

MC 572  
5.8  
BOX 2 FOLDER 4

[HEPAP] [1971-1978], correspondence

84-6063

private

priv info

HEPAP

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
DEPARTMENT OF PHYSICS  
CAMBRIDGE, MASSACHUSETTS 02139

March 2, 1971

Dr. Paul McDaniel, Director  
Division of Research  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Paul:

I am obliged to transmit to you the distress and despondency of the members of HEPAP when faced with the continuing reductions in the high energy physics budgets, produced by direct decrease of funds as well as the indirect reductions caused by inflation. We considered it to be the duty of our Panel to advise you as to how high energy physics should be developed productively by turning towards the most interesting and challenging research projects and facilities. The Panel feels helpless and frustrated when it has to do nothing but advise you how to distribute insufficient funds so as to minimize the damage to the field. At the same time we have warned of the effects these reductions were having in decreasing productivity, in missing opportunities, and in postponing innovations.

The recent additional cut of \$4.3 million in the operational funds has dramatized this situation which has existed since 1968, and has become more critical every year. We appreciate greatly the efforts of the Commission, of the OST and of the National Science Foundation to increase the support of high energy physics from other sources, in order to partially fill the losses caused by this recent cut. We must point out, however, that the situation was dangerously critical, even before this cut.

In 1970 the decision was made to close the 3-GeV proton accelerator at Princeton and to restrict work at the Cambridge Electron Accelerator to colliding-beam research. Although the work at these labs was of considerable importance, it was felt that the financial picture of high energy physics was sufficiently bleak to require relatively more support to the higher energy and high priority machines. Since that decision was made, total operating funds available to high energy physics have decreased by more than \$6 million--an amount greater than that saved by the cutback

of PPA and CEA. In addition, since 1970, the necessary minimal support for the developing experimental program at the National Accelerator further curtails the funds available for exploiting the other high energy machines.

This bleak situation is in glaring contrast to the state of the field. We find ourselves today in a period of unusual activity and promise. New exciting results, new ideas and new methods appear on many fronts of high energy physics. As examples I quote the evidences pointing to smaller subunits of the proton found at SLAC, the unexpected phenomena discovered at Frascati, the new ideas of Veneziano, the development of wire spark chambers, proportional chambers, and superconducting devices. High energy physics has discovered and systematized a whole new layer of natural phenomena within the last ten years: The field of hadron-spectroscopy opened shortly after 1960, the  $SU_3$ -symmetries were found, the structure of the proton was explored, the vector dominance model was born; the violation of time-reversal invariance was discovered; the exploration of weak interactions began; etc. All this indicates that the last decade showed a high rate of discovery.

The promise of this decade is at least as great. The largest accelerator in the world will be working soon, the other accelerators are ready to deliver higher intensities and better beams, electron-positron clashing beam devices are being built. These facilities could keep up the pace of discovery and innovation if the support of high energy physics would allow their proper use. If the present budget trends continue, however, the laboratories will be forced to neglect innovation and daring advances in a desperate attempt to keep the present facilities alive. The restricted funding was tolerable for a certain time, since the United States physics program has accumulated a large reservoir of strength during the past decades. But this time has now run out. We will soon be surpassed by the Western Europeans in quality and quantity of research. They are already spending more money on high energy physics than we are, and their facilities are better supported than ours.

A most alarming damage resulting from the insufficient funding is the effect on the manpower situation. The high energy physics program has always been a producer and a pool of some of the finest scientific talents. Due to the intellectual challenge of the field, the high energy physicists--the physicists working on the front line of the search into the structure of matter--have an excellent tradition in training

Dr. Paul McDaniel

- 3 -

people who are ready and able to help solving important problems of great complexity as the experience in World War II and after has shown. This pool begins to dry up because the influx of young people is severely reduced by the lack of funds and, consequently, of jobs. We do not ask for a return to the abnormal growth rates of the post-war period, but we sincerely believe that a return to reasonable funding levels and patterns which allow systematic planning and innovating is a necessary condition, not only for the productivity of high energy physics, but for the continuing development of U. S. Science as a whole.

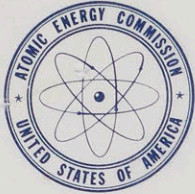
Yours sincerely,

Viki

Victor F. Weisskopf

VFW:gpm  
Enclosure

P. S. I include as background information a slightly shortened version of a paper by W. Panofsky.



UNITED STATES  
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

AUG 30 1972

Dr. James R. Sanford  
Associate Director, Planning and  
Programming  
National Accelerator Laboratory  
Post Office Box 500  
Batavia, Illinois 60510

Dear Jim:

I was re-reading your letter of July 24, 1972, accepting reappointment to the High Energy Physics Advisory Panel (HEPAP) and was reminded that I intended to acknowledge earlier your comment concerning the internal conflict between, (1) participating on HEPAP as a physicist interested in high energy physics and knowledgeable about NAL, and (2) acting as a spokesman for NAL. This presents an obvious source of conflict, particularly with the items of substance which are usually involved. The Panel, for reasons of convenience and expediency, has probably too often succumbed to the temptation to have the available informed HEPAP member speak on the item or problem of interest.

Certainly, the charge to each Panel member is to serve in the interest of a viable and productive national program in high energy physics and not as a representative of his particular institution or geographic region. I am most pleased that you are willing to continue on the Panel in that function. I will send Viki a copy of your letter indicating your acceptance and your special concern.

With warm regards.

Sincerely,  
Original signed by  
W. A. Wallenmeyer

William A. Wallenmeyer  
Assistant Director for High  
Energy Physics Program  
Division of Physical Research

cc: V.F. Weisskopf, MIT ←

NATIONAL ACCELERATOR LABORATORY 

PO. BOX 500  
BATAVIA, ILLINOIS 60510  
TELEPHONE 312 231-6600  
DIRECTORS OFFICE

July 24, 1972

Dr. W. A. Wallenmeyer, Assistant Director  
for High Energy Physics Program  
Division of Physical Research  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

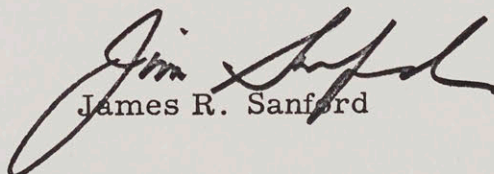
Dear Bill:

I am responding to Paul McDaniel's letter to me of June 28, 1972. As you know, I have been away from my office and only returned today. I imagine that Paul has left the AEC by this time, but if not, please pass this letter on to him.

By this time, I expected to be free of my public duties to HEPAP. Little did I think that you would need any more advice from me. However, if I can be of service to the Committee for another year, I will accept. I would like to continue to participate in the affairs of HEPAP as a physicist interested in HEP and knowledgeable about NAL. I would appreciate it when there are NAL matters of policy or direction to be discussed that you call upon the Director of NAL or his spokesman to speak on these matters. I will at times be asked by Bob Wilson to do the latter job, but I find that I cannot function well on the Committee when I am trying to make presentations and be a committee member at the same time.

With that problem which I know to be common to many HEPAP members off my chest, I am prepared to help again this coming year.

Sincerely,

  
James R. Sanford

JRS:jp

30 June 1972

Dr. Paul McDaniel  
Director  
Division of Research  
U.S. Atomic Energy Commission  
WASHINGTON D.C. 20545

Dear Paul,

I am writing to you in my capacity as Chairman of the High Energy Physics Advisory Panel (HEPAP) to communicate to you the concern of HEPAP over the preliminary budget guidance given to you by the AEC's Budget Review Committee suggesting the deletion of the SLAC Recirculating Linear Accelerator (RLA) from the high energy physics budget request for FY 74. The panel strongly endorsed the RLA project when it was considered by the Division of Research for inclusion in that budget request. We repeat that strong endorsement, and urge that this project be included in the FY 74 budget.

HEPAP considers RLA to be an undertaking which will accomplish an exceptional increase in the capabilities of one of the most important of the US accelerators at a relatively low cost. It will both double the beam energy of the highly successful SLAC two-mile linear accelerator and at the same time will increase the duty cycle of this accelerator 100 fold near its present energy. RLA will preserve and enhance the leadership in electron physics, which the unique SLAC installation has provided in the past.

Experimental opportunities offered to high energy physics by RLA are numerous. Experiments at SLAC in the last few years have given us our first insights into the substructure of the elementary particles and have made many important contributions to our understanding of the dynamics of particle interactions. The RLA project will make SLAC a considerably more powerful tool for research in these areas and greatly expand the opportunities to those scientists working in the fields of electron scattering, high energy photoproduction, hadron interaction using secondary beams and the precision measurements of weak interactions. Moreover, RLA will extend the usefulness of those bubble chamber techniques which are unique to SLAC, and which have already resulted in SLAC becoming the primary supplier of bubble chamber film to the nation's physicists.

HEPAP

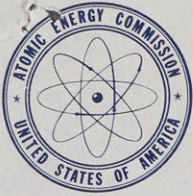
The estimated cost of the RLA project is 17.3 million dollars, which is roughly ten percent of the capital investment in the SLAC installation today. Considering the past record of the SLAC laboratory in accomplishing construction undertakings within budget and on schedule, the cost estimate should prove reliable. It seems to us that the RLA project is an extremely cost-effective approach to greatly expanding the capabilities of the world's most powerful electron accelerator. In times of fiscal stringence (which are apt to continue for sometime) there is a great temptation to curtail any new capital projects, however meritorious they may be. The argument is that as long as the current accelerators are not fully utilized - which is indeed the fact today - no new construction is warranted. This line of reasoning ignores the time lag inherent in the creation of new facilities - if RLA is fully authorized for FY 74 the first experimental results could not become available for at least four years. Moreover, discouraging innovation in the nation's high energy laboratories will ultimately be destructive of the vitality of the entire program. For this reason, the AEC, in its submission to the JCAE in February 1972, entitled "Considerations for a Viable and Productive High Energy Physics Program", wisely included a minimum estimate for the construction of "new projects". The costing rate projected for the RLA, if authorized in FY 74, meets the dollar figures given in this document for FY 74 and subsequent years; in the fact of this, it would be unfortunate indeed if the project to which the Division of Research has assigned highest priority were now deferred for fiscal reasons.

I hope that, keeping all these facts in mind, you will be able to appeal the BRC preliminary decision successfully.

Sincerely,

V.F. Weisskopf





UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

JUN 28 1972

Professor V. F. Weisskopf  
CERN  
1211 Geneva 23  
SWITZERLAND

Dear Viki:

It is indeed gratifying to know that you are willing to continue for the present in the important role of Chairman of the High Energy Physics Advisory Panel. We value highly the advice and guidance of this Panel, and recognize that its effectiveness is due in large measure to your special leadership and expertise.

Working closely with you during the last five and one-half years on the difficult and challenging problems concerning high energy physics has been a source of pleasure and encouragement. You have my sincere respect and admiration for your keen perception of the multi-faceted issues on which the Panel's guidance is sought. Your efforts in the past and your willingness to continue as Chairman of HEPAP, often I realize at considerable personal sacrifice, are very much appreciated.

With warm best wishes.

Sincerely,

Paul W. McDaniel, Director  
Division of Physical Research

May 10, 1972

Dr. Andrew M. Sessler  
Lawrence Radiation Laboratory  
University of California  
Berkeley, California 94720

Dear Andy,

Thank you very much for your shipment in regard to the reporting on HEPAP's activities. You did an excellent job and it will help me greatly in doing my report. Your contribution is by far the most valuable I have received.

With best regards,

Sincerely yours,

V. F. Weisskopf

VFW:dle

HEPAP

April 27, 1972

Drs. Andrew M. Sessler  
George A. Snow  
Sam B. Treiman

Dear Friends,

More than a month ago I had written to you and asked you to help me write a report of the HEPAP activities directed to the community of physicists. I have not received anything from you yet in this regard.

I would like to urge you to do so as soon as possible because I want to present the Panel next time with such a letter to be published either in Physics Today or in a publication of the Division of Particles and Fields.

I know this is a difficult task, but it is also difficult for me. Please help me in carrying it out.

Best regards,

V. F. Weisskopf

VFW:dle

I  
3  
P  
6

April 27, 1972

Dr. Jack Sandweiss  
Department of Physics  
Yale University  
New Haven, Connecticut 06520

Dear Jack:

It is very important that HEPAP members have your report not later than the first week in May. If this boundary condition is not fulfilled, the finalization of this report would have to wait until next Fall and that would be the death of the report. Please do everything in your power to have your final version sent to the HEPAP members before May 5th. Sorry to press you so hard.

With best regards,

Sincerely yours,

V. F. Weisskopf

VFW:dle

HEPAP

Prof VF Weisskopf  
~~Department of~~ Department of Physics  
MIT

AEC

Dear V. izki

Since you wanted to know my position on nuclear power safety I will state it.

1) I believe that as presently planned & executed it is safer than other power generation. Large accidents are very unlikely.

2) Power is likely to be ~~used~~ <sup>increased</sup> tenfold & we need more safety anyway. Therefore we ought to continually push for safety.

I would ~~like~~ A) Keep nuclear reactors away from towns - at least as much as present.

B) Do all the studies on Emergency Core Cooling now planned & in progress

C) Maybe deep power 20% till these are done, or at any rate have some reasonable intermediate position.

D) Revamp the AEC regulatory staff & put them in the position they should have - industry should do the pushing.

I have one & only one quarrel with the union of concerned Scientists. They assume that the AEC knows what to do & is being obstinate about doing it. (Henry said just about that in public) I think that is nonsense. The AEC needs to be told, & so does industry. The present adversary positions are bad. They are an outgrowth of Johnson's intransigence in the Vietnam war, but the situation is not similar.

Power companies & the AEC will do sensible things if we explain what is sensible & they are not backed into a corner. I can point to examples.

Yrs  
D. I. C. Wilson

March 16, 1972

Andrew Sessler  
Lawrence Radiation Laboratory  
University of California  
Berkeley, California

Dear Andy:

Thank you very much for a copy of your letter to Bill, regarding the storage ring at ANL.. I understand your worry, but I am not quite sure whether I agree with your conclusions. The discussions at the last HEPAP meetings have given me the impression that the majority of the members are not enthusiastic with this program both in respect to its technological value and with regard to its merits relating to the improvement of the ZGS. In contrast to this, the Panel approved strongly the RLA at SLAC.

Of course, I am aware of the fact that any discussion of HEPAP is incomplete and I can not exclude a change of mind of the Panel, however, on the basis of these discussions I would not be in favor of putting the SSR and the RLA on the 1974 budget. We should not propose something that we are not convinced is of it being first order. Also it would be very dangerous to put up a cheaper project with a more expensive one since the tendency would be great to cross out the more expensive one. After all, the Bureaus would conclude that the two are roughly equal in quality if they are proposed together. I believe that it would be deplorable if we arrived at an approval for SSR and not of RLE.

May I change the subject and ask you for another service? Some time ago we discussed that HEPAP should write a report on its activities for the community of physicists, to be published in Physics Today or a similar place. I find this very much in order to get good contact with the community. We have lost some of this contact during this academic year.

