EVALUATION PLAN
FOR
PEER REVIEW
OF
RESEARCH SCIENTISTS

OFFICE OF REGULATORY AFFAIRS
U.S. Food & Drug Administration

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I. PURPOSE

This Plan establishes the responsibilities and procedures and which will be followed at regularly scheduled peer review meetings in evaluating the scientific qualifications and contributions of:

- Candidates for vacant research scientist positions in the ORO at GS-13 and above.
- ORO research scientists proposed for promotion to the GS/GM-13 level and above (if promoted, new three year cycle begins).
- ORO Staff Fellows when they are to be converted to research scientists at the GS/GM-13 level and above.

Promotions made under the Plan are Career Promotions and are not subject to competitive promotion procedures. This Plan is to be used in conjunction with the 'OPM Research Grade Evaluation Guide' (RGEg), and the 'Handbook for using the Research Grade-Evaluation Guide in FDA' [both attached to this plan].

II. POSITIONS COVERED

A. Identification of Research Scientist and Supervisory Research Scientist Positions.

1. RESEARCH SCIENTIST POSITIONS

A research scientist position in the Food and Drug Administration (FDA) is predominantly engaged in performing or leading all elements of research (as defined below). OPM Research Grade-Evaluation Guide (RGEg) is used to determine its grade level. A research position meets the following criteria:

a. The position is characterized by systematic, critical, intensive investigation of theory, experimentation, or simulation of experiments directed toward the development of (a) new or (b) fuller scientific knowledge of the subject studied.

b. The work is characterized by a scientific process, including problem exploration and definition, planning of the approach and sequence of steps, execution of experiments or studies, interpretation of findings and documentation or reporting of findings. This includes the development of principles, criteria, methods and a body of data of general applicability for use by others in the scientific community, and/or for regulatory purposes.

c. There is a clear requirement for the exercise of creativity and critical judgment in focusing the direction of research assigned.

d. The qualifications, stature, and contributions of the incumbent have a direct, major impact on the level of difficulty and responsibility of the work performed.

e. Research capability, as demonstrated by research experience and/or graduate education, is a significant requirement in the selection of candidates.

2. SUPERVISORY RESEARCH SCIENTIST POSITIONS

Most supervisory positions in ORO research centers will be classified under the provisions of this plan since research leadership and ability are requested qualifications for filling such positions.

B. Supervision of GS-15 Senior Research Scientists

Individuals, promoted to GS-15 Senior Research Scientists positions, will automatically be under the supervision of the Director of Field Science while maintaining research duties located at a field laboratory.

III. PEER REVIEW PANEL

A. Active Members

The Standing Committee will have six voting members consisting of scientists from each of the following categories: Field Laboratory Branch Directors, Research Directors, Science Advisors, FDA Center for Food Safety and Applied Nutrition Center Scientists and other Center Scientists where appropriate. The members will represent the appropriate diversity of program areas and disciplines in ORA field laboratories. Alternates, as agreed to by the ACRA and Committee Chairperson, will be appointed to serve when necessary. Each voting member, except for the Committee Chairperson who is a permanent member of the committee, will serve a three-year term with two members rotating off the Committee each year.

The Office of Human Resources Management (OHRM) will make available a Position Classification Specialist who will be a full voting member of the Committee, and who will offer guidance in the review of cases. The Executive Secretary to the Committee serves as the alternate to the Chairperson and only votes in the absence of the Chairperson.

B. Advisory Participants:

The Committee will have the authority to call upon scientists, engineers, personnel specialists and any others who may be of assistance in the review process.
C. Responsibilities

1. ASSOCIATE COMMISSIONER FOR REGULATORY AFFAIRS (ACRA)
   The Chair of the Committee serves as the representative of the ACRA, who appoints the members of the Committee.

2. COMMITTEE CHAIR
   The Chair along with the Director of Regional Operations shall make recommendations to the ACRA for committee members.
   - Conducts meetings with the Committee to establish guidelines for the review of cases, orientation of new members, and to provide guidance in instances which are not specifically covered by this plan.
   - Receives case material. Decides with the OHRM representative whether cases may be appropriately reviewed by the Committee, and if so, whether the submissions are complete. May exercise the right to return cases with no action, or for additional information.
   - Assigns cases to appropriate Committee members for in-depth review prior to scheduled meetings.
   - Calls and chairs Committee meetings.
   - Insures that Committee discussions and recommendations are kept confidential.
   - Speaks for the Committee in communications with the Regional Directors, Associate Commissioners, District Directors, Branch Chiefs and other supervisors, sponsors, applicants and any others having business with the Committee.
   - Prepares Committee recommendations to be submitted to the Chief, Classification Services, OHRM, on the disposition of cases.

3. EVALUATION COMMITTEE
   Meets at the call of the Chairperson. Five of the Committee Members present at a meeting including the Chairperson and the OHRM Representative constitute a quorum.

Each case will be carefully reviewed. Evaluation will be based on scientific and technical merit. All germane information such as memoranda of recommendation, reports and evaluations by supervisor and work examples will be used. Questions that arise during the review may be referred to the recommending official or the Position Classification Specialist assigned to provide assistance to the Committee. As assigned by the Chairperson, Committee Members will conduct in-depth reviews prior to the Committee meeting.

The Committee may schedule interviews or meetings with the recommending official, or persons with knowledge of the candidate's achievements and contributions. The Committee may invite a representative of a discipline not represented on the Committee to provide information on the role and impact of the discipline in the regulatory process.

