QUARTERLY STATUS REPORT NO. 10

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by

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P R E F A C E

This Quarterly Status Report covers Center activity from 1 July 1967 through 30 September 1967. The report was prepared by Dr. Lee B. Zink, Director of the Center, with the assistance of the entire staff. It is the tenth quarterly report of activity under NASA contracts since TUSC was founded.

October, 1967

I N D E X

S U M M A R Y

The technology utilization phase of the TUSC program gained six (6) new clients during the quarter. Satisfactory progress is being made; however, the TUSC staff is concerned about the lack of adequate evaluation of our work. A project to develop a new evaluation technique is being considered.

Staff changes during the period have slowed the administrative work of the Center. A new consultant has been added to the staff.

Cooperation with the Oklahoma State Technical Services program gained momentum during the period. The state designated agency is becoming more interested in utilizing some of the TUSC facilities on a more effective basis.

Our efforts to service a large organization have culminated in the beginning of a new venture during the period. Interest on the part of the firm is high and we hope for significant results in the future.

Momentum in the project to serve faculty members at other institutions increased during the quarter.

Publication of the profile data updating is complete.

Technology Utilization Program

During the quarter the technology utilization phase of the TUSC program maintained satisfactory progress, although the pace slowed somewhat. Some six new clients became active during the period. Some 498 technical reports were provided to clients.

The following is a continuation of the reporting procedure for transfers of technology established in Quarterly Status Report Number 2 and continued in subsequent reports. The first section involves the updating of previously reported transfers. The numbers used are those given the transfer when originally reported.

34. The peanut drying project--to relate the knowledge of heat transfer generated in the aerospace industry to the problem of drying peanuts--appears to be in some difficulty. At present, as explained in previous quarterly reports, prospects for attacking the problem of peanut drying from a new and perhaps more sophisticated approach appeared to be excellent. However, activity by the Oklahoma Peanut Commission is now encountering severe financial problems. Through our efforts, officials of the United States Department of Agriculture from Washington have become interested in the project and there was a possibility that some funding could be available to the Commission through this agency. However, due to current budget restraints, it appears that progress on this most important project has, at least for the time being, halted.

92. The electrically-fired incinerator project. Late in September this client completed its first large-scale prototype of the incinerator and test fired it. This initial test apparently indicates that an electrically-fired incinerator is possible and

will be feasible. We continue to work with this client regarding the highly technical problems involved, and after successful completion of their project, we feel that we will have a number of specific, important transfers to report from this one project.

97. Problem - To determine the maximum noise level under which men can do useful work.

Solution - TUSC sent the client three NASA reports, N67-11677, "Material on the Physiological-Hygenic Basis of the Allowable Levels of Impulse Noise," N66-32496, "Maximum Level for Army Materiel Command Equipment," and N66-22768, "Human Performance as a Function of Changes in Acoustic Noise Levels." The last report covered the exact area of the client's interest. The others were peripheral in nature. The client has indicated that the information TUSC provided has saved him considerable time and effort.

98. Problem - To find information on lightweight concrete for house or apartment construction.

Solution - This client is considering a new project utilizing lightweight concrete products in panel form. This type construction is not widely used at the present, but could become very popular when developed. The panels would be poured into molds and after drying be stored for future use. If this construction method proves successful, a house of 2,000 square feet could be constructed in less than a week. A search was done on the state-of-the-art of mixing lightweight concrete. Also, TUSC has a complete file of the Portland Cement Association Technical Bulletins. A field representative from the Portland Cement

Association was contacted and was asked to work with the client. A search was also done in the NASA literature.

Four abstracts were found that were pertinent. As a result of the search, three NASA reports have been ordered. These reports dealt with research that has been done on concrete behavior. Also, five Portland Cement Association technical bulletins were ordered pertaining to the structural lightweight concrete field. At the present time it would appear that there is tremendous potential for significant transfer possibilities here. Future reports will give detailed information on the client's progress.

99. Problem - The present state-of-the-art in steam curing concrete.

Solution - This client has developed a new concrete panel for construction purposes that when painted resembles brick. This new type construction is very simple to assemble and is strong. The company plans to market the product for fencing purposes now, and later plans to test the product for low cost housing. The client knows the product is strong enough for one story construction, but the panels would have to be structurally tested by a testing company before two story construction could be done. The company has ordered more concrete forms so they can pour up to fifty panels a day. By steam curing or drying, production would be speeded up several times. Present plans are to build a new building for manufacturing of the panels. The product should be on the market within a month. A search was done in STAR and IAA but no pertinent abstracts were found. A search was done in TUSC's Portland Cement Bulletins and several technical bulletins

were found. Technical Bulletin #D22, "Optimum Steam Curing Procedure in Precasting Plants," dealt directly with the problem. (In this particular area of concrete construction it becomes evident that the auxiliary files developed by TUSC are of significant importance.)