I have found that this is not as easy as one might have assumed. May I ask you and one or two others on the Panel to help me with this? In order to get the necessary input, you should look at the minutes of this academic year's meetings; try to remember what really has happened; and try to write down a report of our activities directed to the community. I would be very much interested in your thinking. The styling details are less important than the content. I would be extremely grateful if you would try your hand at it and send me a very rough draft.

I hope you will not be too unhappy by this severe imposition on your time.

With best wishes,

Sincerely,

V. F. Weisskopf

VFW:dle

March 17, 1972

Professor Sam B. Treiman  
Palmer Physical Laboratory  
Princeton University  
Princeton, New Jersey 08540

Dear Sam:

Some time ago we discussed that HEPAP should write a report on its activities for the community of physicists, to be published in Physics Today or a similar place. I find this very much in order to get good contact with the community. We have lost some of this contact during this academic year. I have found that this is not as easy as one might have assumed. May I ask you and one or two others on the Panel to help me with this? In order to get the necessary input, you should look at the minutes of this academic year's meetings; try to remember what really has happened; and try to write down a report of our activities directed to the community. I would be very much interested in your thinking. The styling details are less important than the content. I would be extremely grateful if you would try your hand at it and send me a very rough draft.

I hope you will not be too unhappy by this severe imposition on your time.

With best wishes,

Sincerely,

V. F. Weisskopf

VFW:dle



March 17, 1972

Professor George A. Snow  
Department of Physics and Astronomy  
University of Maryland  
College Park, Maryland 20742

Dear George:

Some time ago we discussed that HEPAP should write a report on its activities for the community of physicists, to be published in Physics Today or a similar place. I find this very much in order to get good contact with the community. We have lost some of this contact during this academic year. I have found that this is not as easy as one might have assumed. May I ask you and one or two others on the Panel to help me with this? In order to get the necessary input, you should look at the minutes of this academic year's meetings; try to remember what really has happened; and try to write down a report of our activities directed to the community. I would be very much interested in your thinking. The styling details are less important than the content. I would be extremely grateful if you would try your hand at it and send me a very rough draft.

I hope you will not be too unhappy by this severe imposition on your time.

With best wishes,

Sincerely,

V. F. Weisskopf

VFW:dle

UNIVERSITY OF CALIFORNIA

HEPAP  
corres.

LAWRENCE RADIATION LABORATORY  
BERKELEY, CALIFORNIA 94720  
TELEPHONE (415) 843-2740

TELEX 335313 LAWRADLAB BERK  
TWX 910-366-7172 LAW RAD LAB  
CABLE UCLRL BERKELEY

7 March 1972

Dr. William A. Wallenmeyer  
Director for High Energy Physics  
Division of Research  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Bill:

I have been somewhat concerned since the last HEPAP meeting with the new construction projects section of the proposed budget for FY 1974. Now, three things have conspired to precipitate my concern into a letter.

Firstly, the HEPAP meeting which was scheduled for next week has been put off for about two months. Secondly, I notice that the final version of the report "Considerations for a Viable & Productive High Energy Physics Program" has, in contrast with the version circulated at the last HEPAP meeting, a considerably reduced budget in the New Construction Projects category. Thirdly--and here you must discount any special influence to which I may have been subjected--I am a member of the AUA Board Committee on HEP and, as a result, have become rather impressed with the arguments (which I won't go into in this letter) for the ANL-ZGS Superconducting Storage Ring (SSR).

You recall that at the last HEPAP meeting there was considerable support for the SSR, but then as the discussion proceeded support swung to the RLA--not because of dissatisfaction with the SSR, but on the grounds that the RLA would open new areas of physics, and therefore, if a choice had to be made between the projects the RLA would be first choice. (I supported--and still do support--this view.)

But, really the two are very different size projects--there is more than a factor of four difference in cost between them. I am inclined to think that difference was not adequately emphasized in the discussion; we may not have to choose between the projects.

But even more to the point, the New Construction Budget is reduced from what we thought, so that RLA authorization in FY 1974 looks less likely, and now there well might be more HEPAP support for the SSR.

Sessler

On a purely tactical level--and even without regard for the guidelines for FY 1974--perhaps both RLA and SSR should be included in the preliminary 1974 budget, so that if the RLA is deemed too expensive, there exists a clearly designated first priority alternative.

Turning to the more general subject of major new construction projects, I want to remark that I am quite concerned by the New Construction Projects budget for 1973 to 1977. The low level excludes a major new project during that time, and means that there will be more than 10 years between the last major project and the next. This is radically different from what we have enjoyed in the last 20 years, and is just only barely consistent--in my opinion--with the title of the report. What particularly concerns me is that not even the start of a big project has been planned for 1976 or 1977.

Perhaps I shouldn't take the report seriously; i.e. I can believe that after the community has agreed to the next major project (say Isabelle or PEP) then efforts can be made--and they will be successful--in changing the budget. If I don't believe that--if I think that we must wait about 10 years before we will be able to do physics with large storage rings--then truly I become despondent.

Well, I am sure you can judge better than I how to proceed so as to optimize the HEP program, but perhaps these views will be of some assistance to you in the process of forming your judgment.

I gather the authorization hearings went well, in which connection I would like to congratulate you and your colleagues.

Sincerely,



Andrew M. Sessler

AMS:mb  
cc: V. F. Weisskopf

February 24, 1972

The Honorable  
Congressman Melvin Price  
Joint Committee on Atomic Energy  
Congress of the United States  
Washington, D. C. 20510

Dear Sir:

I thank you very much for asking me to testify before your Committee on February 29th and March 1st, 1972. I am honored by this request and I am glad to come to do so.

You will get five copies of my testimony two days before the hearings begin.

Sincerely yours,

Victor F. Weisskopf

VFW:dle

JOHN O. PASTORE, R.I.,  
CHAIRMAN  
LINTON P. ANDERSON, N. MEX.  
HENRY M. JACKSON, WASH.  
STUART SYMINGTON, MO.  
ALAN BIBLE, NEV.  
GEORGE D. AIKEN, VT.  
WALLACE F. BENNETT, UTAH  
PETER H. DOMINICK, COLO.  
HOWARD H. BAKER, JR., TENN.  
EDWARD J. BAUSER, EXECUTIVE DIRECTOR

MELVIN PRICE, ILL.,  
VICE CHAIRMAN  
CHET HOLIFIELD, CALIF.  
WAYNE N. ASPINALL, COLO.  
JOHN YOUNG, TEX.  
ED EDMONDSON, OKLA.  
CRAIG HOSMER, CALIF.  
JOHN B. ANDERSON, ILL.  
WILLIAM M. MCCULLOCH, OHIO  
ORVAL HANSEN, IDAHO

# Congress of the United States

## JOINT COMMITTEE ON ATOMIC ENERGY

WASHINGTON, D.C. 20510

February 17, 1972

Professor Victor Weisskopf  
Head, Department of Physics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts 02139

Dear Professor Weisskopf:

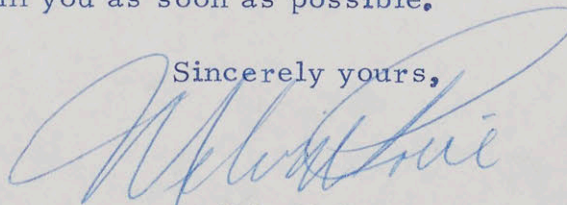
The Joint Committee's Subcommittee on Research, Development, and Radiation plans to hold hearings on the Atomic Energy Commission's physical research program on February 29 and March 1, 1972. The Subcommittee is well aware of your abiding interest in physical research, particularly that area directly related to high energy physics.

The Subcommittee invites you to appear as a witness at the morning session on March 1, 1972, to discuss the development of particle physics and, as the Chairman of the High Energy Physics Advisory Panel, the Panel's method of operation and philosophy. We would appreciate having your views and comments on how the high energy physics research program is now constituted and any suggestions you might care to make about changes and direction of scope.

Should you plan to testify, the Committee requests that you limit your prepared remarks to 20 to 25 minutes, and that 5 copies of your statement be received in the Committee office at least two working days before the hearings are scheduled to begin. You can, of course, submit a more detailed statement for inclusion in the record. I will send you a copy of the press release announcing the hearings, the agenda, and the list of witnesses when it is prepared.

We would appreciate hearing from you as soon as possible.

Sincerely yours,



Melvin Price  
Chairman

Subcommittee on Research,  
Development and Radiation

HEPAP

STATE UNIVERSITY OF NEW YORK  
AT STONY BROOK

STONY BROOK, LONG ISLAND, NEW YORK

11790

THE INSTITUTE FOR THEORETICAL PHYSICS

February 17, 1972

Professor V. F. Weisskopf  
Department of Physics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts 02139

Dear Vicki,

Ned Goldwasser has sent me a copy of his letter to you of 10 February. I write to you now because my recollection of the sentiment of Advisory Committee concerning a Physics and Society Session is somewhat more positive than Ned's. I recall that nearly all committee members thought that an evening session on "The Future of International Collaboration in High Energy Physics" would be a good idea. The idea was initially suggested by Prof. Panofsky.

My opinion is that, because of the world we live in, this Conference should devote some time to questions outside of curricular high-energy physics. It is also clear to me that discussions of delicate international issues are too risky at present. The "International Collaboration" discussion is a way of moving cautiously in the right direction which may enable future conferences to do even more.

Sincerely,

*Dan Freedman*

Daniel Z. Freedman

DZF:dd

January 18, 1972

W. Jen~~s~~schke  
Director-General  
CERN  
1211 Geneva 23  
Switzerland

Dear Willy:

How are things going on at CERN? I am not asking you to write me a letter because I know how little time you have, but perhaps you can send me some paper so I know how the reorganization is going.

You have received a letter from Telegdi which reflects his unhappiness about the situation. I wonder whether there is any possibility of getting him a job at Geneva University. I have not looked into this for a long time, but it would be easy to find out from Heer or Jauch. I certainly think that the University would profit enormously and CERN too. His problem of making temporary arrangements with CERN which might be broken by the next Director-General may be solved by the way in which you want to settle the Zichichi problem and similar situations. Anyhow, I hope that the Telegdi problem will find some solution.

I would also like to inform you of some talks I had with Frank Yang about how to establish relations with the Chinese physicists. It seems that the "official" method of contacting the Academy is not the best one. Yang was told explicitly that it is much better to contact persons in China who had some personal relations with the West. The man who would be an obvious man for CERN to be in contact with would be:

*Jentschke re: Chinese*

W. Jentschke  
January 18, 1972  
Page 2

Chang Wen-yu, Ph.D., Cambridge, England 1938 (Chang was in Princeton and Purdue until 1956. He was the discoverer of the mesic atom.)  
Deputy Chairman of the Revolutionary Committee (i.e., Deputy Director), Institute of Nuclear Physics, Academy of Sciences, Peking.

The best approach would be to invite him to CERN, alone or with some colleagues. Another possible contact is:

Chou P'ei-yuan Ph.D., Cal Tech 1928 (general relativity, turbulence) Deputy Chairman of the Revolutionary Committee (i.e., Vice President), Peking University, Peking.

It is important to realize that the "Revolutionary Committee" is just another term for directorate.

I hope very much that CERN will succeed in getting some ties with the Chinese. It was always CERN's tradition to be pioneers in establishing ties with places that are politically far apart. After all, CERN was the first to establish ties with Eastern Europe and the Soviet Union. It would be great if we could get a similar relation with China.

I am really very sorry that I have to keep my trans-Atlantic trips to a minimum since I found that they make me more tired than I thought. Therefore the chances are not high that I come before my regular summer stay, but I am looking forward to that date. This year it will be earlier than usual, and I expect to be there toward the end of May.

Yours sincerely,

Victor F. Weisskopf

VFW:gph



Mit besten Grüßen

Dein

Valentin.

3. I. 72.

December 29, 1971

PERSONAL AND CONFIDENTIAL

Professor W. Jentschke  
Director-General  
CERN  
1211 Geneve 23  
Suisse/Switzerland

Dear Willy,

I have postponed answering your kind letter of November 18 for quite some time, but I feel that you should have a response by the beginning of the new year. The matter in question is of considerable importance to me, and I believe that we should explore all aspects carefully.

(1) In our discussion, we were talking about a permanent appointment at CERN; since you do not refer at all to such an appointment in your letter, I assume that -- at least temporarily -- you do not intend to make an offer along these lines.

(2) The solution that you suggest consists, if I interpret your letter correctly, is a joint appointment with European university. There could be some difficulties with such a solution:

(a) Joint appointments, such as that of Zichichi for instance, were until recently under fire, and I believe that CERN wanted to stop this type of arrangement rather than push it. Furthermore, a contract of this type would appear to be of temporary character, resting merely on an agreement between the present D.G. and myself. Such a contract could perhaps be discontinued on the basis of a change of policy at CERN. One might say that I would still be left with my professorship; but this could change the financial conditions, both professional and personal, under which it was initially reasonable to abandon my present position.

(b) My productivity has so far been derived from the fact that I have always been in minute-to-minute contact with the experiments, rather than "doing physics by telephone". For this reason, I have some hesitations about an appointment at a "distant" university. The University of Geneva would be best suited, and Viki feels that this is an avenue that you could explore.

(3) I am also interested in exploring the possibility of a joint appointment between Chicago and CERN, say on a fifty-fifty basis. I anticipate no major difficulties on this end.

Page Two  
Professor W. Jentschke  
December 29, 1971.

(4) As two years ago, I would again like to spend a few months at CERN in the summer of 1972 as a Visiting Professor. In view of the flattering remarks that you made about my teaching, I hope that this can be arranged.

With many thanks for your kind interest and best wishes to you and your family for the New Year.

Cordially yours,

V. L. Telegdi

VIT/al

January 3, 1972

Dr. Victor F. Weisskopf  
Massachusetts Institute of Technology  
Department of Physics  
Cambridge, Massachusetts 02139

Dear Viki:

I have reread the report of the Sandweiss Committee for the  
n th time, and I feel that after a discussion and modification  
by HEPAP it should be transmitted on to the AEC. I have probably  
worked on it too long to be properly critical.

I realize that it is not as inclusive as you might like to  
see. It does contain, however, the selected topics that the sub-  
committee was able to discuss, and find some agreement on.

Best wishes for the new year. I'll see you next week.

Best regards,



James R. Sanford

October 2, 1972

Dr. Andrew M. Sessler  
Lawrence Radiation Laboratory  
University of California  
Berkeley, California 94720

Dear Andy:

Coming back from the first HEPAP meeting this fall I noticed with regret your departure from our fold. I know you are glad to be relieved from this onerous duty but I hope you feel like I do that our meetings had their personal compensations. It was a great experience to have worked with you, to have suffered with you and to have shared with you an enthusiasm and a devotion to a great idealistic cause. This is what I want to thank you for.