A consensus is developed among those Committee Members present at a meeting to decide the final recommendation by the Committee. The Committee Member serving as in-depth reviewer will summarize the Committee action on the case in the form of a draft career evaluation report.

The activities of the Committee, including all written and non-written communications, discussions and decisions are considered privileged information that is not to be discussed or shared with unauthorized persons. Failure to abide by these instructions may result in appropriate disciplinary actions.

4. POSITION CLASSIFICATION SPECIALIST
   At the request of the Chair, the position classification specialist, who is also the OHRM representative, secures nominations for the selection of Committee Members from Regional Directors. Keeps track of terms of Committee Members and informs the Chief, Classification Services Staff, OHRM when a term is near expiration so that replacements can be selected.
   - Applies the appropriate classification standard or standards to the case being considered by the Committee and prepares an evaluation statement. This will be done after the conclusion of the Committee meeting.
   - Informs the Committee, through the Executive Secretary, of any modifications or changes in the classification criteria used in the evaluation of cases. Informs the RPO's of personnel actions required after final decision has been made.

5. EXECUTIVE SECRETARY TO THE PANEL
   Receives cases from the Chairperson and Regional Directors or Associate Commissioners.
   - Coordinates and schedules meeting dates(s) and site(s) with the Chairperson and confirms the date (s) with Committee Members.
   - Distributes guidance and policy information to the Committee Members.
   - Distributes case material to Committee Members.
IV. PROCEDURAL STEPS

A. Submission of Case Materials
The nominee prepares case material form submission to his/her director supervisor. The supervisor recommends a personnel action through appropriate chain of command up to the Regional Director. Case material, 1 original to Committee Chairperson and 6 copies to the OHRM representative, must arrive at the designated headquarters offices no later than sixty calendar (60) days prior to the first day of the month of regularly scheduled meetings.

B. Initial Review
The Committee Chairperson and OHRM representative review all cases and make an initial evaluation of the documentation. Cases which are accepted will be given to the Executive Secretary of the Committee.

C. Determination of Cases to be Reviewed
The Executive Secretary schedules the in-depth reviewers of the Chair and the cases to be reviewed at the meeting(s) of the Committee. Regularly scheduled meetings of the Committee will normally be held in February and August.

D. Committee Review
Prior to a Committee meeting, each voting Member will review each case and reach a tentative opinion based on the criteria in the Guide for the Peer Review of Research Positions in the ORO.

E. Appointment of In-Depth Reviewers
As assigned by the Chairperson, Committee Members will conduct in-depth reviews prior to the Committee meeting, and will obtain any additional information which will help the Committee evaluate a case.

F. Committee Meetings
Committee meetings will be conducted in accordance with accepted guidelines in ‘Handbook for using the Research Grade-Evaluation Guide in FDA’ - Guidelines and Criteria for the In-depth Review. Committee recommendations and decisions will be distributed through official channels only.

G. Recommendations
After reviewing a case, the Committee will return the case with a written recommendation to the Chief, Classification Service, OHRM. The recommendation becomes a part of the file for each case.

H. Cases not Recommended for Action
Cases which are not sustained for recommended promotion, or were not sustained during cyclic audit, will be returned to the recommending official through the appropriate Regional Food and Drug Director with a written explanation prepared by the Committee Chairperson and OHRM representative detailing the reasons for the committee's decision. Any subsequent resubmission must clearly show any changes or additions which address the points raised in the decision made by the Committee.

I. Request for Additional Information
If the Committee decides the documentation of a case is insufficient, the case will be returned for the collection of any additional pertinent information. Depending on the issues, the case may be considered at the scheduled meeting or deferred to a later meeting of the Committee. Failure to respond to the request for additional documentation within 30 days will prevent further review of the case.

J. Notification
The Chairman will be responsible for notifying the appropriate recommending official about the decisions of the Committee.

K. Appeal Process
All research scientists covered by this Evaluation Plan may appeal the final classification of their positions through established PHS and OPM classification appeal procedures.
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I. INTRODUCTION

The Research Grade-Evaluation Guide is a Civil Service Commission document for use in classifying positions involving 1) the personal performance of a research scientist either as an individual or as a team leader and 2) leadership of a research team or organizational unit where the primary basis of selection is research competence and capability rather than supervisory or administrative ability. Whenever the size of a team or organizational unit or other management concerns dictate the need for marked supervisory and administrative ability in a position, other classification standards should be used.

The Research Grade-Evaluation Guide is based on the premise that the qualifications of an incumbent can greatly expand a given research position in depth and/or scope. The Guide is also based on the premise that the qualifications of an incumbent are directly proportional to the demonstrated research accomplishments of that incumbent. Thus, a research position cannot be classified without considering an incumbent in the position.

The first 7 pages of the Guide elaborate on the above points, develop the conceptual framework of how positions and incumbents will be measured for classification purposes, and suggest an overall philosophy to interpret the standards which are listed on pages 8 through 12. Anyone using the Guide needs to fully understand the first 7 pages and to keep familiar with them.

II. SUPPLEMENT TO THE GUIDE

A supplement has been developed to aid in interpretation and use of the Guide. It is the Supplement to the Research Grade-Evaluation Guide degree definitions and it clearly identifies the key elements in each factor of the Research Grade-Evaluation Guide. The elements are essentially continuous and each letter degree definition provides a benchmark for measuring the element. Every effort has been made to keep the level of each benchmark equivalent to that in the Guide.

