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International Fertilizer Section  
Quarterly Report  
January 1-March 31, 1981

Summary

Eight contracts were signed during the quarter; six with IFDC, one with the Canadian Forestry Service, and one with the International Atomic Energy Agency. The latter two are Application Agreements for TVA fertilizer material tagged with stable nitrogen (nonradioactive) isotopes for research purposes. Five IFDC contracts were for TVA professionals to conduct a seminar for CEFER/IPT in Brazil on the use of computers in calculating least-cost formulation; to provide assistance in conducting a seminar in Brazil to demonstrate equipment methodology in measuring pollution from fertilizers plants; to conduct a course in Brazil on the properties of fluid fertilizers; to serve as an advisor in Egypt for the National Academy of Science in evaluation of Egyptian phosphate ores; and to serve as a Bangladesh group leader to visit the Philippines, India, and the United States to observe problems in zinc and sulfur deficiency in crops. An original contract was expanded to cover disposal of wastes generated in IFDC facilities. Also, work under contract TV-548908 to IFDC for testing phosphate rock was completed during the quarter.

IFDC/NFDC cooperative work consisted of one joint staff meeting, one seminar, nitrogen inhibitor work group meetings, NFDC analysis of urea samples and preparation of tablets of research materials, training programs for visitors, and technical advice exchange. IFDC assisted in some international distribution of NFDC publications. Recommendations were made to IFDC for disposing of phosphogypsum produced in their wet-process acid pilot plant.

During the quarter, NFDC staff members assisted in two seminars in Brazil; three members attended the United Nations FAO/FIAC working meetings in Rome and one paper was presented there; one served as an advisor for the National Academy of Science in Egypt; one participated in the FAO/UNIDO/World Bank fertilizer work group meeting in Zurich, Switzerland; two presented papers at the Fourth International Fertilizer Conference of the British Sulfur Corporation Ltd., London, England; one conducted a course on fluid fertilizers in Brazil; and one served as a leader on a Bangladesh study tour of the Philippines, India, and the United States.

TVA Fertilizer Patents, bulletin Y-161, was received from the printer and distributed. Three other project publications are at the printer and one publication is being prepared. Three technical updates planned have not been started. The plans for the Agricultural Resource Development International Shortcourse are complete, but the number of students registered at the end of the quarter is very low.

There were 95 technical visitors from 36 foreign countries who visited NFDC during the quarter. IFS staff responded to 52 letters from 25 different countries.

A technician from Japan completed his training at NFDC and an engineer from Japan requested a one-year training program to begin in June 1981. The total paid subscribers to Fertilizer Abstracts increased from 843 at the beginning of the quarter to 870 at the end of the quarter. A new price schedule was approved for Fertilizer Abstracts to be effective January 1, 1982. One person was promoted and one vacancy exists in the section.

#### Foreign Travel Summary

D. E. Nichols	January 15-22	England
J. L. Nevins	January 15-February 1	Brazil
F. P. Achorn	January 17-22	England
J. R. Lehr	January 21-February 4	Egypt
J. D. Bridges	January 22-February 2	Italy
C. B. Kresge	March 3-17	Italy & England
O. P. Engelstad	March 7-14	Italy
D. A. Russel	March 10-April 18	Bangladesh, Philippines, and India
E. A. Harre	March 13-23	Switzerland
E. D. Myers	March 26-April 20	Brazil
H. L. Balay	March 26-April 20	Brazil

No domestic travel was reported by the IFS staff.

Contracts and Agreements

The following contracts and agreements were completed during the quarter:

1. TV-53449A, International Fertilizer Development Center, Muscle Shoals, Alabama. This contract provides for Dr. Jon L. Nevins to serve in a technical capacity on an assignment with the Instituto de Pesquisas Tecnologicas do Estado de Sao Paulo, S.A. (IPT) in Brazil. The length of the assignment will not exceed 2 workweeks to be spent in Brazil. IFDC will pay TVA for Dr. Nevins' services not to exceed \$2,264.16. This contract was approved January 2, 1981.
2. TV-46709A, Supplement No. 6, International Fertilizer Development Center, Muscle Shoals, Alabama. This contract extends the original contract to cover "Disposal of solid and other wastes that are generated in IFDC laboratories and pilot plants and that TVA agrees to accept." This supplement was approved January 9, 1981.
3. TV-55601A, Canadian Forestry Service, Pacific Forestry Research Center, Victoria, B.C., Canada. This is an application agreement for TVA fertilizer materials tagged with stable nitrogen (nonradioactive) isotopes for research purposes. This agreement was approved January 9, 1981.
4. TV-55602A, International Fertilizer Development Center, Muscle Shoals, Alabama. This contract provides for Mr. James R. Lehr to serve in a technical capacity for IFDC on an assignment for the National Academy of Sciences in Egypt. The length of the assignment will not exceed 9 workdays with approximately 6 workdays spent in Egypt. IFDC will pay TVA for Mr. Lehr's services not to exceed \$2,222.99. This contract was approved January 15, 1981.
5. TV-55605A, International Fertilizer Development Center, Muscle Shoals, Alabama. This contract provides the services of Dr. Darrell A. Russel to function as leader for a group from Bangladesh to visit the Philippines, India, and the United States for observation and discussion of zinc and sulfur problems on rice. He is to prepare a literature review on zinc and sulfur fertility and on use of organic wastes as related to Bangladesh conditions. His services are required from March 9-April 17, 1981. IFDC will compensate TVA for Dr. Russel's services not to exceed \$6,813 during this period. This contract was approved February 3, 1981.
6. TV-55606A, International Atomic Energy Agency, Vienna, Austria. This is an application agreement for TVA fertilizer materials tagged with stable nitrogen (nonradioactive) isotopes for research purposes. This agreement was approved February 6, 1981.
7. TV-55611A, International Fertilizer Development Center, Muscle Shoals, Alabama. This contract provides the services of Mr. Hubert L. Balay in a technical capacity on an assignment for the Instituto de Pesquisas Tecnologicas do Estado de Sao Paulo S.A. (IPT) in Brazil. The duration of this assignment will not exceed 5 workweeks with up to 2 workweeks spent in Brazil. IFDC will compensate TVA for Mr. Balay's services not to exceed \$5,810. This contract was approved March 16, 1981.

8. TV-53437A, Supplement No. 1, International Fertilizer Development Center, Muscle Shoals, Alabama. This contract provides the services of Mr. Edwin D. Myers in a technical capacity on an assignment with the Instituto de Pesquisas Tecnologicas do Estado de Sao Paulo S.A. (IPT) in Brazil. The length of the assignment will not exceed 4 workweeks with up to 2 workweeks spent in Brazil. TVA will be reimbursed by IFDC for this assignment not to exceed \$4,492. This supplement to the original contract was approved March 16, 1981.

#### IFDC/NFDC Cooperative Work

The TVA/IFDC nitrogen inhibitor working group members were all present at a meeting March 3 at NFDC. An outline of TVA-proposed programs with nitrification inhibitors and urease inhibitors was distributed. Also distributed was a description of IFDC work with nitrification and urease inhibitors. Two subgroups will meet and explore details of collaborative work.

One IFDC/NFDC seminar was held during the quarter. On January 30, Dr. Paul J. Stangel, IFDC, gave a seminar at NFDC on "The People, Agriculture, and Capacity to Produce and Use Fertilizers of China." About 120 people attended.

IFDC/TVA staff meeting was held February 6. Cooperative projects were discussed and the status of the work with nitrification and urease inhibitors between the two organizations was reported. The beneficiation tests in the IFDC pilot plant for TVA were scheduled to be completed in late February. Speakers for future joint seminars were suggested. These speakers would be of international interest. The OACD seminar program will cover a wide range of topics but will be mostly domestic. The rescheduling of the Indo/U.S. Agricultural Inputs Working Group meeting will be up to India, and NFDC has extended its offer to host the meeting when it can be rescheduled. Gary Akin has been assigned the task of assembling existing data on SCU in order to determine the direction OACD should take concerning SCU in the United States. The International Regional Agricultural Resource Development Shortcourse will be conducted May 10-June 26 and will involve NFDC employing the Tennessee Valley agricultural development experiences. The TVA Fertilizer Conference will be held October 7-8, 1981 at Louisville, Kentucky. The Fertilizer Institute and NFSA will be a part of the conference in 1981, but the Trade Fair Show will no longer be a part of it. TVA cosponsored the Southern Grain Marketing Conference March 12-13, 1981, in Memphis, Tennessee. IFDC was invited to attend the TVA fieldstaff reports in Muscle Shoals on February 17-18. A process for making granules up to 10 millimeters in diameter (fluidized-bed granulation) sold by NSM was discussed as a potential process for material to be used in rice growing areas. The contract on handling of certain IFDC laboratory- and pilot-plant wastes by TVA has been completed and was discussed.