Hoping to be allowed soon to join the ranks of the exhepapists

I remain,

Yours as ever,

enclosure

Same letter sent to: Sam Treiman, Bruce Cork, Bill Willis

Report on my conversations with  
Boyce McDaniel and Norman Ramsay  
May 28, 1972

I talked about  $\frac{1}{2}$  hour with Boyce over the phone. I considered my main aim to convince him to stay at NAL longer than September 1972. I therefore did not report explicitly about HEPAP's critical evaluation of the NAL situation, but stressed the positive influence which he extended upon the situation, the high stakes of success and failure, his unique role and ability to help technically as well as psychologically, the fact that his continued presence may attract other people who would not come if he leaves. From his sparse reactions - he talks very little, in contrast to Ramsay - I concluded nevertheless that he clearly is aware of the troubles and difficulties. In respect to his return to Cornell, he mentioned that several people will be on sabbatical leave next year, and he may be needed because of the improvement program at the Cornell machine. However, he seemed greatly impressed by my telling him of Marcel Bardon's remarks that the NSF would strongly approve his staying at NAL, even at the cost of a slowing down at Cornell. (It would be good if Marcel could find a way of transmitting this attitude directly to him.) Altogether, I got the impression that he is aware of his critical role at NAL, and that he will consider his prolonged stay more seriously than before. Anybody among you should try to influence him, if he feels he is close enough to him to do so.

I then had two lengthy conversations (personal, not by phone) with Norman Ramsay. Norman does not consider the situation as critical as the majority of HEPAP. He quoted a few examples to show that the situation is improving and not falling apart. He said that each time they have gone to a new regime of higher energy of more intensity, they encountered great difficulties, but, when they then returned to the previous regime everything worked well and the difficulties encountered with the previous regime had vanished. He said that indeed there was low reliability when major changes were made but the reliability turned out to be high when returning to the older regime. The main example of this was the going from 80 to 200 GeV. There were many difficulties and breakdowns when first arriving at 80, and at 200. When they returned

from 200 to 80 everything went fine and none of the previous hang-ups reappeared. He said everything is really good up to the injection into the main ring. First, only 10% of the protons got into the ring, now 50% get into it, and they seem to know what to do to get better. Last week, he said, the main ring asked for 118 hours and they got 104. Hence reliability. The linac delivers full intensity (for  $10^{13}$  protons per pulse) the booster gives enough for one injection in order to reach  $10^{12}$ . The multiple injection is not yet ready. As a proof that things go reasonably well, he quotes that the installation of water cooling was supposed to take eight weeks but actually was done in two weeks with another two weeks for debunking. All pieces that made so many troubles in the period July 71 to January 72 are now operating with small problems only. There were no magnet failures in the last three weeks, whereas  $\frac{1}{2}$  year ago there were almost one a day. The 200 magnets which were vacuum epoxied, never failed afterwards.

He does not agree with the statement that technical information is hard to get. He quotes (somewhat off the point) that you only need to call "Joe" (extension 563) to get taped reports of what's going on.

When he talked about the fact that so many good accelerator experts left NAL, he admitted the facts but remarked that L. Smith was of no help anyway, that Mashke had a tricky personality and that the morale went up after he left. He said that Tom Collins is now working successfully with the accelerator and was of immense value recently.

As far as the future development is concerned, he is confident that  $10^{12}$  per pulse with 50% exploitation can be reached well within a year. The extraction is now 25% and will improve. He emphasizes that Bob was hired to get  $10^{12}$  per pulse at 200 GeV with reduced experimental areas. Berkeley said that even this cannot be done before 1974 but he will have it at the latest early 1973. A date for the goal of  $5 \times 10^{13}$  and 400 GeV cannot be given today. Of course, he is painfully aware of the fact that Bob has made a lot of promises over and above these aims.

Ramsay said that the HEPAP group represents a group especially critical of NAL. The centers of skepticism are (I quote N.R.) CERN, Brookhaven and SLAC and to a lesser extent Berkeley. The latter three are represented in HEPAP by strong and vocal personalities. Upon my question, who holds more positive opinions, he mentioned the NAL users committee, in particular its chairman Earle Fowler.

To the statement that Wilson reorganizes the lab. every four months and nobody knows what he will be working at, he replied that this is partly true and better now (because of McDaniel) but that most of the complaints are caused by the necessary actions half a year ago, when the main ring was in bad shape.

Altogether Norman says that things are better than before ; that they are in a rapid state of flux (toward the better) ; he is worried too about the situation, there are large problems yet to be solved, but there is an excellent chance that they will be overcome.

We should not be overcritical ; wait until September and things will look a lot better. He was very grateful that we are urging McDaniel to stay on. He is aware that this may help greatly to improve the situation.

We then talked about the large equipment sums for NAL in FY 73 and 74, which may not be needed in view of the stretch of the time scale. I told him that it would be politically dangerous to transfer part to other labs. or to the Universities, because it would be taken away. I suggested that NAL could now be more generous in helping users with equipment. He took up this suggestion with great enthusiasm and he plus Bob will see Wellenmeyer and Hildebrand about how to do it.

Finally, we discussed the future of the direction of NAL, and how long Wilson intends to stay. Here Norman is very positive. He believes Wilson should and will stay at least until NAL starts serious experimentation (reliable  $10^{12}$  protons). He definitely thinks



it would be good if he stayed longer. Norman believes Bob would make an excellent Lab. director also for the research phase, different from other directors, but nevertheless successful. There will be no pressure by URA on Wilson to quit when the machine is running. (In spite of this, I personally believe that he will quit when  $10^{12}$  protons are reached.)

The above report describes Norman Ramsay's position and not my own. I was deeply impressed and somewhat appalled by the unanimous critical attitude of all HEPAP members. Let me know by all means if any of you have second thoughts about the situation in one direction or the other. It may perhaps help if B. Baresh tells Bob Bacher how serious the situation is. He is chairman of the board of URA. In my view, the most important task is to get good people to NAL. We must work at this with all means available. Some people must overcome their dislike of Bob's methods in the interest of the greater cause. May be Shoemaker can be convinced by Trieman and via Harry Smithe.

December 30, 1971

D. H. Wilkinson, F.R.S.  
Head of the Department  
Nuclear Physics  
Oxford University  
Keble Road  
Oxford OX1 3RH  
ENGLAND

Dear

Thank you very much for your invitation to come to the Physics III meeting at CERN in the middle of March. I would be most delighted to come, but I fear that my time and energies are probably not sufficient to come over. I enjoy my life and physics very much, but there is one point at which my relatively advancing age interferes and that is that trips tire me much more than they did before.

The "little jewel of CERN" is still close to my heart. In addition, I feel that Physics III started on my initiation, and this is why I am very happy to learn that you are now going to be the Chairman of Physics III. I am very glad that you are taking over this task. I will be happy to help you whenever I can, but I may be forced to restrict my help to the summer months during which I am always at CERN.

Yours sincerely,

Victor F. Weisskopf

VFW:gph

*Wilkinson*

OXFORD UNIVERSITY  
NUCLEAR PHYSICS DEPARTMENT

*From the Head of the Department*  
D. H. WILKINSON, F.R.S.



Nuclear Physics Laboratory  
Keble Road  
Oxford OX1 3RH

Telephone 0865-59911

10 December 1971

Professor V. F. Weisskopf,  
Department of Physics,  
M. I. T.,  
77 Massachusetts Avenue,  
Cambridge,  
Massachusetts 02139.

Dear Viki,

Can you by any very good chance happen to find yourself in Europe in the middle of March next year?

I have recently become chairman of Physics III at CERN and one of my first tasks is to organize a 2-day meeting to be held there on March 16th and 17th 1972. The object of the meeting is to look ahead to the programme on the improved SC, but in particular to look at the whole field of application of high and intermediate energy techniques to the study of nuclear structure. We want particularly to look at the respective roles of the improved machines such as the CERN SC and Nevis in relation to the new machines such as TRIUMF and LAMPF. We shall be having a dozen or more presentations of various bits of the field, with an introductory speaker to tell us what we don't know about nuclear structure and one, two or even more summarizers to tell us how we might find it out.

I hope that the "little jewel of CERN" is still close to your heart, and that if you possibly could, you would come to our meeting. If you were to come, it would be inevitable that one of the summary talks would be extracted from you but I don't want to ask you to make any other definite commitment because I think it would be much better if you had a completely free hand.

It would be absolutely grand if you could come, and I shall look forward to hearing from you.

*Deruy*

UNIVERSITY OF MARYLAND

COLLEGE PARK, MARYLAND  
20742

COLLEGE OF ARTS AND SCIENCES  
DEPARTMENT OF PHYSICS AND ASTRONOMY

December 13, 1971

Prof. Victor F. Weisskopf  
Department of Physics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts 02139

Dear Viki:

This is my preliminary response to the Sandweiss committee report on future patterns. In general I think it a fine effort and I agree with most, but not all, of it. I do not support the recommendation and statement "that funding procedures should support experiments rather than groups to a greater extent than has been done in the past". The problems with this approach are several, in particular,

(i) there would be too little relationship between the approval granted by a physics advisory committee and the availability of resources within the laboratory,

(ii) the ease with which good high energy physicists can write proposals to do "significant" experiments is not matched by the total resources available to the U.S. high energy physics community, so that other factors beyond approval of a proposal at a given accelerator must be considered,

(iii) the present system seems to allow most truly innovative proposals to be funded, usually by the laboratory scraping up the money, since each laboratory is very eager for exciting new ideas,

(iv) it has often been true in the past that the most exciting physics has emerged from non-innovative, but extensive, competent, continuing programs of research along a given line (e.g., resonance spectroscopy, total cross sections, two body differential cross sections,  $K^0$  meson decays, etc.).

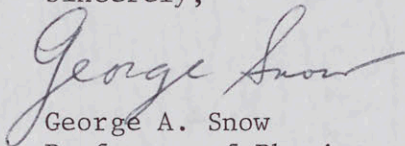
The second major point of the report that bothers me somewhat is its discussion of young physicists and their future support and development. To an appreciable extent I think the report waffles on this one. If in fact the current level of support for young physicists is not enough to ensure the future health of the field, then one must either get more funds and more tenure University positions dedicated to this purpose or one must face up to the problems of phasing out competent but older physicists in the field. The "problem" exists not only at the National Laboratories as discussed on page 8, but also at the Universities, since essentially all available tenure slots at most institutions of higher learning are already occupied. To the extent that this condition remains true for the next decade, extra support

Prof. Victor F. Weisskopf  
December 13, 1971  
Page 2

for promising young physicists may not be necessary, in that the most promising will have already left the field in anticipation of this problem. The suggestion that we be more restrictive in the number of new students trained and especially in the number of new students trained at "lower ranked departments" while laudatory in many ways, also has the effect of reducing the opportunity for bright new Ph.D.'s to create and lead new research programs at these "lower ranked departments" where their opportunities for advancement are often much higher. I am in fact a strong advocate for not allowing the total number of physics graduate students to increase nationwide, but I think the report does not sufficiently respect the inevitable consequences of such a policy on the academic careers of young Ph.D.'s. I think that the problem is a very severe one for the younger physicists, but that the field itself is not threatened.

I hope these comments are helpful.

Sincerely,



George A. Snow

George A. Snow  
Professor of Physics

GAS/pjq

cc: J. Sandweiss  
Yale University

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
DEPARTMENT OF PHYSICS  
CAMBRIDGE, MASSACHUSETTS 02139

December 8, 1971

To all members of HEPAP

Dear Friends:

I am very sorry that we had to call off the last meeting at such short notice. I am sure that Bill Wallenmeyer told you the reason. Both he and Paul got an order to stay in Washington, and I did not want to have a meeting without them since one of our purposes is to let them know our feelings and attitudes.

You all have received a copy of the latest version of Jack Sandweiss' report "On Future Patterns of HEP Research". We ought to discuss this report and its final form at the next meeting. Since the program will be overloaded, I would like to give it a flying start by asking you to read it over and let me know by letter your opinion, your criticisms and your suggestions for change. Please write to me even if all there is to be said would be that it is "OK".

I wish you all a very good Christmas, and I hope that we can agree on a date in January for the next meeting.

Yours sincerely,

*Viki*

Victor F. Weisskopf

VFW:gph

*Copy - David Miller  
in hand*

December 7, 1971

Dr. Edward David  
Office of Science and Technology  
Executive Office Building  
Washington, D. C.

Dear Dr. David:

The members of the AEC High Energy Physics Advisory Panel (HEPAP) have become increasingly aware of the growing disparity between the U. S. effort in applied superconductivity and the larger, more diversified efforts of the Western European countries which are extremely well coordinated across national boundaries. At the same time there are significant programs in Japan and the U.S.S.R.

Following the discovery of high field superconductors at Bell Telephone Laboratories in 1961, high energy physics research was the first application for which large pieces of experimental superconducting equipment were developed and built. In fact, most of the major advances in superconducting magnet technology have been a direct result of the needs of high energy physics. In spite of this, high energy physics laboratories have neither the funds nor the mandate to continue to carry out long-term or broad development programs in this area. Other disciplines which also stand to benefit from advances in superconducting technology face similar problems.

As you know, there are many potential areas in which widespread industrial use of superconductivity may occur within the next ten to twenty years. Some examples of such applications are:

1. Generators and motors; ac and dc; compact, quiet, large capacity, efficient, cheaper than conventional.

Dr. Edward David  
December 7, 1971  
Page 2

2. Underground transmission lines; ac and dc; large blocks of electrical power over long and short distances--possibly coupled with breeder reactor program.
3. MHD electric power generation; being pursued in Japan, Germany, and the U.S.S.R.
4. Large separation magnet for ore separation and for scrap metal segregation.
5. Large confinement magnets for thermonuclear fusion reactors.
6. Magnetic levitation for transportation systems, presently thought of as train-like.
7. Magnetic energy storage devices.
8. Very long magnetic guide fields; new type energy transmission via charged particle beams.
9. Special purpose electrical machinery.
10. Advanced instrumentation and frequency standards.
11. Special applications in High Energy Physics, Space Physics, and Controlled Thermonuclear Research.

Although some of these may not turn out to be successful, it seems certain that there will be more and more practical applications of superconductor technology in the future.

The realities of the present U.S. situation in this technology have been summarized by a subpanel of HEPAP in the observation that although some important efforts of a proprietary nature are still going on in industry, the total rate of building superconducting devices in this country is declining. Several of the U.S. superconductor material manufacturers have recently gone through financial reorganizations. This apparently reflects not only the decline of U.S. activity in this field, but also the reduction of orders from Western Europe now that European companies are developing increasing technical



Dr. Edward David  
December 7, 1971  
Page 3

and manufacturing expertise in this field.

It seems to us that the long-term prospects for the large scale use of this technology appear favorable enough that the U.S. should not allow a technological gap to develop. Otherwise, future domestic users may have to buy a large fraction of their materials and devices from foreign sources who will have the advantages of prior large scale manufacturing and operating experience as well as patent protection.

Since most of the new large scale uses of superconductivity not only lie outside the field of high energy physics, but in fact span a very broad range of science and technology, I feel that your office is the proper one to assess this situation so that corrective measures can be taken if deemed necessary.