For degrees B and D, interpolations were made to help establish continuity. The word 'technology' was often added to suggest points of reference for applied research or research which directly impacts industry or user groups that is considered equivalent to 'basic research'. Also, the words 'team member' or 'team leader' have been inserted to provide appropriate references considered equivalent to individual performance of research. If concern exists regarding the appropriate letter degree when using the Supplement, the Guide itself should be referred to as the final source of authority.

Often one element in a factor will be at one letter degree while another element will be at a different degree. In such situations, an 'average' must be determined to assign the most appropriate letter degree. The 'average' is not necessarily an arithmetic average of the elements since the importance of each element varies with positions, incumbents, and grade levels. To illustrate this point, consider the three elements of Factor IV - Qualifications and Contributions. At the lower degree levels, the majority of the weight for scoring Factor IV will usually be based on Element 1 since there is little expectation of significant involvement in Elements 2 or 3. As a scientist progresses and advances, more involvement in Elements 2 and 3 is expected. At the upper grade levels or in the case of research leaders, Element 1 carries less significance so that the majority of the weight for scoring the total Factor IV may be based on Elements 2 and 3. The Guide covers the situation by stating that when assigning a letter degree, a definition as a whole in its total context must be applied - not isolated words or phrases. Thus, the final decision rests on subjective judgment and the fact that the judgment is divided into segments and quantified does not excuse an uncritical application of numbers rather than sound judgment. (See page 6 of the Research Grade Evaluation Guide).

A word of caution is in order when using the Supplement. The Supplement is intended to be an aid in focusing attention on the principal elements in each factor of the Guide and should be so used. It is not a new classification standard and is not to be used as the ultimate source of authority.

III. EVALUATION PROCEDURES

The recommended procedure in using the Supplement for each case is as follows:

Prior to a Panel Meeting
1. After receiving a case writeup with exhibits, skim the case material from front to back or, if preferred, start with personal data and skip around. The main point is to become generally familiar with the research position and the incumbent.

2. Study the accomplishments including exhibits to objectively evaluate all accomplishments that may be listed. Decide which letter degree for element 1 of factor IV is most appropriate by using the definitions of Element 1 in the Supplement as a guide. Place a check in the appropriate letter degree box for Element 1 of factor IV on the Work Sheet (Exhibit 1).

3. Evaluate the remaining two elements of Factor IV using the appropriate definitions in the Supplement as guides and place a check in the appropriate box on the Work Sheet.

4. Examine the checks for the three elements and decide which letter degree best represents the whole factor. Refer to the standards in the Research Grade-Evaluation Guide, itself, if considerable difference exists between elements.

5. Evaluate the remaining three factors using the Supplement focusing on one element of a factor at a time and follow the techniques in steps 3 and 4. The remarks column can be used to record concerns or justification for your rating which will be of use in discussion during panel meetings.

6. For each case, translate the letter degree assigned to points and record the points on the Research Evaluation Score Sheet (Exhibit 2).

During Panel Meeting
During panel meetings, the Supplement will be utilized to help identify points of disagreement between panel
members and focus discussion on them. The usual procedures for each case in a panel meeting should be:

1. Executive Secretary records scores of each panel member.
2. Identify points of difference between panel members.
3. Hear the indepth review report.
4. Discuss points of difference.
5. Arrive at a consensus decision.
6. Outline key points to go in the Career Evaluation Report (Exhibit 3) recording the decision.

IV. INTERPRETATIONS, GUIDES AND ADDITIONAL AIDS

The Supplement is an aid that helps interpret the standards in the research Grade-Evaluation Guide (pages 8 through 12). However, several extremely important concepts are contained in the first 6 pages of the Guide and their interpretation is critical when using the Guide. These are:

- Appropriate use of the Guide as a classification standard for a position
- Team leadership
- Meaning of independence and independent performance of research
- Evaluation of regency of accomplishments
- Evaluation of qualifications when an incumbent changes research assignment.

Interpretations of these concepts, appropriate to FDA, are discussed in the following sections. In addition to these concepts, three other issues will be discussed which often become involved in application of the Guide. They are:

- Splitting letter degrees by assigning points other than the exact equivalent given in the Guide.

Dealing with nonresearch activities performed by a scientist.

- Considerations when evaluating long-term research as contrasted to short-term research.

Also included as part of this handbook are two additional aids for panel members which are not directly related to the Research Grade-Evaluation Guide but are integral parts of the evaluation system. The first is ‘Guidelines for Indepth Review of Research Scientists’. Since the discussion by the panel of a given case is as important in making final decisions as the written material, the responsibility of the indepth reviewer for providing additional information to the panel that is not available in the case writeup cannot be overemphasized.

The other aid deals with the final step in the panel evaluation process - the ‘Career Evaluation Report’, which is designed to communicate the results of panel deliberations to the scientist who has been evaluated.

Appropriate Use of the Research Grade-Evaluation Guide
(See pages 2-3 of the Research Grade-Evaluation Guide)

Covered Positions
When using the Research Grade-Evaluation Guide, one concern is whether a position involves research for which the Guide is an appropriate classification standard. In making the determination, the Guide points out that all of the five criteria listed on the top of page 8 in the Guide must be applicable before it should be used to classify a position. In addition, the Guide defines the research process in the degree A definition of Factor I. That process is illustrated in the flow diagram shown below. The first activity has been expanded to indicate key subactivities in the broader activity illustrating the research-type application of the scientific method. The emphasis in both the criteria and the research process is using scientific hypotheses as guidelines to plan experiments that will provide data which can be interpreted and will lead to new or fuller knowledge.

