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PD-AAL-506-4

TRIP REPORT

June 23, 1977

NAME: Dean F. Peterson, Chief, SWM, TA/AGR *D. Peterson*
PERIOD OF TRAVEL: June 20-21, 1977
ITINERARY: Washington, D.C. - Florence, Alabama - Washington, D.C.
PURPOSE: Review, Familiarization and Orientation. International Fertilizer Development Center and International Program of Tennessee Valley Authority.

7p.

Organizations and Persons Contacted:

IFDC

- Donald L. McCune, Managing Director
- Paul Stangel, Deputy Director and Acting Chief of Outreach Division
- Owen Livingston, Chief of Technology Division
- Per Pinstrup-Anderson, Chief of Agro-Economic Division
- James Schultz, Manager of Pilot Plant
- Shumail Carmon, Technology-Granulation
- Jorge Polo, Technology-Granulation
- Guerry McClellen
- Russell Dietrick, Beneficiation
- Surjit S. Sedhu, Economics
- Carlos Baanante, Socio/Econ.
- Mohendu S. Mudaher, Econ.
- Kerry J. Byrnes, Sociol.
- Eric Craswell, Agronomy
- Paul L. G. Vlek, Agronomy
- Bernie Byrnes, Green House
- Fred Clem, Outreach (Engrg.)
- Yao Chung, Outreach (Information System)
- Ray Diamond, Outreach (Africa)
- Dennis Parish, Outreach (Asia)
- Carl Armstrup, Outreach (Training)

Other Staff Members

TVA - National Fertilizer Development Center

- Lewis B. Nelson, Manager
- John T. Shields, Admin., International Fertilizer Program
- R. N. Young, International Fertilizer Program
- Other Staff Members

Follow-Up Action: I recommend that IFDC and AID set up visits of one or several groups of AID officers to IFDC to inspect the facilities and program, making suggestions on how IFDC might better serve AID's needs. Any such group should be limited to no more than six persons.

Distribution:

- | | |
|---------------------|--------------------|
| C. Farrar, AA/TA | SWM Staff |
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| L. Otto, TA/AG | J. Chaig, IA/DR |
| G. Baird, TA/AG | R. Olson, NE/TECH |
| K. McDermott, TA/AG | J. Rixse, SER/ENG |
| Division Chiefs | |

NARRATIVE

I was accompanied by John Malcolm. We arrived in Huntsville Monday evening June 20 and proceeded to Florence by rented auto. Meetings continued through Tuesday and Wednesday. We returned to Washington Wednesday evening, June 22. I had the opportunity to inspect the new facilities in detail and with a couple of exceptions to visit with the key members of the entire scientific and technical and outreach staff. Since the program and focus of the center have been widely described and documented, I'll simply touch on some of my impressions. Overall the trip was a most valuable one for me. It was most helpful to talk directly to the scientists in some depth, and to see the equipment and to inspect the facilities.

General Management

Approximately the first two hours were spent with McCune and Malcolm reviewing the general philosophy of the program, budgetary and staffing matters and general administration.

BUILDINGS

Pilot Plant

Approximately one-third of the capital investment totalling \$8.8 million has gone or will go into the pilot plant facility. This consists of a large open space for receiving, storage and general purpose, the pilot plant space, and support laboratories for control of pilot operations: Chemical, physical-chemical and beneficiation. A major piece of the control apparatus will be x-ray fluorescence spectrography equipment. Much of the general chemical apparatus is installed, however the x-ray fluorescence machine is yet to be received. Schultz showed us 3 dimensional transparent models of the pilot facility which is designed for flexibility and access and with training as well as pilot-plant operations in mind.

Administration and Laboratory Wing

This houses management, outreach, bench-level laboratories for the Agro-economic Division and the Technology Divisions and the Greenhouse and associated headhouse. The last two items have been released to the Center since November, 1976. The laboratories were released only recently and construction is being finished off in the outreach and management wings.

The greenhouse program is under way and is focused on nitrogen utilization by rice.

I was extremely well impressed with the design and construction of these two buildings. They are single-story, well screened by trees with sawed limestone exterior. The interior design has good flexibility and access; seems very well arranged and, considering the half-dozen or so scientific laboratory buildings that I have been involved with in design since 1956, these look very good to me. Doubtless use will provide the test.