Samples of urea submitted by IFDC to NFDC General Analytical Laboratory on January were analyzed for biuret.

NFDC prepared 2000 grams of urea with DCD and 500 grams of melamine with monomethylol urea during the week of March 9. NFDC also prepared 2139 grams of urea tablets for IFDC during the week of February 17.

Susanna V. Tomlinson, NFDC, was asked by IFDC to make recommendations about disposing of IFDC phosphogypsum produced from Florida rock at their wet-process acid pilot plant. She suggested a holding facility be constructed which would comply with applicable regulations.

Melvin Norton, NFDC, assisted IFDC in providing engineering information on a rock grinding, TSP/MAP/DAP, granulation complex for two engineers from Fertinor, which is located in Bahia, Brazil.

IFDC provided a training program in producing ammonia from coal for Ismail Yusuf, a visitor from PUSRI in Indonesia. The TVA facility was used and TVA staff was consulted during the plant tours conducted by John Burnett. The plant tours and discussions with TVA plant operating personnel began February 16 and lasted 5 days.

#### AID RSSA Projects on Transfer of Fertilizer Technology

1. Technical Update: Pan Granulation of Urea. The blue-line copy of this monograph has been reviewed by OACD and returned to the printer for 5000 copies.
2. TVA Development of Pan-Granulation Process for Nitrogen Fertilizers. Corrections have been made on this monograph and returned with a request for 1000 copies.
3. International Fertilizer Information Centers. No activity during the quarter.
4. TVA Fertilizer Patents. This publication has been received from the printer (3000 copies); approximately 800 copies were sent to 71 countries. IFDC received 200 copies for international mailing. Other copies are being distributed by the TVA Technical Library at Muscle Shoals.
5. Directory of Fertilizer Research in the United States. The publication was completed and sent to the printer on March 19.
6. Preparation of a Paper on Nutrient Balance to be Presented at the FAO/FIAC Meeting in Rome. Dr. O. P. Engelstad prepared a paper, "Nutrient Balance in Crop Production: Another Look." He attended the FAO/FIAC meeting in Rome and presented the paper on March 9 to the Technical Sub-Committee.
7. Sulfur-Coated Urea Abstracts. The literature is now being reviewed. The first draft should be completed by October 1, 1981.

8. Agricultural Resource Development International Shortcourse Videotape. The course is scheduled for May 10-June 26, 1981. Dr. Taylor Byrd, Jr., is coordinator, and Dr. R. C. Woodworth is identifying key people and scheduling involvement. Contractual arrangements for video tapes are being worked out with Alabama A&M University, Normal, Alabama.
9. New Projects for FY 1981. Projects that have been developed and approved but have not been started include three technical updates: (1) field experiences with the pipe-cross reactor, (2) pollution control in fertilizer plants, and (3) the falling-curtain granulation process.

#### Cooperative Work with Other Organizations

Sieve analysis of fertilizer dust samples sent by Fisons, Ltd., Levington Research Station, Levington, Ipswich, Suffolk, England, were made and a test procedure was provided them by TVA. These results were transmitted January 16.

Analyses were performed on superphosphoric acid (Simplot), a liquid fertilizer (10-34-0) produced from the acid, and solids formed in the finished product. The samples were provided to TVA by Simplot Chemical Company, Ltd., Brandon, Manitoba, Canada. Results and technical directions were reported to Simplot January 9.

Dr. Carl O. Thomas, Director, Center for International Research and Development, The University of Tennessee, Knoxville, Tennessee, visited NFDC to review TVA programs on biomass energy and alcohol fuels. Dr. Kresge and Mr. Stinson of TVA, and Dr. Thomas will exchange international information and evaluate possible cooperation efforts in the future.