RESEARCH PROCESS

- Research Initiated
- Define Problem
- Plan Experiment
- Execute Experiments
- Analyze Data
- Interpret Results
- Report Results
- Research Completed

1. Review/observe problem part of real world
2. Formulate and/or revise mental model of problem part of real world
3. Propose multiple hypotheses
4. Propose experiment to disprove hypotheses
5. Select best experiment(s)
Excluded Positions
The Guide should not be applied to positions described on page 2 that it excludes from coverage. FDA has many such scientific positions which operate in a research or laboratory environment, but are specifically excluded from coverage by the Guide. On page 2, the Guide defines research as systematic, critical, investigation directed toward development of new or fuller scientific knowledge. Identifying a biological specimen, determining the chemical composition of a sample, or determining the physical properties of a sample are not examples of new or fuller scientific knowledge. Most scientific professional activities involved in education, design, construction, consulting, manufacturing, etc., do not produce new or fuller scientific knowledge as defined above. Thus there is a distinction between research and non-research activities, as defined in the Guide. Then the work of FDA scientists falls outside of this research definition, the Guide is not appropriate.

The flow diagram of the research process is useful in distinguishing when an incumbent is not performing responsibly in the complete research process but is involved in a support role. To illustrate, a person might be receiving training and perform in all activities of the research process but with extremely close supervision. Use of the Guide's Part II would be appropriate here. On the other hand, a person might be heavily involved in planning experiments, executing experiments, and analyzing data, but not be substantively involved in the other activities of the process. Such a position is research support if scientific professional knowledge is required, but the Guide is not the appropriate classification standard. A supporting position regardless of grade will generally have limited, if any, involvement in the problem definition and interpretation of results activities.

The actual evaluation approach and classification standard to use for evaluating excluded positions will vary depending on type of position and grade level. However, as the Guide points out on page 2, positions excluded from the Guide are not necessarily less grade worthy nor do they call for less originality or inventiveness; rather, the language and criteria that are useful in determining grade levels are different. Furthermore, the Guide encourages using the person-in-the-job classification concept for evaluating some excluded positions. In the footnote on page 3, the Guide states, 'Thus, there are many types of excluded positions - particularly those which are defined broadly and require substantial creativity - in which the qualifications and professional stature of the incumbent will materially affect the grade level of the position. Even though the published classification standards for such positions do not provide specific guidance in consideration of the man/job relationship, a classification approach which accords consideration to the qualifications of the incumbent comparable to that in this Guide may be used as appropriate.'

Team Leadership
A different situation exists where an incumbent is in a team leadership position responsible for formulating and guiding a research attack. The leader might spend a major portion of time with problem definition and interpretation of results activities, and only a minor portion of time in the other activities. The Guide is appropriate in such situations. Thus, the amount of time devoted to each activity in the process is not as critical as the types of activities in order for the Research Grade-Evaluation Guide to be applicable. Personal professional participation in the problem definition and interpretation of results activities with responsibility though not necessarily personal performance in the other activities is essential for the Guide to be applicable.

Expected Results
Another way to determine if the Guide is an appropriate classification standard is to examine the end product of an incumbent's work. This can be done by evaluating the expected results if they have been stated in the research assignment to see if a research accomplishment may result. If the expected results are not specifically stated, they must be extrapolated from stated objectives of the assignment. If it is determined that no significant accomplishments will result then measured in Factor IV, the Research Grade-Evaluation Guide is not an appropriate classification standard.

Sponsored Funds
A special situation regarding the appropriateness of the Guide exists with the sponsored research conducted by FDA that is supported by funds from other Federal Agencies. In such situations, the research is often conducted by contract. If an FDA scientist in a research position has major responsibility for managing sponsored research, the work done may or may not be appropriately classified using the Guide. If the scientist leads in the development of an overall research plan and is intimately involved in preparing requests for research proposals, such activities are equivalent to defining the problem in the research process since they involve developing and guiding a research attack in a problem area. If the scientist also has primary responsibility for making final interpretations of results of the research, the Guide is appropriate. On the other hand, if the scientist functions more as a monitor of the contracts or grants and primarily spends time on 'administrative paperwork matters', the Guide should not be applied. When it is applied, documentation of research accomplishments will also have to be given special treatment and that will be discussed under research leadership in the next section.

Research Leadership
(See page 2 of Research Grade-Evaluation Guide)

While the Guide specifically identifies its appropriateness to research leadership positions, no specific examples of leadership accomplishments are given in the degree definitions of Factor IV on pages 11 and 12.

All references to specific research accomplishments are those identified with the personal performance of research although adequate reference is made to recognition and stature of a leader. The Guide does adequately deal with leadership positions in Factors I, II, and III. As stated on page 5, 'In the case of a true team leader ... a level should be credited which reflects the scope and character of projects conducted by his team'. Thus, the team leader gets credit for leadership responsibilities as soon as the leader enters the job. Getting credit for leadership accomplishments in Factor IV, however,
is another matter. A typical perception by many
scientists is that the time required for leadership
activities prevents them from making personal research
accomplishments that they could have made if not in a
leadership position; therefore, they may lose or at
least not gain additional credit in Factor IV over the
time that they occur in a leadership position.

Therefore, it is useful to identify what amounts
to leadership accomplishment which can substitute for
personal accomplishment. The underlying philosophy
of a leadership accomplishment is that only one type
exists and that is when a leader causes a change in
research accomplished by the team led. A change may
either an increase or decrease and may occur either
in the quantity, quality, or area of research
accomplished. Thus, at a minimum, the leader should
maintain the research productivity of the team led.
To be granted additional credit, the leader must have
caused a significant or extensive increase in the
quantity or quality of productivity of the research
team by: a) better coordination of research, b)
changing the direction of a research program to a more
significant area of exploration with resultant impact
on science or technology, c) improving the scientific
environment or atmosphere in which the research team
functions, d) increasing the efficiency of the team’s
research techniques, or e) improving the research
capability of scientific personnel in the research
team.