Technology

The principal lines of focus; product development, e.g. granulation, use of indigenous rock phosphates, utilization of tailings from inefficient phosphatic processes, etc; and technical assistance for new and operating plants seem quite clear. Conceptualization of approach seems to be matured and well-thought through.

Agro-Economic

Most of Tuesday afternoon was spent visiting with this staff under Per Anderson. On the socio-economics side the programs include: 1-Farm level constraints, 2-Demand, 3-Public Policy, 4-Marketing, 5-Production Economics - all referring, of course, to fertilizer. Staff is on board to handle the first three topics. More than an hour was spent discussing various aspects of the complex problems and how they might be approached. Contemplated work was mentioned in Kenya, India, Brazil, Bangladesh, Korea and some institutional linkages have been established or identified for possible establishment in these countries. Two additional staff members will be added to handle the last two areas: marketing and production.

On the agronomic side, the discussion centered on low efficiency (maybe 30 percent) of N utilization by rice. I was particularly interested by the loss through volatilization of ammonia to the atmosphere.) Work is already underway in the greenhouse on this.

On phosphorus, Dr. Anderson outlined the desire to help governments best utilize indigenous rock resources and how these can best be approached considering that these are quite variable around the world, agronomic responses are not well tested, acid soils are a problem, etc. Preliminary approaches will be made in the greenhouse, probably using maize. (This crop would tie into the Benchmark Soils since maize is the main indicator crop in that project.)

Outreach

We were able to spend about two hours in rather intensive discussion with this staff headed by Stangel. The two regional representatives (Latin America was regional leader absent) discussed linkages being developed and approaches used. Parish (Asia) emphasized rice N efficiency and techniques (briquettes, large granules, sulphur-coated urea, mud-balls) of interest in 25 Asian countries. Want to concentrate in three or four (Korea, India, Bangladesh were mentioned) in order to make an impact. While agricultural technology transfer is fairly well institutionalized, this is not true for transfer of engineering technology.

In contrast to Asia, phosphate is of more immediacy in Africa. Diamond reported on institutions and distribution in Sahel countries. Native rock phosphates appear to be a must in the land locked Sahelian countries because of prohibitive transportation costs for imports. One real problem is the collapse of farm prices in the good years. Recently a workshop was held in Ghana. About 21 representatives attended, including some from international agencies. Disappointment was expressed that A.I.D. representatives did not attend. The African desk has asked that a fertilizer strategy statement for Africa be developed with Michigan

State University (Carl Eickert).

Yao described the computerized fertility information system. This will be accessible through General Electric time-sharing to display units that can be dialed up anywhere in the world where LD telephone connections are available. This system would have 3 components: Capital investments, marketing and supply, and raw materials.

Engineering outreach has been heavily involved in responding to questions and to calls for technical assistance. An estimate of 25 to 30 plants throughout the world have been given this kind of support which may involve 2-3 week visits of teams to U.S. and visits of U.S. personnel to LDCs. Seven groups are now present in the U.S. The question as to how far the Center should go in providing assistance to the more routine processes viz a viz concentrating on its more specific goals was raised.

The training program is attempting to build in "evaluation". Training efforts may be on a one to one basis, special group programs may be arranged and repeatable curricula for more regularly-scheduled courses developed. Getting a "critical mass" group was stressed, e.g. 10 in Bangladesh, 9 Venezuelans have been or are being trained.

TVA

Besides contacts with John Shields, mostly on administrative matters, approximately one hour was spent with Dr. Lewis Nelson, Manager of TVA's National Fertilizer Development Center. Dr. Nelson raised the caution that IFDC should insure that TVA's technological developments were not overlooked and that coordination between NFDC and IFDC needs to be strengthened. (This matter was later discussed with Dr. McCune.) I had an opportunity for a quick visit to the general TVA site, more detailed visits to the pilot plant, particularly the sulphur-coated urea process, the library and the greenhouse. Two experiments of interest included disposal of tailings on agricultural fields, and tailings pile reclamation, and the use of heated cooling water particularly from the Brown's Ferry Nuclear plant. The latter effort include lysimeter experiments and commercial greenhousing. A one-half acre greenhouse pilot effort is under discussion with Brown's Ferry.