Sincerely,

Victor F. Weisskopf

VFW:gph

*Copies - All HEPAP  
Wallenmayer  
McDaniel*

NATIONAL ACCELERATOR LABORATORY 

P.O. BOX 500  
 BATAVIA, ILLINOIS 60510  
 TELEPHONE 312 231-6600  
 DIRECTORS OFFICE

*DM*

November 30, 1971

Dr. Paul McDaniel, Director  
 Division of Research  
 U.S. Atomic Energy Commission  
 Washington, D.C. 20545

Dear Dr. McDaniel:

In your letter of November 8, you asked that we review our requirements for operating funds in FY 1972. We have made the study, and our present status and projected budget are presented below.

*W. L. ...*

Activity	Actual Costs and Committed Expenditures for FY 1972 on October 31, 1971	Total Projected Needs for FY 1972
05-01-10-01-0 Physics Research	\$ 1,400,000	\$ 1,750,000
05-01-10-02-0 Accelerator Operations	1,700,000	2,100,000
05-01-10-03-0 Accelerator R&D	1,200,000	2,400,000
05-01-10-04-0 Experimental Facilities Operations	2,800,000	3,500,000
05-01-10-05-0 Experimental Facilities R&D	2,700,000	4,050,000
	<hr/>	<hr/>
Total	\$ 9,800,000	\$13,800,000


The column titled "Actual Costs and Committed Expenditures" includes actual costs and commitments through October 31, extrapolated costs on open requisitions, salary projections for the fiscal year and the FY 72 projected costs for items such as maintenance, fuel and utilities.

For several years we have estimated that our needs for FY 72 operating funds would be more than \$15 million, and we still find this to be so. However, we have squeezed in many ways, and the projection of operating costs displayed on the above table is now only about a million dollars over our current budget allotment. We will continue to squeeze. One solution might be to apply for funding for this projected overrun at the time of the mid-year review. In line with previous suggestions we continue to review the appropriateness of charges to the operating program. It is possible that some relief in the projected operating level will accrue from this review through reclassification of charges to construction.

① May I also react to the portion of your letter in which you say, "The growth in operating funds for NAL has been achieved entirely at the expense of other efforts in the high energy physics program and has resulted in severe restriction on the activities at the other laboratories." Operationally, I understand exactly what you mean. However, one could, within the same set of facts, describe the situation somewhat differently. For example, in the authorization hearings for the National Accelerator Laboratory, it was recognized that the operating budget for the Laboratory should properly grow to about \$60 million when the Laboratory came into full operation, probably by 1974. Such a growth would put our current operating level at about \$30 million, instead of the \$12 million in our present budget. One could therefore say that NAL is constrained to work at less than half its previously projected level in order to provide the funds required to keep the existing laboratories in operation!

② The point of view portrayed above is one that I have never expressed, and I think it would be highly unwise for me or for anyone else to express it. Similarly, however, I believe that the opposite point of view is one that could lead to resentment and one which might encourage a less than full understanding of the basic problems.

Sincerely,



R. R. Wilson

November 24, 1971

Dr. Paul McDaniel  
Director, Division of Research  
U. S. Atomic Energy Commission  
Washington, D. C. 02545

Dear Paul:

I herewith submit to you a report on "Advanced Accelerator Concepts and Technology for High Energy Physics" compiled by a sub-panel of HEPAP which we have appointed for this purpose under the chairmanship of Bruce Cork. The High Energy Physics Panel has studied the report and was in full agreement with its findings and its recommendations. We would like to add only one qualification in respect to the subpanel's recommendations of increases in financial support which we subscribe, only if the future appropriations for high energy physics will be such that other activities may not suffer too much by an increase of support of accelerator technology.

We hope that this report may be of some use to you for the planning of these kinds of activities.

Very truly yours,

Victor F. Weisskopf

VFW:gph

*McDaniel*

November 24, 1971

Dr. William A. Wallenmeyer  
Research Division  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Bill:

I include here the official letter to Paul that should go with the sub-panel report of Bruce Cork. I suppose that you have the latest version of this report. Please transact the official submission to Paul.

Yours sincerely,

Victor F. Weisskopf

VFW:gph  
Enclosure

EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF SCIENCE AND TECHNOLOGY  
WASHINGTON, D.C. 20506

November 19, 1971

Dear Vicki:

I've been asked to respond to your letter to Dr. Edward David dated October 29th. As I told you on the telephone the other day, I think that a letter on the role of the High Energy Physics community in the development of practical applications for cryogenic and superconducting magnets would be very useful. In the present draft you do tend to ignore the efforts of U. S. industry. Perhaps your scouts are better than ours, but I have the impression that some considerable effort of a proprietary nature is under way. Perhaps you could give this some small acknowledgment, so that you won't seem to be ignoring them.

I'll talk to you again soon.

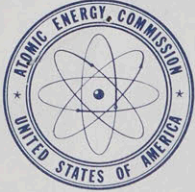
Cordially,



Carl M. York  
Technical Assistant

Dr. Victor F. Weisskopf  
Department of Physics  
Mass. Institute of Technology  
Cambridge, Massachusetts 02139

*York re. letter to David*



UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

NOV 11 1971

Professor Victor F. Weisskopf  
Head, Department of Physics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts 02139

Dear Viki:

Thank you for your letter of November 5, 1971, expressing your concern about the funding problems facing MIT's experimental high energy physics program.

We, too, are concerned about the ability to support all the well regarded high energy physics research programs at MIT. As you well know, our limitations in funding have resulted, in part, in a general slowdown in the high energy physics research programs throughout the U. S. This, indeed, is the case at MIT also. A parallel problem, related in part to funding, is the uncertainty and stretchout of accelerator schedules. Thus, there is some slowdown in the NAL and CEA schedules which affects the Pless and Friedman-Kendall-Rosenson groups and the Osborne-Luckey-Frisch group. The Ting work at NAL is in an especially uncertain approval and scheduling situation. These stretchouts, in part, make it possible to more closely match the available dollars and, in part, are just frustrating.

I should very much like to try to undo an impression which I feel has been mistakenly drawn. There has been no attempt here to especially reduce development programs at universities. Although there aren't many universities that have the capability to participate in major development programs, MIT has been held in especial esteem in this regard. However, I understand that with the press of funds, it was the decision at MIT to cease the development of the major three-view PEPR program. Remaining development programs, such as MIT work associated with the rapid-cycling SLAC bubble chambers and the hybrid spectrometer system for NAL, are smaller by comparison.

We continue to believe that the MIT experimental program will be contributing to the U. S. high energy physics program in a major fashion. I would point out as indicative of our high regard for the MIT high energy physics program that it is funded at a substantially higher level than any other university high energy physics user program in the U. S. Further, with regard to the Pless group in the MIT

Professor Victor F. Weisskopf

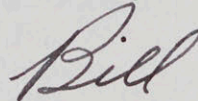
2

NOV 11 1971

program, it has been supported at a substantially higher level than any other MIT user group and, indeed, at a higher level than any other single user group in the nation. This has been justifiable on the basis of the importance of both the research and the associated pioneering development work.

As to the quandary of less funds and more Ting, I do not believe that this problem is insoluble - if we can all work together.

Sincerely,

A handwritten signature in cursive script that reads "Bill".

William A. Wallenmeyer  
Assistant Director for High  
Energy Physics Program  
Division of Research



November 18, 1971

Dr. William Wallenmeyer  
Atomic Energy Commission  
Washington, D. C. 20545

Dear Bill:

I was very much relieved when I received your answer to my letter regarding the M.I.T. situation. I agree with everything you said, and I am fully aware that no promises of any kind are implied. However, the letter shows a certain parallelity between your's and my thinking, and this was the cause of my relief. It is always nice to see that one is in agreement with someone whom he respects.

Yours sincerely,

Victor F. Weisskopf

VFW:gph

*Wallenmeyer*

November 17, 1971

Dr. Doyle M. Davis  
Health Physics Division  
Oak Ridge National Laboratory  
P. O. Box X  
Oak Ridge, Tennessee 37830

Dear Dr. Davis:

I am answering you in regard to the enclosed description of CERN. There is indeed a change necessary due to recent developments. The intersecting storage rings are now completed, and a 300 BeV machine is under construction. I therefore suggest that you add to the list of instruments the following "and an intersecting storage ring for colliding proton beam experiments of 25 BeV producing protons with a relative center of mass energy of 50 BeV which corresponds to an ordinary accelerator of 1600 BeV at a stationary target. A large proton synchrotron of 300 GeV has been recently approved and is now under construction." Furthermore, you must change the last line, saying "Professor W. Jentschke, Director-General and Dr. John Adams, Director-General of the new accelerator project."

Sincerely yours,

Victor F. Weisskopf

VFW:gph

*Davis M. Davis*

OAK RIDGE NATIONAL LABORATORY

OPERATED BY

UNION CARBIDE CORPORATION

NUCLEAR DIVISION



POST OFFICE BOX X

OAK RIDGE, TENNESSEE 37830

November 8, 1971

Professor Victor F. Weisskopf  
Massachusetts Institute of  
Technology  
Cambridge, Massachusetts 02139

Dear Professor Weisskopf:

Two copies of the latest edition, 7th Edition, 1971, of the document Compilation of National and International Nuclear Standards (Excluding U. S. Activities) and extra pages (48-49) of the standards activities sponsored by your organization are enclosed. We would like to start immediately collecting the material for updating this document for the next edition, 8th Edition, 1972, and would appreciate your assistance again this year in this matter.

Using the extra pages enclosed (pages 48-49), or some other method if more convenient, would you please make the appropriate corrections or revisions for the standards activities sponsored by your organization and return them to me by January 1, 1972, if possible. I will send you additional copies of ORNL-NSIC-94, if you so desire.

Thank you for your assistance in this matter.

Very truly yours,

A handwritten signature in blue ink that reads "Doyle M. Davis".

Doyle M. Davis  
Health Physics Division

DMD:cm

Enclosures - 3

November 3, 1971

Dr. William A. Wallenmeyer  
Research Division  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Bill:

Let me express my reactions to the present problems confronting M.I.T.'s experimental High Energy Physics. I read between the written lines and spoken words that the AEC expects us to live with our present support or even less and at the same time support Ting's work also. This is only possible after a severe cut in our present activities. It is important to be clear what such a cut may mean.

Our present activities are, apart from small mop-up operations:

1. The APC (Pless)
2. The Friedman-Kendall-Rosenson group  
(Spectrometer for NAL)
3. The Osborne Luckey-Frisch group  
(Magnetic Analyser for CEA)
4. The Ting group  
(Photon physics at NAL, some work at DESY, ISR)

We consider No. 4 our first priority, we consider No. 2 a most promising and fruitful enterprise, we consider No. 3 an absolute obligation as long as CEA has chances, and we consider No. 1 a source of original and important physics.

We are implicitly under pressure to cut down heavily on No. 1 and not on the others. It figures high in expenses because for a long time it was an instrument development program of a size which, usually, does not take place at a University. (By the way, we tried hard and successfully at CERN to shift instrumental developments to Universities away from

Dr. W. A. Wallenmeyer  
November 3, 1971  
Page 2

CERN. This I consider healthy and good for the field. I don't know why here in the U. S. such things are frowned upon. If the University spirit is good for physics it is also good for instrument-building. The two belong together. See my talk at the Accelerator conference.)

Let me now say a few words about the physics of No. 1. They were first in showing that processes with many emerging particles are really two particle processes. Before their work, all one knew was that the phase space contribution is less than 30 percent, and, in some special cases, less than 10 percent of the total. Their new "Prism-plot" method has shown that in pion-induced processes at several energies the phase space is only  $2 + 2\%$ ! That is a most significant result and a qualitative step forward. Nobody was able to analyze before processes with more than 3 particles emerging. It is simply ridiculous to call that kind of work "routine" or "mediocre".

If we have to severely cut the No. 1 program,, it would mean its discontinuation. There is a minimum level of activity under which one cannot run such an enterprise. This minimum is almost reached now.

This is the dilemma which we are facing. It would be a pretense to think that we could reduce the support of any of our present programs without seriously damaging them. If we are forced to do so, we will have to kill the APC program. Can you or can we take the responsibility for such an action?

Sincerely yours,

Victor F. Weisskopf

VFW:gph

October 14, 1971

Dr. Bernard Hildebrand  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Bernie:

I am somewhat confused by what Peter Demos told me about his phone conversation with you. I believe that we should also get the other letters that came in. It is impossible to quote correctly to other persons the content of a letter which was read to you over the telephone.

On the other hand, I quite agree that the letters should not be given to the rest of the people in the laboratory. They should be kept under lock and seal by Peter Demos and should be read only by him and me. The other people should hear from us by word of mouth the content of these letters.

I hope you agree with this procedure. I would hate to have two letters in my hand and the content of the other letters by uncertain oral conversation.

With best regards,

Victor F. Weisskopf

VFW:gph

*Hildebrand*

October 14, 1971

Dr. William A. Wallenmeyer  
U.S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Bill:

Here are my remarks in regard to your draft of the JCAE Report. I am referring to the copy dated 10/4/71.

First of all, let me say that I found your budget projections which you gave us at the end of the HEPAP meeting very reasonable and expressing essentially my own views of a future development under the given boundary conditions. Some of my remarks related to the draft will reflect that philosophy and will be based on the fact that the draft did not follow that philosophy consistently.

I am making my remarks according to page numbers and not according to the order of importance. The pages refer to the overall pagination:

Page 35 -- Line 5 from the bottom

Your sentence gives the impression that the only purpose of new machines is to distinguish between one theory and another. In my opinion the main significance of the new results is the discovery of new phenomena, for example, the break of the slope in the  $t$ -dependents. I am sure there will be more new phenomena discovered which favor no theory and may reject all of them (at least I hope so).

Page 41

It would be good to say explicitly that the role of equipment in research is very different from the role in industry. In general equipment does not increase the scope and cost of a laboratory; it produces better physics.

*Wallenmeyer*

Dr. William Wallenmeyer  
October 14, 1971  
Page 2

Page 59 -- Paragraph 2

I find this paragraph misleading because it sounds too optimistic. When one reads it one gets the impression that everything is wonderful in our labs at this moment. You do not really say it, but the choice of words you use may make that impression.

Page 60

I believe this page must be rewritten in the light of some of the discussions we had during the last HEPAP meeting. The European competition must come in, but not as the only reason for a vigorous program. Somehow "vitality" as a value must be stressed.

Page 61 and 62

You say on Page 61 that "viable and productive programs continue", but in fact you prove on Page 62 that this is really not so. There is a logical contradiction here which comes from the lack of a clear definition of the two concepts. Probably these pages will be better understood in a new version where those concepts will be better defined.

Page 63 -- Paragraph 2, Line 3

I believe that not only a reduction below the '73 levels, but even a maintenance of the '73 level will seriously jeopardize the situation without a complete reorganization.

Page 64 -- Paragraph 3

Same problem as before. I suppose that the necessity of a 2 to 3% increase will have to be mentioned here. I personally think that only a step function of between \$5- and \$10 million is necessary in order to avoid a complete reorientation of the base program.