The most important concept in a leadership
accomplishment is that the change must result from
activities of the leader. To illustrate, consider a
situation where a newly appointed leader has a team of
highly capable enthusiastic scientists. Probably
only minimal leadership is needed. In such a
situation, the leader should have enough time to make
personal performance accomplishments and should not
automatically be given credit for the highly
productive team. On the other hand, if the new
leader has a team that has low productivity, and the
leader spends considerable time and does increase
their productivity to that which was considered
‘average’, the leader should get credit for a
leadership accomplishment to substitute for lack of
personal performance accomplishments. Thus, the
focus in a leadership accomplishment is on change in
team productivity caused by the leader not just the
level of team productivity.

If a leader does not cause any significant
increase, leadership credit should not be given even
if the leader tried hard. The situation is no
different than for a personal performance research
accomplishment. Just because a scientist tries hard,
credit is not given.

Unless the research has been successful and had
impact (made major advances, opened the way for
extensive further developments, solved a problem of
major importance) the level of credit assigned should
be proportional to the impact. Except for the nature
of the accomplishment (indirect rather than direct) a
research leadership accomplishment should be treated
no differently than a personal performance accom-
plishment when assigning level of credit.

Sponsored Research Leadership
In the situation where a scientist leads sponsored
research, accomplishments will need to be credited in
a slightly different manner. Obviously, full credit
should not be given for successful research as though
it were personal performance even though the broad
planning was done by the incumbent. Similarly, a
change in productivity in a team is not a meaningful
nor measurable concept with sponsored research
particularly when done by contract. But, the
contributions of the scientist should be as identifi-
able as in any multidiscipline team research effort
involving personal performance of research. These
contributions can be documented with statements by a
supervisor, the written research plan, requests for
research proposals, etc., that will illustrate what
the scientist personally did. Panels will need to
weigh the impact of these contributions just as for
personal performance or leadership when assessing the
demonstrated research accomplishments in Factor IV.
When you remember that two other elements of Factor IV
are also used in the final assessment and they are not
evaluated by research accomplishments so they serve as
cross check, then the chance of making classification ‘errors’ is small. Thus, if an incumbent is
involved in sponsored research as outlined in the
previous section so that the Guide is applicable,
measurable research accomplishments should result that
can be evaluated in Factor IV.

Independence
(See pages 2 and 3 of Research Grade-Evaluation Guide)
Another concern when using the Guide is the definition
of the word independence. This word has various
meanings. At grade GS-11, independent means the
incumbent is capable of performing responsibly in all
phases of research but with close supervision
particularly review of work performed. At grade
GS-12 and above, independent means the incumbent is
capable of accepting responsibility for all phases of
research with limited technical supervision in most
phases of research at GS-12 and ranging to essentially
no technical supervision in all phases of research at
higher grades. When applied to a member of a team
where large problems cannot be segmented into
identifiable areas, independent means the Incumbent
is fully participating as a professionally responsible
member of a team in substantive aspects of the work or
makes contributions that may be regarded as equivalent
to independent performance; working alone is not
required.

Regency
(See page 4 of Research Grade-Evaluation Guide)
Another concern is the evaluation of regency of
accomplishments. The Guide states that ‘recent
research or similar activity which assures maintenance
of research competence is essential for full credit of
past accomplishments’. This is interpreted to mean
that the total research career should be evaluated and
then if lack of regency exists, full credit should not
be given.

Evaluating regency as related to an assignment
involves highly subjective judgments. Each situation
must be considered on its own merits. How much
credit should be withheld when regency is lacking will
depend on extenuating circumstances that are beyond
the control of the incumbent, as well as the per-
formance of the incumbent. When in the opinion of a
panel an incumbent has not performed like an 'average'
research scientist would have, full credit should not
be given. The position and incumbent should be
classified at a grade level where the incumbent’s
performance is considered equivalent to that normally
expected at that grade level.
Changing Assignment
(See pages 4 and 5 of Research Grade-Evaluation Guide)
Another point of concern is assessing qualifications when an incumbent changes research assignments. The Guide points out that the total qualifications of a researcher must be considered as they bear on the dimensions of the current research situation and work performance. On the other hand, the Guide recognizes that a specialist in one field may be reassigned to a related field without change in degree of Factor IV when it is expected that the researcher will probably meet substantially the same level of competence after a reasonably short orientation.

How far expertise can be stretched or how quickly new expertise can be acquired must be individually evaluated. When in the opinion of a panel an incumbent can be expected to make the transition, full credit should be given. However, if in the opinion of a panel an incumbent cannot be expected to make the transition, full credit should not be given.

Splitting Letter Degrees
(See page 6 of Research Grade-Evaluation Guide)
When scoring (translating letter degrees to points) a tendency exists to use odd as well as even numbers on the first three factors thus further subdividing the letter degree. Similarly, Factor IV can be subdivided by using 2, 6, 10, etc., as well as 4, 8, 12, etc., because the basis for a letter degree is the word definition as a whole, making further breakdowns to indicate a degree of precision that does not actually exist. The situation is somewhat analogous to carrying calculations out to five places beyond the decimal point when the original data are precise only to the first decimal place. Because of the double weighting of Factor IV, some justification exists for subdividing it. Thus, FDA policy on subdividing letter degrees:

1. Any even number can be assigned to a letter degree both on initial scoring and consensus scoring. This permits subdividing Factor IV but not the other three factors.
2. On initial scoring, a + or - may be used to indicate that the assigned letter degree may need to be shifted following discussion. A + or - cannot be used on consensus.