General

I felt that the physical facility is excellent, probably outstanding. I was very well impressed by the staff, which seems to have been carefully chosen. Program planning and focus seems matured and well justified in the technology area. The socio-economic area is a vast one. It is not as clearly focused yet. Doubtless some priority choices will have to be made. I see no reason why this should not fall into place as the program develops, but this will be the most difficult program to design of those contemplated by IFDC.

I liked the outreach program in concept. It will need to "stay loose" to be responsive as needs develop. There wasn't time to explore the World Information System as deeply as I wished and I'll try to remedy this.

There probably is a need for AID regional officers and TA to become better informed on the programs and to input suggestions during the present formulative stage. My own feeling is that one site visit would be worth about 20 slide talks. IFDC and AID might wish to set up one or more such visits involving fairly small groups of half-dozen or so people.

EXHIBIT A

AUGUST 1-31 PROPOSED P. T. PUSRI TRAINING PROGRAM

<u>Date</u>	<u>Time</u>	<u>Activity</u>	<u>Instructor</u>
Aug. 1	9:00	Welcome to IFDC	D. McCune
	9:30	IFDC orientation	M. Sanchez
	10:00	Begin physical exams	
Aug. 2	9:00	Complete physical exams	G. Bolds
	1:30	Introduction to pilot-plant process, equipment, and facilities	
Aug. 3	9:00	TVA orientation	T. Frederick
	1:30	Tour TVA pan-granulation unit	
Aug. 6	9:00	General theory and practical aspects of urea granulation	T. Frederick
	10:45	Break	
	11:00	Plant safety	G. Bolds
	11:30	Quality control	J. Polo
	1:30	Handling urea melt	J. Schultz
	2:30	Demonstration	G. Bolds
Aug. 7	9:00	Review and questions	T. Frederick G. Bolds G. Bolds
	9:30	Pan operation and theory	
	10:30	Demonstration	
	1:30	Solids system (recycle)	
	2:30	Demonstration	
Aug. 8	9:00	Review and questions	T. Frederick G. Bolds G. Bolds
	9:30	Cooler, screen, dust handling demonstration--cooler w/heater	
	1:30	Demonstration--screen, scrubbing system	
Aug. 9	9:00	Review and questions	J. Polo J. Polo
	10:00	Process control and instrumentation	
	1:30	Demonstration of instrumentation	
Aug. 10	9:00	Review and questions	G. Bolds to direct
	9:30	Prepare pilot plant for operation	
Aug. 13	9:00	Pilot plant equipment run--no melt	G. Bolds
Aug. 14	9:00	Discussion and presentation of program for today	G. Bolds
	10:00	Discussion and preparation of urea melter	G. Bolds
	11:00	Initial plant operation ≈3 hours	G. Bolds
Aug. 15	Open		
Aug. 16	7:30	Prepare plant for operation and begin plant run--assign counterparts	G. Bolds

<u>Date</u>	<u>Time</u>	<u>Activity</u>	<u>Instructor</u>
Aug. 17	7:30	Plant operation--optimum conditions	G. Bolds
Aug. 20	9:00	Discussion of the effects of changes in operation:	
		A. Melt concentration	J. Schultz
		B. Recycle ratio and temperature	G. Bolds
		C. Pan temperature	T. Frederick
		D. Oversize and crushing	J. Polo
		E. Chemical conditioning	
		F. Dust handling alternatives	
		G. Process control alternatives	
Aug. 21	7:30	Plant operation demonstration of above-- reassign counterparts	G. Bolds
Aug. 22	7:30	Plant operation	G. Bolds
Aug. 23	7:30	Plant operation--reassign counterparts	G. Bolds
Aug. 24	Open	(Assign two operating crews)	
Aug. 27	7:30	PUSRI Crew A operates plant	
Aug. 28	7:30	PUSRI Crew B operates plant	
Aug. 29	7:30	Crew A	
Aug. 30	7:30	Crew B	
Aug. 31	9:00	Discussion and debriefing	