John Malcolm, DS/AGR/AID, asked us to think of ways to make known to the AID missions the TVA services available to them. As a result, three letters have been sent to selected AID offices and attaches this quarter. These letters are informally titled--"To AID with Policy Technology."

#### Foreign Travel

Eleven (11) members of the NFDC staff made overseas trips during the quarter.

<u>Name</u>	<u>Purpose</u>	<u>Date</u>	<u>Country</u>	<u>Funded by</u>
D. E. Nichols	Presented a paper at the Fourth International Fertilizer Conference of the British Sulphur Corp. Ltd., London, England.	January 15-22	England	TVA

J. L. Nevins	Conducted a seminar and provided consultancy on the use of computers in calculating least-cost formulations for granulation and/or bulk blending of fertilizers for CEFER/IPT.	January 15- February 1	Brazil	IFDC
F. P. Achorn	Presented a paper at the Fourth International Fertilizer Conference of British Sulphur Corp. Ltd. London, England.	January 17- 22	England	TVA
J. R. Lehr	Served as an advisor to the Ore Beneficiation and Chemical Processing Lab. of the National Research Center in Cairo in a cooperative program with the National Academy of Science in evaluation of Egyptian phosphate ores.	January 21- February 4	Egypt	IFDC
J. D. Bridges	Participated in the meeting of the sub-committee of the <u>ad hoc</u> Working Party on Fertilizer Statistics of the FAO/FIAC in Rome.	January 22- February 2	Italy	TVA
C. B. Kresge	Participated in the UN FAO/FIAC meeting, contributed to working group on economics of fertilizer use. Conferred with FAO officials in Rome, and visited British Sulphur Corp. Ltd. officials in London.	March 3- 17	Italy & England	AID
O. P. Engelstad	Attended the UN FAO/FIAC meeting and presented a paper at the Technical Sub-Committee meeting. Visited FAO headquarters in Rome.	March 7- 14	Italy	AID
D. A. Russel	Served as leader of a group of Bangladeshis' scheduled to visit the Philippines, India, and the U.S. for observation and discussion of zinc and sulfur problems.	March 10- April 18	Bangladesh Philippines India	IFDC

E. A. Harre	Participated in FAO/UNIDO/ World Bank Fertilizer Work Group meeting in Zurich. The group evaluated fertilizer data and the implications of the data on future supply and demand.	March 13 23	Switzerland	TVA
E. D. Myers	Provided assistance in conducting a seminar to demonstrate equipment methodology in measuring pollution from fertilizer plants. The seminar was conducted by Instituto de Pesquisas Tecnologicas do Estado de Sao Paulo, S.A. (IPT) in Brazil.	March 26- April 20	Brazil	IFDC
H. L. Balay	Conducted a course on the properties of fluid ferti- lizers and provided a post course evaluation and recommendations for follow- up work at Instituto de Pesquisas Tecnologicas do Estado de Sao Paulo, S.A. (IPT) in Brazil.	March 26- April 20	Brazil	IFDC

#### Technical Visitors

During the quarter, there were 95 technical visitors from 36 foreign countries. Sixty-one percent of these visitors were from developing countries. The foreign technical visitors spent a total of 176 person days at NFDC, or an average of 1.85 days per visitor compared to 1.12 days per visitor for American technical visitors. The following visited IFS staff for discussion:

January 6	Mr. Luis Hernan Hennickle, World Bank, Chilean Representative, Washington, DC.
January 7	Mr. K.R.V. Subramanian, Rajasthan State Mines, Udaipur, India.
January 7	Dr. John L. Malcolm, DS/AGR/AID, Washington, DC.
January 8-9	Dr. Carl O. Thomas, Dean of Research & Director of Center for International Research & Development, The University of Tennessee, Knoxville, Tennessee.
January 9	Dr. John Wybenga, Nederlandse Stikstof Maatschappij, Brussels, Belgium.
January 29	Mr. Kenzo Fukushima, Mitsui & Co., Ltd., Tokyo, Japan.