Page 69

On this page and in other similar discussions a point should be made that the labs have lived on credit in the last few years. I mean that a maintenance of the current level of support would actually be a lowering of the activities. This is not only because of the escalation, but



Dr. William Wallenmeyer  
October 14, 1971  
Page 3

because of many deferments and postponements that the lab directors have made in the hope of larger funds to come.

Page 79

On this page and on other pages where a shutdown of laboratories is discussed, I wonder whether the point should not be made that laboratories should not be suddenly shut down and that a lot of important physics can be squeezed out by running them for several years on a reduced budget without improvements and innovations.

I hope that this is helpful to you. I found our discussions at the last meeting very interesting and useful. The new HEPAP members are of excellent quality. I can only quote Jerry Rosen saying that I am "grimly enthusiastic" about the work of HEPAP.

Sincerely yours,

Victor F. Weisskopf

VFW:gph

October 14, 1971

Dr. Paul McDaniel  
Director, Division of Research  
U.S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Paul:

During the October meeting of HEPAP we discussed the interaction of the NAL Users Program with the Users Programs at other laboratories. There was some concern expressed that too many potential users and, of course, their associated equipment may be presently tied up with the NAL program and that we may be missing some opportunities to proceed with important experiments by those same users at other facilities on a more timely basis.

We all recognize the great interest of the users in carrying out experiments at NAL and the importance of their being ready when the accelerator and the experimental facilities are ready. We are concerned, however, that compared to the program which actually may be completed at NAL over the next several years, too much of the total national capability already may have been committed. For example, the existence of realistic schedules, even though rough, would assist everyone in improved planning and execution of programs at all laboratories.

We fully recognize the difficulties in making an evaluation at this time because of many uncertainties. Obviously, the primary attention of the NAL staff must be directed towards completing the construction of the machines and preparing for ~~at~~ transition to stable operation. We would, however, like to discuss the problems with you at our next HEPAP meeting.

Cordially,

Victor F. Weisskopf

VFW:gph

*McDaniel*

# UNIVERSITY OF HAWAII

Department of Physics and Astronomy  
High Energy Physics Group

September 16, 1971

Professor A. H. Rosenfeld  
Lawrence Berkeley Laboratory  
University of California  
Berkeley, California 94720

Dear Art:

I note that you are giving the talk on Symmetries and Resonances at the Irvine Conference this December. Since you are a theme speaker on hadron spectroscopy and also have been secretary of the Particle and Fields Division for many past years, I would like to "let down my hair" and make a few observations (undoubtedly exaggerated) concerning the state of the art. Feel free to pass this on to others who might be interested in this subject--perhaps HEPAP?

My basic complaint is that on the subject of hadron spectroscopy for instance, we have been going through the cycle of "on again and off again" for far too long a period. We have had the  $A_2$ -splitting and now Northeastern-Stony Brook says its gone; we have lived with a narrow  $\delta(962)$  shakily since 1965; the  $Z^*$ 's are still objects of violent controversy concerning their very existence (c.f., Trilling's Hawaii lecture notes); and there is tantalizing hints of an  $\omega$  mass degenerate with  $\omega(784)$  but no more than just hints. This is terribly frustrating especially for one who has a private axe to grind (e.g., yours truly who believes in the existence of C-exotic mesons forming Pais C-doublets with the  $\eta'(958)$  and  $\omega(784)$  etc.).

What we need to resolve is to decide once and for all whether exotic hadrons are worth the necessary investment in energy and resources which must be expended to establish their existence or non-existence. If the answer is yes, then a few top notch experimental teams should go after them with high statistics experiments which can fully explore production cross-sections for possible exotic mesons at least two orders of magnitude below those expected for the normal mesons, coupled with sensitivity to resonance widths  $\lesssim 1$  MeV. Likewise, for the  $Z^*$ 's, polarization measurements and phase shift analysis should be refined to the stage where no ambiguity or doubt

*Sam ...*

can possibly exist amongst reasonable men in the field. All these remarks are of course "better said than done," since as mentioned above, enormous resources are involved in a conscious decision to go ahead. But such a valued decision yes or no is a relevant one, since in my opinion a dilatory status for this field, such as exists at this moment, is a harmful one both in terms of morale and for the overall advancement of high energy physics. It may well be that we should decide that exotic mesons and baryons have no high priority in the overall scheme of things. Then we should not be afraid to say so. The motto being, anything that is worth doing is worth doing well or not at all.

I have observed three particle physics conferences (Hawaii, Cornell, and Rochester) during the month of August. They are all excellent Conferences no doubt. However, I cannot escape completely a feeling that we are entering a conformist or conservative era in particle physics with many groups (both in theory and in experiment) performing essentially the same task. This is probably a reflection of the stagnant funding situation and the lack of new and young blood in the field. It is a pity since our field is by its very nature one which demands bold new initiatives.

With best greetings and aloha.

Yours sincerely,

SFT.

San Fu Tuan

SFT:jr

cc: Professor V. F. Weisskopf /

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

*Mail Address*

SLAC, P. O. Box 4349  
Stanford, California 94305

September 8, 1971

TO: MEMBERS OF THE HIGH ENERGY PHYSICS ADVISORY PANEL

V. F. Weisskopf, Chairman	J. R. Sanford
B. C. Barish	A. M. Sessler
B. Cork	G. A. Snow
J. W. Cronin	G. F. Tape
R. R. Rau	S. B. Treiman
B. Richter	W. A. Wenzel
J. L. Rosen	W. J. Willis

Gentlemen:

At Bill Wallenmeyer's suggestion I am sending you copies<sup>\*</sup> of SLAC's proposals for the recirculating linear accelerator as well as a copy of our 15 GeV colliding ring report so that you may have them for your October 8 meeting.

*Sid Drell*

Sidney D. Drell  
Acting Director

SDD:br

Enclosures

cc W. A. Wallenmeyer (5)

*\* under separate cover*

T. Fields  
19 Aug. 1971  
draft

*rewritten*

Dear Dr. David:

The members of the AEC High Energy Physics Advisory Panel (HEPAP) have become increasingly aware of the growing disparity between the U.S. effort in applied superconductivity and the larger, more diversified and better coordinated efforts of the Western European countries, Japan, and the U.S.S.R. *which are extremely well coordinated across national boundaries.* As panel chairman I am writing *At the same time there are significant programs in Japan and the U.S.S.R.* ~~to say that we view this with some concern, and feel that it would be desirable for your office to make an assessment of the situation.~~

Following the discovery of high field superconductors at Bell Telephone Laboratories in 1961, high energy physics research was the first application for which large pieces of experimental superconducting equipment were developed and built. In fact, most of the major advances in superconducting magnet technology have been a direct result of the needs of high energy physics. In spite of this, high energy physics laboratories have neither the funds nor the mandate to continue to carry out long-term *or broad* development programs in this area. Other disciplines which also stand to benefit from advances in superconducting technology face similar problems.

As you know, there are many potential areas in which widespread industrial use of superconductivity may occur within the next ten to twenty years. Some examples of such applications are:

1. Generators and motors; ac and dc; compact, quiet, large capacity, efficient, cheaper than conventional.
2. Underground transmission lines; ac and dc; large blocks of electrical power over long and short distances -- possibly coupled with breeder reactor program.
3. MHD electric power generation; being pursued in Japan, Germany, and the U.S.S.R.
4. Large separation magnet for ore separation and for scrap metal segregation.
5. Large confinement magnets for thermonuclear fusion reactors.
6. Magnetic levitation for transportation systems, presently thought of as train-like.
7. Magnetic energy storage devices.
8. Very long magnetic guide fields; new type energy transmission via charged particle beams.
9. Special purpose electrical machinery.
10. Advanced instrumentation and frequency standards.
11. Special applications in High Energy Physics, and Space Physics, and Experimental Program. Controlled Thermonuclear Research.

Although some of these may not turn out to be successful, it seems certain that there will be more and more practical applications of superconductor technology in the future.

The realities of the present U.S. situation in this technology have been summarized by a subpanel of HEPAP in the observation that the total rate of building superconducting devices in this country is declining. Several of the U.S. superconductor material manufacturers have recently gone through financial reorganizations. This apparently reflects not only the decline of U.S. activity in this field, but also the reduction of orders from Western Europe now that European companies

PROPRIETARY

are developing increasing technical and manufacturing expertise in this field.

It seems to us that the long-term prospects for the large scale use of this technology appear favorable enough that the U.S. should not allow a technological gap to develop. Otherwise, future domestic users may have to buy a large fraction of their materials and devices from foreign sources who will have the advantages of prior large scale manufacturing and operating experience as well as patent protection.

Since most of the new large scale uses of superconductivity not only lie outside the field of high energy physics, but in fact span a very broad range of science and technology, I feel that your office is the proper one to assess this situation so that corrective measures can be taken if deemed necessary.

Sincerely,



THE UNIVERSITY OF ROCHESTER  
DEPARTMENT OF PHYSICS AND ASTRONOMY  
ROCHESTER, NEW YORK 14627

PARTICLE PHYSICS LABORATORY

August 13, 1971

Dr. Paul W. McDaniel, Director  
Division of Research  
U. S. Atomic Energy Commission  
Washington, D.C. 20545

Dear Dr. McDaniel:

This letter is in response to your letter of August 2, 1971, reappointing me to membership on the High Energy Physics Advisory Panel. I willingly accept this reappointment and do so in a spirit which, for want of a fuller and richer description, I can only characterize as grimly enthusiastic.

It is certainly good news that Professor Weisskopf has consented to stay on as chairman.

Sincerely yours,

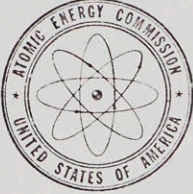
*Jerome Rosen*

Jerome L. Rosen  
Professor of Physics

*W  
8/16/71*

JLR:eb

*Rosen*



UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

August 10, 1971

TO: HIGH ENERGY PHYSICS ADVISORY PANEL MEMBERS

B. C. Barish	A. M. Sessler
B. Cork	G. A. Snow
J. W. Cronin	G. F. Tape
R. R. Rau	S. B. Treiman
B. Richter	✓ V. F. Weisskopf, Chairman
J. L. Rosen	W. A. Wenzel
J. R. Sanford	W. J. Willis

Enclosed are copies of material which Dr. McDaniel indicated last week we would send you. They include:

- (1) The "Hearings before the Subcommittee on National Security and International Operations of the Committee on Government Operations United States Senate" in which Dr. Schlesinger discusses zero based budgeting and planning, programming and budgeting in general.
- (2) Extracts pertinent to the Research Division program from Part 4 of the JCAE Hearings on the FY 1972 budget.

William A. Wallenmeyer  
Assistant Director for High  
Energy Physics Program  
Division of Research

Enclosures:  
As stated

*enc  
sent  
not X'd*

*Wallenmeyer*

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

*Mail Address*

SLAC, P. O. Box 4349  
Stanford, California 94305

PRIVATE

August 2, 1971

Dr. Victor F. Weisskopf  
CERN  
1211 Geneva 23  
Switzerland

Dear Viki:

Thanks for your letter of July 30. I am sorry that you will not chair the special HEPAP meeting on August 2 but, frankly, I think it will not be of crucial importance in relation to the long year plan which the AEC has been asked to generate by the Joint Committee.\*

Let me give you the information I have on the two items raised in your letter.

1. AIP Cuts. The present staff of the Joint Committee is even less competent than usual because Bauser, the Executive Director, was sick during the last month preceeding the issuance of the FY'72 report; therefore the writing of this report was in the hands of Murphy and Shwiller, neither of whom is very knowledgeable and both of whom have an extremely reactionary political outlook. As is customary, the Joint Committee itself takes relatively little interest in these matters so the staff has an undue amount of power. The Joint Committee has been under much pressure as a result of the PPA closing and therefore the staff focused on the fact that AIP were spent lavishly on PPA until the very year of its closing. Since this was clearly a bad investment the committee used deliberately the withholding of AIP funds as a lever to have the AEC take its long-range planning more seriously. Unfortunately AIP funds had already been cut before in ignorance of what it was for by the OMB and so the second cut was the "unkindest cut of all." The distribution of the cuts among the laboratories was done in private by the Joint Committee staff, and I suspect strongly that the complete cut of SLAC money was a vindictive action on the part of the staff against some of the public utterances by some of our faculty, with which you are familiar. I cannot, of course, document this last fact. The timing of these cuts was such that the AEC had no opportunity to appeal.

I took the matter in my own hands and made an appointment with Holifield and Melvin Price, and then also with Shwiller and Bauser.

---

\*Burt just phoned and said the meeting went in a routine way; the principal item was a priority ordering of laboratories.

I explained to these gentlemen via the attached document what the real role of AIP was in high energy physics and all four of them put the blame back on the AEC staff by saying "Why didn't anybody tell me about this before?" They thus candidly agreed that this cut was a mistake but proclaimed that at this time there was nothing they could do about it. I then wrote the attached letter to Senator Pastore since I was told that if a superhuman effort were made, restoration of these cuts is possible in the appropriation process. Although as a practical matter I consider the damage to be irreversible, I hope that my dialogue will sensitize the JCAE to this problem so that this kind of thing will not be handled in such a cavalier fashion next year.

2. Equipment Cuts. This matter was more complicated. The Joint Committee staff, again in ignorance, cut out the funds for the joint NAL-Argonne computer. In this case the Controller was able to appeal this decision by agreeing to find money within the budget to fund this computer, provided the authorization was permitted to go through. As a result the AEC lost \$10 million of over-all equipment money of which \$3 million went to physical research and \$1 million to high energy physics. Again this appears unappealable at this junction.

3. Long-range Planning. I tend to think that Schlesinger's chairmanship will be more of a blessing than a detriment in drawing up a meaningful long-range plan. I have ascertained that he has not been shown the F-P-W document but that the OMB staff under him is very familiar with it. Being familiar with the ways of the OMB I think that Schlesinger will in fact be helpful towards reducing the AEC staff study to be more responsive to what the Congress and OMB actually want, and I think this means in practice it will not end up being too different from what we actually wrote. Wallenmeyer has seen our report; I let him have it overnight on the condition that he return it to me uncopied and this commitment he has kept. He therefore knows what it says and I think it would not be useful to send him a few pages because he can regenerate the curves under our assumptions probably more competently than we did ourselves.

Wallenmeyer is going through a cycle to obtain scientific input to his report. This cycle consists of subpoenaing the different laboratories and having them answer various questions of the "when did you stop beating your wife" type. I am enclosing the copy of the letter which has been sent around to laboratory directors. The HEPAP August 2 meeting serves the same purpose. However the decision of the General Manager is that the report which the AEC will write will not be recycled back through HEPAP or the Laboratory Directors because the feeling is that its recommendations would certainly leak

August 2, 1971

to the scientific community and lead to various appeals carried by individual congressmen before the report has even been shown to the Congress.

