with an awareness of the potential problems, and only after a comprehensive systems analysis of the organization, its operating procedures, present methods of acquiring data and presenting reports, and its present and anticipated data requirements. The documents provided were given serious consideration by the planning staff of the Department during the March-June period.

In June 1979 the Commissioner of Health stated that, because of competition for manpower resources from other programs and limited budget, it would not be possible to undertake the long-term commitment to MIS implementation at this time. MIS implementation would be reconsidered in the near future. BAP will continue to monitor MIS developments in health care delivery for such possible future application.

6. Hazardous Materials

In every successful industrial city there are waste products from its industry. Some of these present varying degrees of hazard to the populace and to the environment. In some industries the input raw material or the processing itself also presents risks of varying degrees. Every industrial situation usually has some degree of risk involved. The recent concerns over kepone, PCB and Love Canal waste burial have heightened public concern, sometimes to the point of near irrationality. Since risk of some degree is always present, the goal should not be the total elimination of risk. The valid questions for each situation are "What is the level of tolerable risk?", "How do we achieve that level?", and "How do we satisfy the public concern that the situation has been adequately treated and that the remaining risks are tolerable?"

A brief study of both the available literature and the federal activities in hazardous waste was made. In general the conclusions reached are as follows:

- 1) Most hazardous situations can be identified.**
- 2) Most hazardous situations can be ameliorated through a proper choice of technology (which is already available in most cases).**
- 3) Incorporation of ameliorating technology is likely to take time and cost money. It is unclear who pays for it and when.**
- 4) A studied consensus of how much amelioration of hazard is needed is not presently available (probably leading to over-compensation tendencies).**
- 5) Spending money or dedicating time to the problem, when coupled with the lack of a clear guide as to how far to go, readily leads to decisions in favor of the status quo.**
- 6) The status quo, if preserved, is likely to present some hazard to the public.**
- 7) This combination of inaction and ignorance leads to federal entry into the decision process (ultimately regulations).**
- 8) In a jurisdiction like Baltimore it is not clear which organization in the city should have the responsibility for action. The Health Department, Fire Department, Police Department, Planning, Public Works, Disaster Control, and perhaps others will likely share in the responsibility for action.**

To date discussions about hazardous waste have been held with Mr. Berkowitz in the Mayor's Office and with Dr. DeHoff, Commissioner of Health. A new form of emergency control for episodes of less than disastrous proportions has been instituted in the City. It is called Operation SWIFT. Key City officials and administrators report for duty in their own offices during an

emergency (as compared to reporting to the Disaster Control Center). Through telephone communications with City agencies, serious events (e.g. local flooding) are dealt with. Operation SWIFT relates to post facto hazardous waste problems when spillage or seepage occurs. Further specific activity on hazardous waste by BAP awaits a higher assigned priority for the task.

7. Coal Gasification

Baltimore, perhaps like other northeastern seaboard industrial cities, suffered gas curtailment and cut off several winters ago. The unavailability of gas for industrial fuel and feedstock was, in retrospect, an economic, regulatory or pricing problem, but it was and still is perceived as a condition which might be amenable to technological solution.

A considerable amount of coal is shipped through the port of Baltimore. Railway transport facilities for coal have been established and operated for some time. A logical alternative in the absence of natural gas supply is the consideration of coal and its gasification as a substitute. Conversations with individuals in the Department of Energy responsible for gasification programs indicated that the process is entirely within the state of the art. In fact coal gas was the dominant form for early domestic gas generation since interstate pipelines for shipping natural gas are a relatively recent development. Implicitly, at least, the decision to explore gasification of coal in or near Baltimore was then largely based on economics.

Coal shipment by rail, however, is not as energy efficient as transport of gas through a pipeline. This, coupled with the erratic nature of natural gas availability and *in situ* gasification technology development by the Department of Energy, suggested an examination of the usefulness to Baltimore industry of this form of gasification. Stated briefly the concept of *in situ* coal gasification is to burn the coal underground (instead of mining) in a controlled way so that the exhaust gasses are recovered and processed chemically to extract the combustible gasses (methane).

Experimentation is underway in Wyoming and in West Virginia. It was determined that the state of the development is perhaps ten years from practical commercialization. With stronger economic pressures this might be cut by a few years. The technology for the above ground portion of processing is essentially available; it is not that different from established methods for extraction of gas from coal. The present experiments will provide the needed insight as to locating the proper coal seams and burning them in the most effective way. The present availability of natural gas with no foreseeable interruption of supply tends to lower the priority of this task. Because of the well advanced state of the art for above ground gasification and the preliminary state of the *in situ* (below ground) gasification, further work on this task was curtailed.

The principals involved in this effort were Mr. Russ Bardos and Mr. Ed Burwell of the Department of Energy; Mr. Neil Curran of the Baltimore City Planning Department and Mr. Rick Mappin of the Allegheny County Development Co. (Cumberland, Maryland) through whom a briefing on *in situ* gasification for interested parties in the "coal country" of Maryland was arranged.

8. Emergency Vehicle Proximity Sensing

Late in this period a Fire Department representative requested that BAP investigate the feasibility of one emergency vehicle determining the presence of another when approaching an intersection, in order to prevent collisions. A search of the available data bases has been initiated through the Goddard library to determine the existence of technology related to this problem. Some preliminary discussions have been had with Goddard personnel relative to the adaptation of emergency location transmitters and receivers to this use.