- February 5 Mr. Arlindo Cunha and Ms. Isabel M. C. Ayres, Regional Coordination Commission of the North, Rio Tinto, Portugal.
- February 12 Sr. Weber Medeiros de Souza, SUFRAMA, Amazonas, Brazil.
- February 20 Dr. Peter Pickwell, Fisons, Ltd., Ipswich, England.
- February 20 Dr. Arthur Limbird, Associate Professor, Department of Geography, The University of Calgary, Alberta, Canada.
- February 26 Mr. John Carter, Florence, Alabama, Associate of Joe Spencer, Nottingham, England.
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- March 5 Thirty-six international graduate students, Vanderbilt University, Nashville, Tennessee.
- March 10 International students from Mississippi State University, Starkville, Mississippi.
- March 17 Mr. Roberto Melville, Social Anthropologist, Center for Advanced Studies, Taipan, Mexico.
- March 24 Mr. Hiroshi Hirayama, Toyo Engineering Corporation, Chiba, Japan.
- March 24 Mr. Kan Sugise, Toyo Engineering Corporation, New York Office, New York.
- March 31 Mr. Julio Cancino, Mr. Arturo Leon Belez, Mr. Jose Luis Anzo, and Dr. Ramon Fernandez, FERTIMEX, Mexico City, Mexico.

#### International Training

Mr. Masaaki Inoue, Mitsubishi Chemical Industries, Kitakyushu, Japan, completed his one-year study of phosphoric acid production from low-grade phosphate rock in the NFDC Division of Chemical Development.

A request was received from Rasa Industries, Ltd., Tokyo, Japan, for Mr. Yokio Utsumi, Chemical Engineer, to begin a one-year work-study program on wet-process phosphoric acid and urea phosphate with the Division of Chemical Development. This work-study program would begin in June 1981. Mr. Utsumi will complete a work-study program at IFDC in May 1981.

#### International Correspondence

During the quarter, IFS staff responded to 52 letters from 25 different countries. Copies of the informal "To AID with Policy Technology" letters were mailed each month to 185 AID people in 68 different countries.

### Shipment of Experimental Fertilizer

Two plastic bags, 1 pound each, of sulfur-coated urea were prepared and shipped to Erich Scheibler, Uhde GmbH, Dortmund, West Germany.

One sample, 500 grams of superphosphate labeled with  $^{32}\text{P}$  was prepared and shipped to the International Atomic Energy Agency, Vienna, Austria.

### IFS Staff Activities

D. A. Russel traveled to Nashville, Tennessee, on March 16 to observe various types of audiovisual equipment during a showing sponsored by technical industries.

Demonstrations of the IBM-5520 administrative system were given March 26-27. Attending March 26 were J. W. Aldridge, Norma Balentine, and Donna Emmons. C. B. Kresge, J. B. Martin, Jane Mackey, Judy Smith, and Marie Plyler attended March 27.

Staff meetings were held January 5, 12, 19, 26; February 2, 9, 23; and March 2, 16, 30. At the January 26 meeting, guest Fred Myers, Agriculturist, ECS, Division of Agricultural Development, reported on the National Audiovisual Association Trade Show and Conference which he attended in Dallas, Texas, January 13-16. Gary Akin, Agronomist, Division of Agricultural Development, reported on his charge to evaluate TVA involvement in SCU at the February 23 meeting.

Three "To AID with Policy Technology" letters were mailed to 185 AID people in 68 countries each time. This is an effort to make TVA service known to the AID missions.

IFS staff planned a luncheon meeting in the small dining room of the CEB Cafeteria on February 13. The office manager and his assistant, the division directors and their assistants, and members of IFS were present. The guest speaker was Jon Nevins, reporting on his CEFER--Brazil assignment for IFDC. Jon's guests, Dr. J. W. Fitts and Mr. Larry Nelson, Agro Services International, attended the luncheon. These international luncheons, initiated at the request of the office manager, will be held every 1-2 months.

### IFS Training

Donna Emmons and C. B. Kresge attended a meeting at Muscle Shoals on January 28 for explanation of commercial air reservations and ticketing service available through TVA Central Travel Section.

Norma Balentine attended a program for OACD new employee orientation January 29.

Jane Mackey attended a seminar on alcohol from wood January 29, conducted by TVA Division of Chemical Development.