I am also including a copy of the present draft of the report outline and its schedule which deliberately (in contrast to earlier drafts) omits a second HEPAP review. SLAC was the first victim of the AEC subpoena. Dick Neal and I met with Wallenmeyer and McDaniel last week. We submitted to him four levels of budgets:

- A. A full exploitation budget
- B. A 75% utilization budget
- C. An "as is" budget which is about 60% utilization
- D. The "last three years before shutdown" budget.

We also discussed extensively the form of his report. I mainly criticized that he did not emphasize construction and technological innovation actively enough; the problem is that Wallenmeyer naturally is trying to make the strongest case for FY'73 funding which will become a clear emergency unless there is a step increase. Since NAL will require operating money and since it would be totally irresponsible to close down any laboratory next year, and since both the existing laboratories and the user community are under funding pressures, there is no decent solution except through a step increase. On the other hand I feel that in order to make a convincing case for the future Wallenmeyer simply must identify the future viability of his program with maintaining U.S. facilities on a technological frontier, and I advised him to point with pride to the fact that in the past something like one-third of the funds in high energy physics have been spent in innovation. I specifically suggested to Wallenmeyer that in response to the Joint Committee's questions as to "viability" and "productivity" he should identify "viability" as keeping the facilities on a competitive technological frontier and with "productivity" to exploit the existing installations adequately.

Chances are that Wallenmeyer will agree to a priority listing of existing facilities but will try to avoid actually producing fiscal plans for the next decade which he considers optimum under various levels of spending (as we have done). Whether he will get away with avoiding formulating such detailed plans under pressure from either Mr. Schlesinger or the OMB again I do not know.

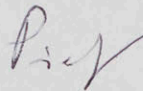
Dr. Victor F. Weisskopf

-4-

August 2, 1971

I hope this will give you an outline of the current, rather murky situation; Carl York has just come back from vacation and is trying to understand what has happened. I am seeing Caspar Weinberger again, hopefully three days from now, to brief him on long-range planning, the role of capital funds in high energy physics, and tell him some of the recent excitement in high energy physics; I hope this might be useful - David encouraged me to see him again. I will see you in Morges, if not sooner.

With best regards,



W. K. H. Panofsky  
Director

encs.

UNCLASSIFIED

Congressional Submission  
FY \_\_\_\_\_ 1972

Construction Project Data Sheet

San Francisco  
Operations Office

Physical Research  
Program

1. Title and Location of Project: Accelerator improvements, Stanford Linear  
Accelerator Center, California

2. Project No.: 72-4-e

3. Date A-E Initiated: 1st Quarter FY 1972

5. Previous Cost Estimate:

3a. Date Physical Construction Starts: 2nd Quarter FY 1972

Date: \$ None

4. Date Construction Ends: 4th Quarter FY 1973

6. Current Cost Estimate:

Date: 12/70 \$475,000

7. Obligation and Cost Schedule:

Fiscal Year	Obligations	Costs
1972	\$ 475,000	\$ 140,000
1973	0	260,000
1974	0	75,000

8. Brief Physical Description of Project:

This project provides for additions, modifications, and improvements to the accelerator-switchyard-target area complex at the Stanford Linear Accelerator Center (SLAC). The items listed are based on current program planning, and are subject to later revision based on technological and research requirements of the programs they support. No significant R&D program is anticipated as a prerequisite for design and construction of the sub-projects currently planned.

- A. Accelerator Control System Improvements ..... \$ 250,000  
(expanding control and analyzing systems)
- B. Machine Systems Improvements ..... 225,000  
(providing a positron source, a C-beam switching system; and expanding the overhead crane coverage in B-target room)
- Total Project Cost ..... \$ 475,000

9. Justification of Need for and Scale of Project:

A. Accelerator Control System Improvements

Items planned under this sub-project are intended to increase the operating efficiency of the accelerator. Included is the expansion of the fast klystron population control system and the energy transient compensation system which will detect and compensate for small energy variations along the accelerator; the installation of a fast and reliable method of measuring the emittance of the accelerator, improvement to the beam analyzing station II which will allow beams of up to 14 GeV and 60 PPS to be dumped safely at Sector 20. Also included is a fine energy control system and an improved phase system to satisfy the increasing requirements of experiments for narrower energy spectrums. The addition of a backup alignment line pipe vacuum pump system is planned. Included also in this sub-project is the expansion and improvement of instrumentation systems including interlocks and the intercommunication system between the two control rooms. Also planned is an interface between the accelerator and the computer which will allow computerized steering of the accelerator beam and will provide RF steering compensation.

UNCLASSIFIED

# UNCLASSIFIED

Construction Project Data Sheet - continued

2-4-e Accelerator improvements, Stanford Linear Accelerator Center, California

Physical Research Program

## B. Machine Systems Improvements

This sub-project will provide several new systems which will increase the versatility of the accelerator. Included in this sub-project is the installation of a positron source at the end of Sector 1, to increase the energy from the present 13 GeV source to 20 GeV. Additions to the material handling system in the Research Area will extend the crane coverage in the B target room and make it possible to transfer loads from either the beam switchyard crane or the End Station B crane. Also included is a C-Beam switching system to provide pulse-to-pulse switching capability for experimenters in the C-Beam area.

## 10. Details of Cost Estimate:

See Description in Item 8. The estimated costs are preliminary and in general serve to indicate the magnitude of each project. These costs include engineering, design, inspection and contingency allowances.

## 11. Major Contractor and Intended Type of Contract:

Design will be by the Stanford Linear Accelerator Center (SLAC) Staff. To the extent feasible, construction and procurement will be accomplished by fixed-price subcontracts awarded on the basis of competitive bids.

UNCLASSIFIED



Application of AIP Funds at SLAC

<u>FY1967 AI</u>	<u>Dollars in Thousands</u>
LRL 82" Hydrogen Bubble Chamber	\$199
Video Switching	21
Klystron Population Management	41
Remote Balancing of BPM Diodes	18
Switched Attenuation for Automatic Phasing	12
180° Phase Shift for Sub-booster	21
Temporary Bldg. 107	47
CCR-DAB Communications	<u>39</u>
	<u>\$398</u>
<u>FY1968 AI</u>	
BSY Control System	\$297
Positron Source Improvements	33
Keybank Improvement	21
Motor Generator Set	203
Injector Gun Improvements	93
Automatic Readiness Analysis	64
Pulsed Steering and Focusing	125
Pulsed Beam Loading Compensation	<u>28</u>
	<u>\$864</u>
<u>FY1969 AI</u>	
B-Beam Slit	\$ 69
2 MVA Transformer	13
T. A. Utility Tunnel	115
A.C. Distribution	50
ESB Water Distribution	33
Control Room Improvements	20
Tune Up Dump	49
Computer Improvements	29
DAB East Console	161
Control Computer Disc	33
T.V. System Improvements	22
General Control System Improvements	<u>32</u>
	<u>\$626</u>

<u>FY1970 AI</u>	<u>Dollars in Thousands</u>
Pulsed Steering & Focusing	\$ 48
Data System Expansion	20
Short Pulse Generation	10
Pulsed Phase Closure	16
Positron Source	23
DAB Instrumentation	36
DAB Rack & Cabling Expansion	31
BSY Magnet Warning System	15
DAB Computer System Improvements	20
R. A. Instrumentation	17
CCR-DAB Consolidation	49
Cooling Tower Cell	94
North Yard Expansion	103
4160 V Extension	12
Utility Tunnel	63
5 KV Contactors	42
2 MVA Unit Substation	<u>41</u>
	<u>\$640</u>

<u>FY1971 AI</u>	
Pulsed Steering & Focusing	\$150
Data System Expansion	72
Short Pulse Generation	7
DAB Instrumentation	201
DAB Rack and Cabling	33
DAB-CCR Consolidation	66
DAB Computer System Expansion	31
Beam Instrumentation	6
CCR Scope Display in DAB	21
Ground Current Relay System	13
Replacement Transformer	13
End Station B Utility Improvements	64
North Yard Improvements	<u>273</u>
	<u>\$950</u>

WP

THE ROLE OF  
"ACCELERATOR IMPROVEMENT PROJECT" FUNDS AT SLAC

Research in High Energy Physics is inherently a large scale undertaking. Execution of such experiments requires large equipment and installations which by current fiscal rules involve construction and the addition of capital assets.

At the AEC's accelerator laboratories, supporting funds are divided into two fund categories. One is "operating" funds used to maintain the laboratory as it exists and to support operation of the facility. The other is called "plant acquisition and construction" funds, used to acquire capital assets. The AEC expects contractors to exercise industrial accounting practices of high standards. Therefore, under this second fund category, capital assets are accounted for in three classifications:

1. Capital changes to the "conventional" plant as distinct from accelerator and research equipment. ("GPP: General Plant Projects"). A small addition to an existing building would be an example of GPP, as would be expansions of roads.
2. Equipment items including large experimental detecting devices. ("Capital equipment not related to construction.") The acquisition of SLAC's new storage ring colliding beam facility, SPEAR, now being installed, falls in this category. A multitude of equipment purchases including general purpose test equipment and beam handling devices such as magnets and power supplies are also funded under this classification.
3. Upgrading and expansion of the accelerator itself and its support systems. ("AIP: Accelerator Improvement Project.")

It is this third subclass of activity (AIP) which is the subject of this note.

Suggestions, recommendations, and requirements for AIP originate in several ways. These needs stem directly from the approved or planned experimental program of research for the laboratory.

### AIP as Part of the Experimental Program

SLAC as a National Facility is available to qualified research scientists from all over the United States. Proposals for experiments are received by SLAC, are analyzed by the SLAC staff, and are then presented to the "Program Advisory Committee (PAC)," a committee of physicists from various institutions, which meets at SLAC several times a year to advise SLAC's Director on the machine's research program. The SLAC staff identifies to the PAC the requirements each experimental proposal imposes on SLAC in terms of personnel support, computer load, supplies, equipment and modification or expansion of facilities. *The experimental proposals accepted often require modification to or expansion of the research facilities at SLAC.* Such needs include expansion of electrical and mechanical utilities and refinements of monitoring and control systems to provide experimenters with the required beams and related measurement data. By the fiscal rules applicable to the AEC's laboratories, AIP funding is required for such modifications.

*Were such AIP projects not to be carried out, SLAC would have to turn away experimenters whose special requirements could not be accommodated; thus the very nature of the experimental program would be restricted.*

### AIP as a Tool to Increase the Efficiency of Utilizing the SLAC Accelerator

Another need for AIP activity stems from the sheer number of research groups who use the SLAC facilities. Without modernization and improvement of facilities there would not be enough "beam time" to accommodate more than a small percentage of all the people who need to use SLAC's electron beam. Thus SLAC continually strives through AIP work to increase operating efficiency, reliability and economy in support of its research program in order to use each operating dollar more productively.

There are three ways of improving beam use efficiency. The first is to increase the ratio of the number of hours the beam can actually be used for productive research to the number of hours the beam is in operation. (The latter quantity is governed by the availability of "operating funds.") The way to do this is to decrease the number of hours required for set-up, testing maintenance, reset-up, and switch over of the beam between experiments. If AIP projects permit an increase in the number of experimental positions, a succeeding beam line can be set up while a previous beam is still in use. Thus research can be carried out whenever the beam is "on."

The second way of improving beam use efficiency is to take advantage of SLAC's capability of running "simultaneous" (or more precisely, "interlaced") beams. If the entire capacity of the beam is not required by an experimenter, the beam can be "shared." One research team can be carrying out an experiment

with the beam in one area while another team can be carrying out its own experiment with the beam in another area. In fact, under ideal conditions, SLAC is able to provide up to six "simultaneous" beams, each of unique energy and intensity and each delivered to an individual research area or experimental device. This capability is due to the fact that SLAC's beam emanates from the accelerator in short pulses at a rate of up to 360 per second. Each of these pulses can be switched and aimed to a particular experimental set up.

In 1967, SLAC's "multiplicity efficiency" was a little less than 1. In effect only one beam was available at a time and that not all the time. By 1971, SLAC's multiplicity efficiency on the average exceeded 3.1. Thus at present, more than three physics research hours are realized with each hour of beam-on time; it is AIP funding which largely made this dramatic improvement in efficiency possible.

The third path to improved efficiency of using the SLAC beam is through increased operating reliability and performance of the accelerator itself.

When SLAC was first turned on in 1966, everything appeared to go well. The accelerator was operating as hoped and quickly reached design energy. But these initial tests were at low current (few electrons per second). As the current was increased, an unexpected phenomenon called "beam break-up" was encountered. As the current in the beam approached 40% of design current, additional electrons began to be lost from the beam so that full design current could never be reached. With the use of AIP, additional focusing magnets were installed along the accelerator to contain these wandering electrons so that full design current was reached and exceeded.

The original design of SLAC incorporated two control centers, one for control of the beam during acceleration and one for steering and handling the accelerated beam for the research physicists. This was required because of the separate and unknown complexity of the two phases. Over the years, the beam stabilized, operations became routine, and consolidation could begin to take place. With AIP, interconnecting data and communications lines were installed to combine duplicated effort. Finally, plans are underway to amalgamate the two control centers into one, thus reducing the man hours (and therefore costs) involved in control and increasing greatly the efficiency of beam handling.

The SLAC beam receives power from 240 klystron amplifier tubes. In the past, whenever a particular klystron failed, the quality of the beam was degraded while a crew installed a replacement klystron. AIP permitted installation of computerized controls which automatically switch a new klystron from

"readiness" to "on line" the instant indications of impending failure appear. This results in a constant beam, independent of klystron failure and the continuity of research data accumulation is assured.

Similarly AIP permitted computer control to be applied to the magnets which switch and direct the accelerated beam to the various research areas. This results in faster beam setting and resetting, back-to-back research operations, less operator time, and more physics hours per operating hour.

#### Summary

The task of managing SLAC as a National Facility is to generate the highest volume of creative research in experimental physics within the total of funds available. To do so effectively within the accounting principles imposed requires a mix of operating and capital funds. The latter category again requires a mix of "capital equipment not related to construction" and of "construction" funds, i.e. GPP and AIP funds. For an experimental program such as the one supported by SLAC *such capital funds primarily serve to optimize the effectiveness of the organized experimental program*; they secondarily provide for expansion of basic plant if this is specifically provided for.

The above examples show how AIP funds closely support the operation of the laboratory by improving accelerator operating efficiency and by enabling the expansion of physics research at SLAC. AIP funds are a relatively small fraction of the total annual new obligational authority; yet they exert a large leverage on the quality and quantity of the physics research produced.

30th July, 1971.

Professor W.K.H. Panofsky  
Director  
SLAC  
P.O. Box 4349  
STANFORD, California 94305  
U.S.A.

*Panofsky*

Dear Pief,

You probably heard the collection of bad news for high energy physics. One is the appointment of Schlesinger and the other the further cuts of the Joint Committee. The reasons for the latter actions are not quite clear to me. On the one hand, they seem to support HEP strongly, and on the other hand, they cut down the equipment and AIP funds. The latter action may even have some logic, since they seem to be dissatisfied with giving AIP funds to laboratories which will be closed soon. I also disliked the large AIP sums given to Argonne. However, the complete cut of the SLAC money does not fit into this reasoning.