Nonreasearch Activities
(See pages 3-4 of Research Grade-Evaluation Guide)
Often an incumbent is required to perform duties that are vital to the operation of FDA but which are not research as it is defined by the Guide. When classifying a research position where the incumbent has mixed duties, direct credit cannot be given for nonresearch activities such as those required of EEO Counselors - information and education or public relation functions, Alcoholism Counselor, some facilities maintenance duties, etc. Nonresearch duties can and should be listed in Part VI, Other Significant Information, of case write-ups where they can be considered by panels. Panels should be able to detect when an incumbent's progress is being slowed down because of too many nonresearch activities. Panels should call such situations to the attention of management in the Career Evaluation Report of the case. Management can then take action as appropriate by assigning some of the activities to someone else, providing necessary support assistance, discontinuance of the activities, or any other feasible means.

Long-Term vs. Short-Term Research
Long-term research projects often require several years or generations in order to conduct a single experiment. Short-term research on the other hand, may require only a few weeks to complete an experiment. Because of this difference in time, some scientists in long-term research feel they are disadvantaged when evaluated using the Guide. The feeling presumably results because of undue concern about numbers of publications. The perceived disadvantage does not exist for the following reasons:

1. The short-term, quick completion of experiment is generally not a quality accomplishment. Rather, usually a series of short-term experiments are required before a significant accomplishment is made.
2. Usually, more than one long-term experiment at a time can be conducted by one scientist. Furthermore, not all the research needs to be of a long-term nature.
3. When evaluating the significance of an accomplishment, the amount of effort and time required is weighed as well as the resulting impact.
4. Peer recognition and consulting activities are also considered in Factor IV and are more dependent on competence and informally recognized contributions than mere numbers of publications.

Thus, if panels follow the intent of the Guide (count quality accomplishments and consider professional standing and recognition in a scientific field) when evaluating Factor IV, the issue of basic vs. applied, long-term vs. short-term, or any other classification comparison is not relevant. The Guide only attempts to distinguish between good and poor research productivity.

V. GUIDELINES FOR INDEEPHT REVIEW OF RESEARCH SCIENTISTS
When a panel member is assigned primary responsibility for reviewing a case(s) for a particular panel meeting, the indepth review must be conducted prior to the meeting. A number of guides should be followed in accomplishing this indepth review. Ideally, but not always, primary review responsibility will fall to a panel member who has competency in the discipline area of the case. However, objectivity is more critical than specific discipline knowledge. The primary reviewer is expected to read the publications submitted as exhibits in enough detail to critically evaluate and intelligently discuss them (other panel members might merely scan or read portions of the publications submitted). The primary reviewer should go beyond the written case material and publications in an attempt to clarify, check further on the significance of the research accomplishments, sort out the specific contributions of the scientist being reviewed in the case of team accomplishments, and generally bring additional information for discussion to the panel meeting that is not available in the written case material.

In seeking additional information, the primary reviewer should keep in mind that if the case has been prepared as prescribed, it should reflect the inputs
VI. GUIDELINES FOR PREPARATION OF THE CAREER EVALUATION REPORT

Purpose
The Career Evaluation Report is the final step in the panel evaluation process and has several purposes. These are:

- To provide feedback to the incumbent regarding evaluation of his or her case.
- To provide the basis for a career conference between the incumbent and supervisor and to document the conclusions reached in that conference.
- Alert management to potential problems, provide management with a measure of research progress of the incumbent’s research program, and document the results of the evaluation for official personnel records.

Important Considerations
Evaluation means classifying an incumbent in the job using the ‘person-in-the-job concept’. This concept requires judging the incumbent’s research career. Judging a research career touches on the professionalism, judgment, capabilities, motivation, and accomplishments of an incumbent in relation to the research assignment.

In addition, the final classification decision relates to the salary received. Obviously, these aspects of evaluation are highly personal to the incumbent and relate directly to status and ego. Those preparing the evaluation report must be sensitive to the probable difficulty of the incumbent, and to a lesser degree the supervisor(s), in being objective about the evaluation and must be sure the report is very carefully worded.

Guidelines
The report should be a brief statement to be transmitted to the immediate supervisor requesting that a conference with the incumbent be held and a report of the conclusions of the conference be returned. The statement should cover the following points as appropriate:

- The verbal consensus of the panel, i.e., promote, retain in grade, etc.
- The panel’s impression of the research as it relates to the results of the evaluation.
- Strong points of the position/incumbent.
- The panel’s impression of the documented accomplishments.
- Weaknesses or deficiencies of the position/incumbent if detected.
- Suggestions for improving scientific stature, impact, and recognition of the incumbent but not what is needed for promotion.

(Extreme care should be exercised in wording this section.)

While feedback to the incumbent is important, straining to say something just to have a report is
developed when the position is reviewed. This may be presented in a variety of ways - for instance, by the supervisor to the panel - but it also needs to be incorporated in a brief summary of the more important background elements which can be appended to the position description. Information concerning the incumbent will need to be redeveloped or modified with changes in incumbency or the competence and stature of the incumbent.