Jane Mackey attended an Agricultural Development staff meeting February 13 to hear a review of development of the pipe-cross reactor.

J. W. Aldridge attended a seminar on Production Schedule Modeling conducted by TVA Division of Agricultural Development on February 12.

Fertilizer Introduction Section Fieldstaff reports given February 18 were attended by C. B. Kresge, D. A. Russel, J. W. Aldridge, Jane Mackey, Judy Smith, and Norma Balentine.

### Fertilizer Abstracts Service

The two internal publications, News Items and Schedule of Meetings, were prepared and distributed each month. About 125 copies of News Items and 140 copies of Schedule of Meetings were distributed each month.

### Fertilizer Abstracts

#### FY 1981 Second Quarter Versus First Quarter FY 1981

#### Comparison of Printed Material and Subscriber

	1-1-81 to 3-31-81	10-1-80 to 12-31-80	Percent Increase Second Quarter 1981 over First Quarter 1981
<u>Abstracts Printed</u>			
Analytical Methods	77	81	-4.9
Technology	178	178	0.0
Marketing	160	141	13.5
Use	293	272	7.7
TOTAL	708	672	5.4
<u>Circulation</u>			
United States subscribers	421	419	.5
Foreign subscribers	449	424	5.9
Exchanges	34	34	0.0
TVA employees	144	144	0.0
Advertising and inventory	102	129	-20.9
TOTAL PRINTED	1,150	1,150	0.0

### Price Schedule

A new price schedule (number 4-10.5) has been approved and effective date will be January 1, 1982. Subscription prices under the new schedule are:

\$40 per year in the U.S. and Canada  
 \$55 per year air mail to other countries  
 \$5 for single copies or index  
 \$45 each for special bound volumes

### Correspondence

#### Advertising and promotion

Mailed 106 sample copies with letters to 16 countries  
 Mailed 757 TVA Fertilizer Patents to 71 countries  
 IFDC was provided 200 copies of TVA Fertilizer Patents, 200 copies of  
U.S. Fertilizer Technology Patents, and 200 copies of Fertilizer  
Marketing Abstracts for international mailing.

#### Literature assistance

Filled 24 requests from 14 countries

#### Editorial management

Sent 6 letters to 4 countries

### Publications

One Y publication was received from the printer during the quarter.  
 In addition, 3 issues of Fertilizer Abstracts, 3 issues of News Items,  
 and 3 issues of Schedule of Meetings were published.

1. Mackey, Jane J. and Aldridge, James W. 1980. TVA Fertilizer Patents,  
 Bulletin No. Y-161. National Fertilizer Development Center,  
 Tennessee Valley Authority, Muscle Shoals, Alabama; 34 pp. (December).
2. Aldridge, James W. (Managing Editor) 1981. Fertilizer Abstracts 14  
 (1,2,3), 1-108. National Fertilizer Development Center, Tennessee  
 Valley Authority, Muscle Shoals, Alabama.
3. Smith, Judy H. 1980. News Items 30 (1, 2, 3), 1-34. National  
 Fertilizer Development Center, Tennessee Valley Authority, Muscle  
 Shoals, Alabama.
4. Mackey, Jane J. 1980. Schedule of Meetings 30 (1, 2, 3), 15 pp.  
 National Fertilizer Development Center, Tennessee Valley Authority,  
 Muscle Shoals, Alabama.

### Personnel

Donna S. Emmons was promoted and reclassified from an SB-3 Clerk-Stenographer  
 to an SB-4 Secretary effective January 11. The SB-4 position had been  
 vacant since December 23, 1980. The SB-3 position is now vacant; Marie  
 Plyler, TVA Clerical Pool, began work in this office January 16, and will  
 work until the position is filled.

At the end of the quarter, employees in this section were:

C. B. Kresge, Administrator  
D. A. Russel, Agriculturist  
R. D. Young, Chemical Engineer (one-third time)  
J. B. Martin, Jr., Agriculturist (one-half time)  
J. W. Aldridge, Technical Reports Writer  
J. J. Mackey, Technical Reports Writer  
J. H. Smith, Editorial Clerk  
D. S. Emmons, Secretary  
N. J. Balentine, Clerk-Typist  
Marie Plyler, (clerical-pool assignment)