I am writing to you because of the following problem. As you know, the AEC asked the Joint Committee to draw up a plan for funding HEP in the next five years. It would be helpful if Wallenmeyer's plan did not differ too much from our plan which we gave to David. Do you think that we could take the responsibility of breaking the secret and sending our report to Wallenmeyer? Could you think about this and communicate with Fitch? If both of you are in favour, I am in favour, too. One also could send him only a few pages, such as the curves for the 5% yearly increase.

There is a special HEPAP meeting on August 2 on this issue. Unfortunately, I cannot be there, but Richter will tell you.

I am looking forward to seeing you in September when the situation will be a little clearer.

Best regards,

Yours sincerely,

Victor F. Weisskopf

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

*Mail Address*

SLAC, P. O. Box 4349  
Stanford, California 94305

July 26, 1971

The Honorable John O. Pastore  
United States Senate  
3215 New Senate Office Building  
Washington, D. C.

Dear Senator Pastore:

During my trip to Washington last week I tried unsuccessfully to make an appointment with you; I am therefore writing instead to communicate my concern about the cuts in Accelerator Improvement funds recommended by the Joint Committee for Atomic Energy in its authorizing report for the FY1972 budget.

I had the privilege last week of discussing this problem with Congressmen Holifield and Price and also with Captain Bauser and Colonel Shwiler of the JCAE staff. It appeared from these discussions that these cuts were recommended without full knowledge of the important role Accelerator Improvement funds plays in support of the *ongoing* experimental program and toward improving the *efficiency of operations of the AEC's accelerators*.

By the fiscal rules of the AEC and the Congress, activities classified as Capital Improvements or Construction may not be financed from operating funds. Yet, because of the large size of high energy physics experiments, many research programs require such capital funds for their effective and safe execution. Therefore the cut of Accelerator Improvement funds as recommended by the JCAE will actually decrease the efficiency of exploitation of the AEC's high energy facilities; this result is clearly contrary to the expressed desires of the JCAE: The Committee in its report expresses deep concern that due to funding limitations the Commission's High Energy facilities are under-utilized and therefore inefficiently operated. As documented in the attached note for the case of SLAC (SLAC Accelerator Improvement funds were cut to zero, in contrast to all other high energy installations) Accelerator Improvement funds have in the past materially increased efficiency of operations and are expected to do so in the future; moreover a substantial fraction was to correct safety problems engendered by the unprecedented high intensity of SLAC's beam.



The Hon. John O. Pastore

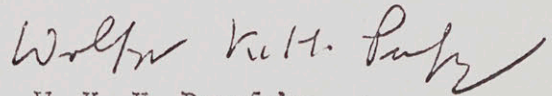
-2-

July 26, 1971

Considering that the JCAE action apparently resulted from a problem in communication, I would like to inquire whether corrective action, possibly in the Appropriation process, could be considered.

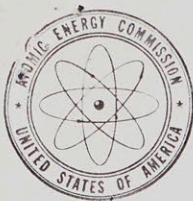
I was very sorry to miss you last week.

With best personal regards,



W. K. H. Panofsky  
Director

cc: Congressman Holifield  
Congressman Price



UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

JUL 16 1971

Professor W. K. H. Panofsky, Director  
Stanford Linear Accelerator Center  
Stanford University  
Post Office Box 4349  
Stanford, California 94305

Dear Professor Panofsky:

The Joint Committee on Atomic Energy recently issued its FY 1972 Authorization Report, a copy of which is enclosed. You should read this immediately. A number of significant comments are made regarding the High Energy Physics Program. A significant excerpt from the report requiring action on our part, states:

"...Therefore, the Joint Committee recommends that the AEC carefully examine the minimum level of support necessary to keep each of its high energy accelerator laboratories, including the NAL, viable and productive, and that it develop a priority listing of which accelerators should be kept operating should future funding be less than the minimum necessary to effectively support each of the six laboratories. The Commission should furnish the committee a report on its evaluation no later than December 31, 1971.

"The Joint Committee believes that these six laboratories are highly deserving of the necessary support to keep each of them operating at their maximum level of productivity...."

We are proceeding to carry out an analysis of the High Energy Physics Program to provide a report to the Joint Committee on Atomic Energy by the requested date. In order to prepare the study, considerable input is required from the laboratories. Some of the specific information required is indicated in the following questions:

1. What is your definition of a viable and productive program for your accelerator? What are the minimum funding requirements and the mode of operation for your accelerator associated with a viable and productive program under each of the following assumptions:
  - a. continued operation on a long-term basis
  - b. continued operation in a reduced mode
  - c. short-term operation assuming accelerator shutdown in a few years

WKP  
7/20/71

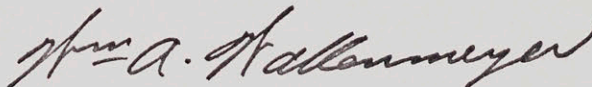
JUL 16 1971

2. What would be the impact if we could not meet the minimum funding levels for continued viable long-term operation? Should a shutdown be programmed?
3. If shutdown of your accelerator is required in the near future, what would be an appropriate procedure and schedule for shutdown?
4. What is the significance, importance, and uniqueness to the overall U. S. high energy physics program of the research which you plan to carry out at your accelerator during the next few years? From the physics point of view, when do you think your accelerator should be scheduled for shutdown?
5. What criteria should be used in determining a priority listing among the high energy accelerators?
6. Please discuss what your program would be if operated near the practical maximum level. What are the funding requirements and the mode of operation for your accelerator associated with this program?

Where appropriate, your responses above should include a discussion of the impact on physics. In presenting fiscal discussions, you should include an indication of the relation to the various budget subactivities. A discussion of accelerator operating schedules for the various cases should also be included.

We will be in touch with you very shortly to set up a time for a meeting with you and your key high energy staff to discuss the issues concerned with the report.

Sincerely,



*for* Paul W. McDaniel, Director  
Division of Research

Enclosure:  
As stated

cc: E. C. Shute, SAN (2)

Privileged  
Information

WT DRAFT  
7/23/71

DISCUSSION PAPER

1971 STUDY OF THE HIGH ENERGY PHYSICS PROGRAM

I. Background

The AEC supported High Energy Physics Program presently includes four proton accelerators (the 200-500 BeV synchrotron at the National Accelerator Laboratory, the 33 BeV AGS at BNL, the 12.5 BeV ZGS at ANL, the 6 BeV Bevatron at LRL) and two electron accelerators (the 22 BeV linac at SLAC and the 6 BeV CEA). In its FY 1972 authorization report, the Joint Committee on Atomic Energy made the following comment with regard to these facilities:

"The Joint Committee believes that these six laboratories are highly deserving of the necessary support to keep each of them operating at their maximum level of productivity. These laboratories provide the fundamental knowledge upon which many other basic advances in science and technology depend. High-energy physics also is a highly competitive field among nations as evidenced by the advanced machines in operation or under construction in the Soviet Union and in Europe. It is, of course, in the national interest that the United States remain in the forefront of this field of scientific endeavor."

The Committee noted that it was concerned about the future of the five existing high energy accelerators supported by the AEC, once the accelerator at NAL, with its large incremental needs, begins full operation. They point out that a steady decline in the high energy physics budget in recent years has resulted in less than optimum operation at these five laboratories and that obviously the trend of declining budgets for high energy physics must be sharply reversed if the NAL and the five existing laboratories are to be adequately funded. They note that if

Privileged  
Information

budget priorities prohibit the necessary increase in funding for high energy physics, the Committee must evaluate very critically, if the available support is spread too thinly. They then state:

"Therefore, the Joint Committee recommends that the AEC carefully examine the minimum level of support necessary to keep each of its high energy accelerator laboratories, including the NAL, viable and productive, and that it develop a priority listing of which accelerators should be kept operating should future funding be less than the minimum necessary to effectively support each of the six laboratories. The Commission should furnish the committee a report on its evaluation no later than December 31, 1971."

This is a particularly appropriate time for this study since there is a need for a major increase in operating funds in FY 1973 to bring NAL into experimental operation, and the precarious position of the remaining laboratories after several years of declining budgets warns against further reductions in their programs.

Our current plans contemplate that the analysis and report would be prepared by Division of Research staff with input and advice from laboratory officials and the High Energy Physics Advisory Panel. We would also plan to discuss the report during its preparation with the General Advisory Committee and the Office of Science and Technology, perhaps including the President's Science Advisory Committee. The contemplated timetable for preparation of the study is as follows:

- Meetings with Laboratory Officials ..... July 28 - Aug. 17
- Meeting with HEPAP ..... Aug. 2
- First Draft circulated within AEC ..... Sept. 1
- More complete draft available for discussion with Commission, GAC, OST, OMB, etc. .... Oct. 1
- Final report ..... Dec. 31

*2  
HEPAP*

## II. General Observations

In responding to the JCAE's request, we plan to prepare a report which primarily emphasizes the realistic needs of the program in the immediate future and conveys the urgency for a step function increase in operating funds to permit the National Accelerator Laboratory to be brought into operation while at the same time maintaining an effective base program at lower energies. The plan contemplates developing a five-year plan which concentrates largely upon effective exploitation of the facilities available today (including NAL). The importance of new construction items to continued viability and productivity of the program will be indicated, but detailed plans for specific major new construction items will not be stressed. The report will explain the use of the different types of annual funding (operating, equipment and accelerator improvements) and the need for a proper mix of all three types of funds.

*How detailed?*

*more stress!*

In responding to the JCAE request regarding the minimum level of funding for a viable and productive program, care will be taken to discuss and establish definitions for viable and productive programs and to define the criteria used to assess a program. The report will make a distinction between the different forms of viable programs based on a number of different assumptions, namely, continued operation on a long-term basis, continued operation in a reduced mode and short-term operation assuming accelerator shutdown in a few years. The point will be made that viability is not determined solely by funding and facilities but that the morale and psychological disposition of the people in the program are also a

factor. The criteria used in establishing priorities among the accelerators will be discussed. The report will also contain discussion of the philosophy of shutting down accelerator facilities. In particular, it will be indicated that abrupt shutdowns are disruptive and inefficient and that a phase-out period of perhaps four years is required.

### III. Information Needed for Study

In order to prepare the study, considerable input is required from the laboratories. Some of the specific information required is indicated in the following questions:

1. What is your definition of a viable and productive program for your accelerator? What are the minimum funding requirements and the mode of operation for your accelerator associated with a viable and productive program under each of the following assumptions?
  - a. continued operation on a long-term basis
  - b. continued operation in a reduced mode
  - c. short-term operation assuming accelerator shutdown in a few years.
2. What would be the impact if we could not meet the minimum funding levels for viable continued long-term operation? Should a shutdown be programmed?
3. If shutdown of your accelerator is required in the near future, what would be an appropriate procedure and schedule for shutdown?

*Comments  
answered  
to individual  
folks.*

4. What is the significance, importance, and uniqueness to the overall U. S. high energy physics program of the research which you plan to carry out at your accelerator during the next few years? From the physics point of view, when do you think your accelerator should be scheduled for shutdown?
5. What criteria should be used in determining a priority listing among the high energy accelerators?
6. Please discuss what your program would be if operated near the practical maximum level. What are the funding requirements and the mode of operation for your accelerator associated with this program?

Where appropriate, your responses above should include a discussion of the impact on physics. In presenting fiscal discussions you should include an indication of the relation to the various budget subactivities. A discussion of accelerator operating schedules for the various cases should also be included.

#### IV. Tentative Outline of the Report

- ✓ A. Digest
- ✓ B. Introduction
  1. Background - brief statement of trends of past few years leading up to present status
  2. JCAE report and charge from JCAE
  3. Goals of study



C. High Energy Physics Research

*History of movement in frontier. History of subdomains*

- 1. Brief history of the field -- what is HEP?
- 2. Current status of the field and recent accomplishments.
- 3. Prospects and goals for the near future.
- 4. Interaction with society -- impact on other fields *cultural values*

D. Research viability and productivity

*mix of data gathering + explicit record. Theoretical advances from both. Need for diversity of tools.*

- 1. Record of research productivity
- 2. Necessity for new and modernized facilities to maintain productivity
- 3. Importance of a continual influx of new people
- 4. Human factors affecting productivity

E. Organization of the U. S. Program

- 1. Laboratories
  - a. Facilities
    - i. Characteristics and operating modes of each facility
    - ii. Role of each facility in providing coverage of the high energy domain
  - b. Laboratory research groups
  - c. Laboratory support resources
- 2. University
  - a. The user group concept
  - b. Mode of operation of research groups and trends for near future
  - c. Theory

3. Interaction between University groups and laboratories
4. Manpower -- supply, demand, trends
- F. The International High Energy Physics Program
  1. Foreign facilities
  2. International Collaboration
- G. Program plans and fiscal considerations
  1. Background statement
    - a. AEC role in Federal support of HEP
    - b. Types of funding -- operating, equipment, AIP, construction
  2. Recent history
    - a. Data and graphs with explanations
    - b. Impact -- closure of PPA reduction of CEA, reduced operations, etc.
  3. Five year plan for well-scoped program
    - a. Data and graphs with explanations
    - b. Discussion of philosophy
      - i. Bring NAL up to good level
      - ii. Maintain effective base at lower energies
      - iii. Users' funding
      - iv. Improvements to existing facilities
      - v. Need for new facilities
  4. Minimum level of support for viable and productive program
    - a. Definitions of viable and productive programs
    - b. Criteria to determine viable and productive programs

*diversity*

*new technology*



2

- c. Discussion of a number of "minimum" levels for each facility
- d. Generalized discussion of coupling of facilities in order to provide coverage of overall high energy domain
  - i. Continuing long-term operation with growth
  - ii. Continuing long-term operation with no growth assuming it maintains its present domain of responsibility
  - iii. Short-term operation with pre-determined shutdown date

#### 5. Accelerator priorities

- a. Criteria for establishing priorities
  - i. Economics of accelerator operations
  - ii. Program balance
  - iii. *competition frontier*
- b. Consideration of impact on laboratory
- c. Need for replacing unique features of a shut-down facility
- d. Non-productive costs and problems resulting from shut-down
- e. Philosophy of an appropriate shut-down schedule
- f. Impact on users
- g. Priority listing

#### H. Conclusion

- 1. Reiterate significance of high energy physics and the need for a viable and productive program

2. Discussion of minimum levels and priorities provided in response to JCAE request and suggest alternative means of responding to restrictive budgets.
3. Stress urgency to bring NAL into operation while maintaining effective base program at lower energies.

# THE ROCKEFELLER UNIVERSITY

New York, N.Y. 10021

June 21, 1971

Prof. Victor F. Weisskopf  
Massachusetts Institute of Technology  
Department of Physics  
Cambridge, Massachusetts 02139

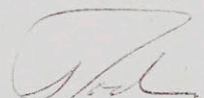
Dear Viki:

Thank you for your letter and your kind remarks. Although I did not mention it to you at the last HEPAP meeting, I received an invitation from Seaborg during the meeting to accompany him on an official visit to the Soviet Union in August. This trip would last from the 3rd to the 20th and would, in effect, take up all of the spare time I have this summer. I rather feel that I should accept the invitation as a matter of duty, although I have very mixed feelings about spending my time in this way. Since I now plan to accept, I do not see how I can accept the responsibility for the HEPAP Sub-Committee and, therefore, suggest that you appoint one of the other members as Chairman.