Research positions are particularly susceptible of changes in performance which may occur gradually over a period of time. This makes it particularly important that they be periodically reviewed to determine what changes may have occurred. Many research installations have promotion panels make periodic reviews of the qualifications and professional development of their researchers, with a view to recommending promotions for those regarded as qualifying for a higher grade. Although the role of such panels may vary, they commonly evaluate the knowledge, abilities, personal qualities, achievements, and contributions of the candidates as these relate to the requirements of the position to be filled. Such appraisals of the man-job relationship for purposes of selecting candidates for promotion require knowledge and judgment similar to that required for grade-level evaluation. Accordingly, agencies may find it helpful to use a single panel for promotion, position classification, employee development, and other purposes.

This guide requires coordination and makes possible a meaningful integration of the qualifications review and the classification review. It provides a ground on which the job knowledge, and knowledge of the incumbent's performance and capabilities, which are possessed by the technical staff of the organization, can be intelligently related to classification and qualification standards and the other personnel and management processes. Such coordination and management participation should do much to provide a basis for more effective personnel management, in a broad sense, with regard to research positions.

A number of agencies have reported values in application of the guide which extend well beyond its use as a classification instrument. This guide has been viewed as a major tool in improving the public image of the Government service. Recruiters for research organizations have effectively used the guide in informing prospective candidates of the modern personnel management practices in research administration in the Federal service and of the opportunities to advance to the highest levels as an individual researcher without supervisory responsibility.

### GRADE-DETERMINATION CHART

Total point value assigned to the four factors may be converted to grade in accordance with the chart below.

<table>
<thead>
<tr>
<th>Classification Grade</th>
<th>Total of factor point values</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS-11</td>
<td>8 - 12</td>
</tr>
<tr>
<td>GS-12</td>
<td>16 - 22</td>
</tr>
<tr>
<td>GS-13</td>
<td>26 - 32</td>
</tr>
<tr>
<td>GS-14</td>
<td>36 - 42</td>
</tr>
<tr>
<td>GS-15</td>
<td>46 - 52</td>
</tr>
</tbody>
</table>

Where the points assigned to a position fall in the gap between ranges assigned to GS-grade, the position may be considered to be "borderline." Thus, it should be assigned to either the higher or lower of the two grades between which it falls in accordance with a judgment determination based on aspects of the position which may not have been fully considered in arriving at the point values, and in consideration of best alignment with other properly classified positions.
**Supplement to**

**OPM RESEARCH GRADE EVALUATION GUIDE**

**DEGREE DEFINITIONS**

### FACTOR I - The Research Situation, or Assignment

<table>
<thead>
<tr>
<th>Element</th>
<th>Level C - 6 points</th>
<th>Level E - 10 points</th>
<th>Level EE - Exceeds (+2's)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSIGNED RESPONSIBILITY</strong></td>
<td>Responsible for the systematic attack on a complex area typically approached through a series of conceptually related studies. Research is conducted either individually or as a team leader.</td>
<td>Responsible, ordinarily as a team leader, but at times independently, for formulating and guiding a research attack on problems recognized as unyielding to research analysis and of exceptional interest to the scientific community and/or the agency's regulatory function. In certain cases the complexity of the problem requires subdivision into separate phases of which several are characteristic of Degree D.</td>
<td>Responsible, normally as a team leader for formulating and guiding a broad scale attack on problems in frontier areas of critical importance to major national programs. The project is so complex as to be divided into separate experimental and and theoretical phases, several of which are typical of Degree E.</td>
</tr>
<tr>
<td><strong>RESEARCH OBJECTIVES &amp; METHODOLOGY</strong></td>
<td>Problems require unconventional or novel approaches, sophisticated research techniques or present other features of more than average difficulty.</td>
<td>(Same as Degree Level C)</td>
<td>New hypotheses, concepts and techniques must be developed for attacking the project and interpretation of results.</td>
</tr>
<tr>
<td><strong>EXPECTED RESULTS</strong></td>
<td>Publishable or documented results that (a) answer questions in the scientific field and/or open significant new avenues for study; (b) validate or modify scientific theory or enhance regulatory technology or methodology; (c) result in important changes in existing regulatory processes or techniques. Examples: listeria in soft cheeses, benzene in bottled water, lead in pottery.</td>
<td>Significant documented progress (e.g. major modification of existing theory, methodology, or technology) representing an advance of great scientific significance and/or impact on agency programs. Progress or solution of problem opens the way to extensive related developments. Examples: PCBs in fish, identification of new anabolic steroids, heavy metal analysis,</td>
<td>Major documentable developments that influence shaping of program goals, advancement of programs and understanding in the total field, and the planned activities of numerous scientists in Government, academia and private industry.</td>
</tr>
</tbody>
</table>
## FACTOR II - Supervision Received

| ELEMENT             | Level C - 6 points                                                                                                                                                                                                 | Level E - 10 points                                                                                                                                                                                                 | Level EE - Exceeds (+2's)                                                                                                                                                                                                 |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ASSIGNED AUTHORITY  | Usually the scientist works in a broad assigned area. Either a broad area is assigned or substantial freedom is given to select specific problems for study and approaches to be taken.                                 | Supervision is nominal and researcher must locate the most fruitful lines of attack within existing funding constraints.                                                                                                                                                               | Near total authority in the selection and approach to be taken in his/her research projects, no matter now novel.                                                                                                                                                                     |
| RESEARCH GUIDANCE GIVEN | Technical supervision limited to jointly developing broad hypotheses and research attack.                                                                                                                                                     | Essentially no technical supervision given other than consultation.                                                                                                                                                                                                          | No technical supervision given. Incumbent is recognized as a distinguished and brilliant scientist.                                                                                                                                                                               |
| REVIEW OF RESULTS   | Incumbent's technical judgment generally relied upon and completed reports and papers are reviewed primarily to evaluate overall results.                                                                                                                                   | Interpretations are considered technically authoritative and used as a basis for administration or regulatory actions. Also may be used for application to other agency regulatory activities.                                                   | Interpretations, recommendations and conclusions are furnished to other agencies and professional organizations without reference to any higher authority.                                                                                                                                |
| GENERAL SUPERVISION | Supervisor is kept informed and his approval is required only for changes in plans involving a considerable investment in time and money.                                                                                                                           | Supervisor is kept informed but incumbent has full responsibility for formulating research plans and carrying them through.                                                                                     | Essentially no supervision of any kind given.                                                                                                                                                                                                                                      |
## FACTOR III - Guidelines & Originality