100. Problem - To find technical information on methods of human waste disposal.

Solution - This client asked for information on human waste disposal in relation to his electrically-fired incinerator. He wanted to know how far the waste material must be broken down and filtered before safe burning would be possible. A search in STAR and IAA was done. Several abstracts were found that were pertinent. N66-25488, "The Use of Incinerators for Treatment of Combustible Wastes," revealed much information. As a result of this preliminary investigation, it appears that there will be no problem in burning human waste in the electrically-fired incinerator.

101. Problem - To find comparison reports on lime and dolomite stabilization for roadbeds.

Solution - This company is processor of a dolomite for commercial applications. During their off seasons they thought of the possibility of processing dolomite for stabilization of highway roadbeds. Lime is used extensively for this purpose. Dolomite has about the same consistency as lime, but has a higher calcium content. A search was done in STAR and IAA but nothing was found. Letters were written to the National Lime Association, Federal Highway Administration, Washington, D. C., and the National Research Council. All of these agencies

responded. The most productive reply was from the National Lime Association. They sent abstracts that dealt directly with the problem. The Highway Research Board sent abstracts on reports dating back to 1910. All of these abstracts were on soil stabilization with lime.

102. Problem - How are "Wedge Lights" produced?

Solution - Our retrieval specialist took the "shot gun" approach on this subject and retrieved fifteen abstracts. The client ordered eleven of the fifteen reports cited. The client cited N63-16101, "Transmittance Measurement of Optical Materials as Affected by Wedge Angle," as being "exactly what I need." We are attempting to obtain more details from the client as to his exact useage of the information we provided.

There are a number of other interesting possibilities for transfers which we are currently pursuing with individual clients. A client who manufactures light bulbs is considering possibilities for use of the Langley inorganic paint in coating the bulbs. Another client is experimenting with the high altitude slides we obtained for him from the Technology Application Center at the University of New Mexico in preliminary investigation of potential new oil fields.

It appears that we are also on the threshold of an interesting use of NASA information in the preparation of a new textbook in drafting and mechanical illustrations. More information will be reported on this project in future reports.

Quarterly Status Report No. 9 indicated that TUSC was beginning a cooperative effort with area utility companies in

a program to serve a broader segment of industry. This effort officially started with a meeting in Little Rock, Arkansas sponsored by the Arkansas Power and Light Company. The purpose of the meeting was to explain the NASA Technology Utilization Program to their Industrial Power Salesmen and to effect a means of communication between them and TUSC. It was decided that the method of communication from TUSC to them would be a bi-weekly "Technology Information Package." This package would be designed to furnish brief introductions to varied new technologies which might be useful to Arkansas Power and Light customers. To date we have mailed three (3) editions of this "package" and have received little reaction. We have been told by some of the recipients that not enough time has yet elapsed for adequate evaluation. We are not certain that this is the case and are going to investigate, in some depth, this lack of response. The basic idea appears good; however, both sides have yet to learn to effectively communicate.

Economic Data and Research Services

TUSC Bulletin #5, results of Professor Warren's analysis of employment changes by counties will be completed by the printer within a short time. The large research project relating to the impact of local governmental expenditures on economic development is nearing completion.

The tremendous work of updating the TUSC profile data publications has been printed and is being assembled in

preparation for distribution. The results of this work appear as a separate volume which contains updated material to add to the previously published eighteen (18) volumes. This information has proven quite useful to many organizations and individuals in the past. So the new volume, which makes the information more current, should enhance the value of the total effort. (By using college facilities, we were able to print the new volume at a fraction of the commercial printer's estimate.)

General Center Functions

In September, Dr. Zink addressed a conference of Oklahoma Community Action Directors (program of OEO). The conference was the first of its kind in Oklahoma. Community Action Directors from all parts of the state assembled to investigate a program of closer cooperation among all agencies directly or indirectly involved in the "War on Poverty." A representative of the Oklahoma governor's office had requested that Dr. Zink describe the technology utilization program and how it could be of assistance in accelerating the economic development of the state. The presentation was well received.

At the end of September, Dr. Zink and Professor Warren represented the Center at the annual meeting of the Mid-Continent Research and Development Council in Stillwater. Dr. Zink was chairman of the initial session and presented the first paper of the meeting.