If it should work out that way I would be willing to give whatever help I can to the Sub-Committee; but it does seem unlikely that time will permit me to accomplish very much.

With best regards,

Sincerely yours,



Rodney L. Cool

p1

June 11, 1971

Professor Rodney Cool  
Department of Physics  
Rockefeller University  
York Avenue & Sixty-sixth Street  
New York, New York

Dear Rod,

After you left the HEPAP meeting last Tuesday, I was suddenly aware that you will no longer be with us. I had an acute attack of sentimental sadness, which was quickly cured by thinking about your own feelings.

Anyway, your duties are not quite over yet, since I would like you to take over the responsibility of corralling the four members of HEPAP present at NAL this summer: Jerry Rosen, Sam Trieman, Jim Sanford, and yourself, to discuss the Sandweiss report. If it can be transformed into a sensible report, please do it; if not, let HEPAP know why not. Sandweiss can be called to come to NAL any time; he is at SLAC this summer, as far as I know.

As you can see, you are not completely dismissed from HEPAP. In fact, I believe that you should still be a member of HEPAP through the October meeting so that you can tell us about the situation regarding the Sandweiss report. I hope that this is not imposing too much upon you. After all, it is only adding a very small percentage to the time and worry which you have already expended for the committee.

With many thanks. I am looking forward to seeing you in Geneva.

Sincerely yours,

Victor F. Weisskopf

VFW/ss

June 11, 1971

Professor Rodney Cool  
Department of Physics  
Rockefeller University  
York Avenue & Sixty-sixth Street  
New York, New York

Dear Rod,

After you left the HEPAP meeting last Tuesday, I was suddenly aware that you will no longer be with us. I had an acute attack of sentimental sadness, which was quickly cured by thinking about your own feelings.

Anyway, your duties are not quite over yet, since I would like you to take over the responsibility of corralling the four members of HEPAP present at NAL this summer: Jerry Rosen, Sam Trieman, Jim Sanford, and yourself, to discuss the Sandweiss report. If it can be transformed into a sensible report, please do it; if not, let HEPAP know why not. Sandweiss can be called to come to NAL any time; he is at SLAC this summer, as far as I know.

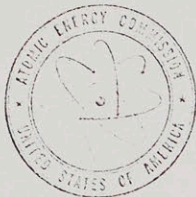
As you can see, you are not completely dismissed from HEPAP. In fact, I believe that you should still be a member of HEPAP through the October meeting so that you can tell us about the situation regarding the Sandweiss report. I hope that this is not imposing too much upon you. After all, it is only adding a very small percentage to the time and worry which you have already expended for the committee.

With many thanks. I am looking forward to seeing you in Geneva.

Sincerely yours,

Victor F. Weisskopf

VFW/ss



UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

JUL 8 1971

Identical ltrs. to:

W. A. Wenzel, LRL  
B. Cork, ANL  
R. Rau, BNL  
W. Panofsky, SLAC  
K. Strauch, Harvard U.

Professor Robert R. Wilson  
Director  
National Accelerator Laboratory  
Post Office Box 500  
Batavia, Illinois 60510

Dear Professor Wilson:

We have been asked by the High Energy Physics Advisory Panel to compile for them a survey of the various spectrometers that are available or planned at the high energy accelerators. It is anticipated that this survey information should also prove useful to many others of the high energy physics community, and it is planned to make the compilation available to each laboratory and each university principal investigator.

A general outline for the requested information is provided here to facilitate tabulation and comparison. Although the principle intent is to provide details on spectrometers of general use, we would like the tabulation to include all spectrometers with the exception of those that are minor or highly transient.

Your assistance in supplying this information for your laboratory will be greatly appreciated. It would be helpful to have your return of this information by August 15, 1971.

Sincerely,

William A. Wallenmeyer  
Assistant Director for High  
Energy Physics Program  
Division of Research

Enclosure:  
Spectrometer Outline

bcc: ✓ V. F. Weisskopf, MIT  
J. Rosen, U. Rochester  
A. Sessler, LRL

*Wallenmeyer*



d)

type of physics.  
(proposed.)

If so, what is  
rate, receive

or planned.  
energy-range  
(appropriate.)

flux,  $\Delta P/P$ ,  
(? Describe.)

counters, etc.  
efficiencies, acceptance,

- memory  
type, other  
event if

users

13. Cost-  
(What is the capital investment? Estimate operating cost. Magnitude of present effort?)
14. Other-  
(List any other information that would be helpful in evaluating the performance or potential use of the device. Possible modifications?)
15. Attachments-  
(Attach any publications, reports, or other material deemed relevant.)



UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

JUL 8 1971

*for your info*

Dr. Ch. Peyrou  
CERN  
1211 Geneva 23  
Switzerland

Dear Dr. Peyrou:

Please excuse my delay in answering your letter (D.Ph.II/ChP/ge) of June 10, 1971. I was out of town for an extended time when it arrived.

The AEC does have on reserve for bubble chamber use a quantity of heavy water with low tritium content. The quantity available is considered minimal or subminimal for projected U. S. needs. We have at present no capability for producing additional bubble chamber grade deuterium.

We foresaw several years ago the potential shortage of bubble chamber grade deuterium. At that time we financed, through the AEC's Savannah River installation and the E. I. DuPont de Nemours and Co., the studies leading to the Arthur D. Little (# C-71081) report you requested. The report, a copy of which is enclosed, discusses the feasibility, preliminary design, and cost estimates for a facility to purify deuterium by fractional distillation. It is our understanding that heavy water with a sufficiently low hydrogen content can be produced in the AEC's Savannah River heavy water plant (at a modest increase in cost) which would require only the "Reduced System for 99.9% D<sub>2</sub> Feed" detailed in the second column of Table 1 on Page 7 of the report.

In view of the potential significance of the physics involved in your need, we will again look into the problem to answer more carefully the questions you pose. I will write to you on this later.

With all best wishes.

Sincerely,

*William A. Wallenmeyer*

William A. Wallenmeyer  
Assistant Director for High  
Energy Physics Program  
Division of Research

Enclosure

*Wallenmeyer*

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE  
**CERN** EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

1211 GENÈVE 23  
SUISSE / SWITZERLAND

Téléphone: (022) 41 98 11  
Telex: GENEVE - 23698  
Télégramme: CERNLAB-GENEVE

Votre référence  
Your reference

Notre référence  
Our reference

D.Ph.II/ChP/ge

▷ A rappeler dans la réponse  
Please quote in your reply

Dr. William A. Wallenmeyer ADHEP,  
Research Division,  
U.S. Atomic Energy Commission  
WASHINGTON, D.C. 20545  
U.S.A.

Genève, 10th June, 1971

Dear Dr. Wallenmeyer,

You have certainly heard from Dr. Richardson and most likely also from other people, that CERN will finish the construction of a large hydrogen bubble chamber around the end of this year. Since this bubble chamber should also run with deuterium we want to investigate how to procure the necessary heavy water quantities of low tritium content.

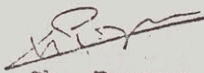
We have heard that the U.S. Atomic Energy Commission has a stock of about 100 m<sup>3</sup> D<sub>2</sub>O with low tritium content (corresponding to about 10<sup>-5</sup> micro-curie/ml).<sup>2</sup> Since CERN must decide very soon if and when the new chamber could be scheduled with deuterium, we must obviously know first the possibilities of acquiring deuterium or heavy water of the necessary quality.

Dr. Richardson advised us to ask you whether about 30 m<sup>3</sup> of this low tritium heavy water stock could be made available for us or whether this stock is reserved for the use of American laboratories. If the latter should be the case I should like to know if this restriction also applies to smaller quantities - for example about 1500 kg of heavy water - that we need from time to time for restocking the deuterium used in our 2m bubble chamber. In the past we bought this deuterium from Bio-Rad. If, however, this possibility should not exist anymore, we have to find other ways of purchasing the necessary supply.

You will certainly understand that the clarification of this question is of utmost importance for us. May I ask you for a quick reply ?

I should also appreciate it if you could send me a copy of the study concerning tritium extraction from D<sub>2</sub> or D<sub>2</sub>O by Arthur D. Little, June 1969.

Yours sincerely,

  
Ch. Peyrou

May 11, 1971

Andrew Sessler  
Lawrence Radiation Laboratory  
University of California/Berkeley  
Berkeley, California 94720

Dear Andy:

Thanks for your letter about the Monday evening session in Washington. I was not worried about the feelings of discontent; in fact, I found that meeting less "discontent" than the meeting a year ago. However, I definitely think we have something to discuss here, and some of the proposals for HEPAP were quite reasonable, such as the periodic newsletter to the community. I shall get in touch with Hildebrand and suggest that some time be reserved for that discussion.

Yours sincerely,

Victor F. Weisskopf

VFW:gpm

Copy to B. Hildebrand

*Sessler*  
*HEPAP*

May 11, 1971

Dr. Bernard Hildebrand  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Bernie:

The enclosed letter is self-explanatory. I think we should set aside a half hour (which will certainly develop into an hour) for a postmortem on Washington.

Sincerely,

Victor F. Weisskopf

VFW:gpm  
Enclosure

UNIVERSITY OF CALIFORNIA

LAWRENCE RADIATION LABORATORY  
BERKELEY, CALIFORNIA 94720  
TELEPHONE (415) 843-2740

TELEX 335313 LAWRADLAB BERK  
TWX 910-366-7172 LAW RAD LAB  
CABLE UCLRL BERKELEY

6 May 1971

Prof. Victor F. Weisskopf, Head  
Department of Physics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts 02139

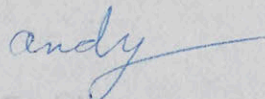
Dear Viki;

I was impressed by the strong feelings of discontent expressed at the Monday evening session of the Washington APS meeting, and consequently think we should devote some time, at the next meeting of HEPAP, to discussing--and perhaps implementing some of--the various reforms which were suggested. (Our next meeting, the last of this fiscal year and the first after the evening session, seems particularly appropriate for the subject).

Upon my request, Mel Schwartz has written out a few pages describing his suggestions; and I am asking Maglic to do the same. I think our collective memories and notes will suffice for recalling the other views which were expressed.

I do hope you agree to schedule this subject for discussion. I believe it is important that we respond to the community in a direct way (even if only to acknowledge that we have considered, and rejected, the various diverse proposals!).

Sincerely,



Andrew M. Sessler

AMS/dk

THE UNIVERSITY OF CHICAGO

CHICAGO • ILLINOIS 60637

THE ENRICO FERMI INSTITUTE

5630 ELLIS AVENUE

AREA CODE 312, 667-4700

May 7, 1971

Sent to all  
HEPAP  
5/18

Professor V. F. Weisskopf  
Department of Physics  
M. I. T.  
Cambridge, Massachusetts

Dear Professor Weisskopf,

I have been listening to many cries for additional money to support high energy physics research. I am all too well aware that the funds available are not adequate to support good research at the level at which results would be optimized but before we make further demands on the national treasury we should examine whether there are ways we might increase the physics from the money we get.

I am thinking of the recent NAL users group meeting. I estimate that the cost of travel and housing for the meeting could have supported 3 or 4 research associates for a year. And to what end? We heard a description of how difficult housing will be at NAL, we heard descriptions of several NAL experiments. There was also a tour of the accelerator site. In my view these benefits hardly justify the expense of the meeting. URA might consider additional support of the NAL physics program rather than sponsoring an elaborate cocktail party. There is hardly a high energy physicist who can't afford to buy a drink from his own money. The buffet supper I feel was also excessive. High energy physicists should learn to live a little less royally, particularly at the tax payers expense.

The purpose of the NAL users meeting would have largely been served by having representatives of NAL visit the meetings of the users group at the other national laboratories. These meetings, being more local, are not nearly as expensive and are often open to a larger number of physicists than were found at the NAL meeting.

Along the same lines of reducing the travel budget of high energy physics we might consider having high energy physics papers presented at only one meeting of the APS or even better at a special divisional meeting. A summer meeting at a university saves the high hotel bills encountered at the typical APS meeting. Money not spent on airplane tickets and hotel bills hires young physicists and supports research.



I would like to make a few additional (less vitriolic) comments about the future of high energy physics and suggest an additional new mode for doing research.

The people now doing high energy physics are overwhelmingly young. Most of us could reasonably expect to be active for another twenty five years. In an era of limited growth this has a devastating effect on the long term future. If we do not train new people then there will be nobody to do research in HEP in  $\sim 30$  years. We need a mechanism by which intelligent young physicists are trained and then allowed to develop their talents. High Energy physics should be organized in a way that young people can try experiments at the limits of their abilities, which means that they will make mistakes. The penalty for experiments which fail should not be so severe as to deter people from trying new and risky ideas. If chance experiments are not tried HEP is dead.

Most active experimental physicists have traditionally been members of university faculties. This has been possible because of the growth in physics departments during the last twenty five years. This growth has ceased. There are not going to be many new academic positions available at major universities. New high energy physicists are hopefully going to find jobs, either as permanent research associates or teaching in colleges, junior colleges or even high schools. A mechanism should be provided by which they can remain active in their field. If they are to be able to develop their talents they should not be restricted to association only with established groups.

Another problem with the current method of support is that it locks people into their current positions. Because facilities for research are located at relatively few institutions and restricted to members of those institutions people are reluctant to leave. As a consequence new institutions find it difficult to attract established people in an effort to develop their departments.

These observations indicate to me deficiencies in our current mode of support for high energy physics. I think a number of small regional high energy labs should be set up. These would not be affiliated with either universities or present national labs. Apart from a small full time component the labs would be staffed by high energy physicists holding positions in small colleges, junior colleges or high schools. The institutions would be compensated (up to  $\sim 50\%$ ) for the time an individual spends at the lab. The labs would be close to the institutions so that a person could work at the lab and still teach at the home institution. The lab should have the facilities to mount experiments, i.e. a shop and an electronics shop or a bubble chamber measuring facility. To keep the lab open to young people the full time staff might come from a major institution for a fixed period (maybe 3 years). Also there could be a maximum period of association with the lab of 10-15 years. After this time the best people would move on to positions at major centers of research either at the major universities or

the national laboratories. There are certainly many details that are not clear but I would like to see the idea discussed.

Sincerely,

*Norman Gelfand*

Norman M. Gelfand

Associate Professor of Physics

NMG:mc

E. R. Piore

Old Orchard Road, Armonk, New York 10504

April 19, 1971

Professor Victor F. Weisskopf  
Department of Physics  
Massachusetts Institute of Technology  
Cambridge, Massachusetts 02139

Dear Viki:

I shall try to join your meeting but it conflicts with the  
NAS Council meeting and an IBM commitment on Sunday  
in Toronto.

I am sorry.

Sincerely,

*Manni*