Also in September, Dr. Zink represented TUSC on a tour of

seven southeastern Oklahoma counties sponsored by the Kiamichi Economic Development District of Oklahoma. The purpose of the tour was to acquaint governmental officials with the potentialities and problems of the region. Among those on the two-day tour were Senator Monroney; Congressman Albert; Lieutenant Governor George Nigh; Mr. William McCandless, Federal Co-Chairman of the Ozarks Regional Commission; and Dr. Robert B. Kamm, President of Oklahoma State University.

Mr. Carpenter, TUSC Industrial Specialist, spoke to some thirty (30) men in Atoka regarding the Technology Utilization Program.

TUSC STAFF

There have been a number of staff changes during the quarter. On 1 July 1967, Dr. Leon Hibbs became Chairman of the Center, succeeding Dr. A. E. Shearer. Dr. Shearer remains on the TUSC staff as an Industry and School Relations Specialist.

Dr. B. Curtis Hamm, assistant professor of marketing in the Oklahoma State University College of Business, has been added to the Consultant staff.

Miss Gwen Tyus, long-time Administrative Assistant, has been required to take an extended medical leave of absence. She has been replaced in that position by Mrs. Martha Stewart.

Mrs. Pat Thurmon, Information Specialist, has moved from this geographical area and has been replaced by Mrs. Evelyn Hutchings.

Specific Report Relating to Statement of Work in NSR 37-004-006

The following is a report relating directly to specific projects stated in the work statement of NSR 37-004-006. Numbers used below are those used in the contract.

1. All previous sections of this Quarterly Status Report relate to this work statement.

2. No additional seminars were held during the quarter.

Even though the attendance at the Fort Smith meeting was disappointing, we are having some effective interchange with three (3) of the seven (7) firms that attended. To date, no "hard" transfers have occurred, but prospects appear promising.

3. The State Technical Services representative working with the TUSC staff is planning a seminar to be held in a city outside the 17 county area in November. TUSC will assist in presenting the program. (At one time, this seminar was planned for September; however, circumstances in the city dictated that it be postponed.)

4. The project to service clients outside the 17 county area by mail and telephone continues to present significant challenges. During this period, we have been in active dialogue with fifteen (15) firms: eleven (11) in Tulsa; one (1) in Oklahoma City; and three (3) in Fort Smith. During the quarter we completed seven (7) retrospective searches for these clients. In our judgment, only one (1) transfer has occurred as a result of this effort (number 97). However, as indicated previously, it is very difficult for us to determine if and how these firms use the information. When we do have some personal contact, we hear that the information has been useful, and in some cases, how it has been useful. However,

this bit of information requires a lengthy, time consuming effort. That was not part of the original design of the experiment; however, it may be necessary to amend that design.

5. We have established excellent relations with the client mentioned in Quarterly Status Report No. 9. The final successful method of contact was a combination of assistance from the Advisory Board member and a "through the front door approach." Dr. Zink had an initial meeting with the president of the corporation on 14 August. On 18 August, the TUSC staff made a presentation to their engineering group. The short time between the two meetings indicates the intense interest of the president in our program.

The company has approximately 500 employees and is currently engaged in the manufacture of computer components. It is presently undergoing significant expansion of its physical plant, which will almost double its production space.

Interest during the meeting of the engineering group was high; the director of the group was ecstatic at being able to obtain the assistance we provide. It was over a month before we heard from him with any request for information. Since that time we have sent a number of SIPs that were requested along with the results of one (1) retrospective search. To date, we have had no evaluation of our service. Again, our evaluation problem is critical and we have plans for proceeding with a new idea in the attempt to improve that effort.

6. Our activities relative to the Oklahoma State Technical Services Program accelerated during the period. The state program

itself has moved ahead with a bit more vigor.

During the period we were visited by a representative of the designated agency. The primary purpose of this was to acquaint that individual with the information capabilities of TUSC. He went away assuring us that they would attempt to make use of our facilities.

The STS staff member at Southeastern continues to be the most productive agent in the state-wide program of technology transfer.

7. Activity in the provision of services to faculty members at other institutions increased during the quarter. We have processed four (4) retrospective searches in this effort during the period. Subjects have varied from "animal behavior" to "interaction of water with chelate compound on complex ions." Again, we are lacking in adequate evaluation of these services but are in process of changing that.

8. Publication of the currently updated material is complete; however, to save money, the volumes are being assembled by hand and will not be distributed for another month or more.

9. During the quarter we provided the OSU project with nine (9) Technical Notes, two (2) Technical Translations, two (2) microfiche, and one (1) Technical Report.

10. During the period we provided no direct service to the college aviation program.

11. Other than the KEDDO tour previously mentioned and the CAP director's meeting (also involving EDA directors), we

have engaged in no direct efforts for the Economic Development Administration program.