<table>
<thead>
<tr>
<th>Element</th>
<th>Level C - 6 points</th>
<th>Level E - 10 points</th>
<th>Level EE - Exceeds (+2’s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUIDELINES</td>
<td>Existing literature is of limited usefulness (Contradictory, containing gaps or only partially related to the problem).</td>
<td>Existing literature of very limited usefulness without significant modification and interpretation.</td>
<td>High degree of abstraction required to make existing literature relevant.</td>
</tr>
<tr>
<td>ORIGINALITY</td>
<td>A high degree of originality required in defining significant complex problems; developing hypotheses and developing new approaches, methods or techniques. Examples: various pathogens in different food products, extending number of pesticides detected in vegetables and fruits.</td>
<td>Creative extension of existing theory or methodology, or significant contribution to development of new regulatory methodology, and/or A high degree of imagination and creativity in the solution of problems of &quot;marked&quot; importance to the scientific field or national regulatory programs.</td>
<td>Unusual productivity, creativity and depth of insight into the fundamental nature of phenomena and their relationship resulting in a substantial variety of new methods, techniques or approaches to formerly intractable problems. Findings have widespread applicability and are likely to be a major stimulus to scientific and technological effort.</td>
</tr>
<tr>
<td>Element</td>
<td>Level C - 12 points</td>
<td>Level E - 20 points</td>
<td>Level EE - Exceeds (+2's)</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>DEMONSTRATED RESEARCH</strong></td>
<td>Has authored one or more publications describing new concepts, techniques, or products of considerable interest to science or technology and/or solution of important applied problems pertaining to the regulatory function.</td>
<td>Has authored a number of important publications or developed new concepts, techniques, materials or products some of which have had major impact on science or have solved problems of great importance to the scientific field, to the agency regulatory function or to the public.</td>
<td>Has made numerous contributions to new knowledge, concepts, techniques, products, or materials recognized as having led to major advances in science or the solution of applied problems of great importance.</td>
</tr>
<tr>
<td><strong>RESEARCH, STATURE, RECOGNITION, AND IMPACT ON SCIENCE AND TECHNOLOGY</strong></td>
<td>Demonstrated ability as a mature competent, productive worker by personal performance or participation in team research and is recognized as a significant contributor to a professional field, or is recognized for leadership in conception and formulation of productive research ideas that are the basis for studies by others.</td>
<td>Demonstrated outstanding attainment (through personal research, team leadership, or formulation of productive research ideas) with contributions of such magnitude that they move either science or regulatory technology significantly forward.</td>
<td>Is a nationally recognized leader and authority in an area of widespread scientific interest or applied problems of great importance.</td>
</tr>
<tr>
<td><strong>ADVISORY AND CONSULTANT ACTIVITIES</strong></td>
<td>Deals responsibly with others concerning full area of responsibility and/or serves on important committees of professional societies and is beginning to be sought out for consultation.</td>
<td>Is sought by colleagues who themselves are experts in their own field and has received special invitations to address professional organizations and/or honors and awards illustrating scientific recognition.</td>
<td>Is sought as advisor and consultant on scientific and technical programs and problems well beyond his/her own field.</td>
</tr>
</tbody>
</table>
# RESEARCH GRADE-EVALUATION WORKSHEET

<table>
<thead>
<tr>
<th>NAME OF EMPLOYEE:</th>
<th>DATE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name/Signature of Peer Review Evaluator:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>DEGREE LEVEL</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

FACTOR I - Research Situation

1. Assigned Responsibilities
2. Objectives/Methodology
3. Expected Results

OVERALL DEGREE LEVEL

FACTOR II - Supervision Received

1. Assigned Authority
2. Guidance Given
3. Review of Results
4. General Supervision

OVERALL DEGREE LEVEL

FACTOR III - Guidelines & Originality

1. Available Literature
2. Originality Required
3. Demonstrated Originality

OVERALL DEGREE LEVEL

FACTOR IV - Qualifications & Contributions

1. Demonstrated Accomplishments
2. Stature, Recognition & Impact
3. Advisory & Consultant Activities

OVERALL DEGREE LEVEL
<table>
<thead>
<tr>
<th>EVALUATORS</th>
<th>FACTOR I</th>
<th>FACTOR II</th>
<th>FACTOR III</th>
<th>FACTOR IV</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Research Situation</td>
<td>Supervision Received</td>
<td>Guidelines &amp; Originality</td>
<td>Qualifications &amp; Contributions</td>
<td></td>
</tr>
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<td></td>
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</tbody>
</table>

CONSENSUS SCORES: 

GRADE LEVEL: 

REMARKS: 
MEMORANDUM

FOR OFFICIAL USE ONLY

Date: 

To: (First Line Supervisor)

Through: (Second Level Supervisor)

From: Chairman
Field Research Scientist Peer Review Committee

Subject: Research Evaluation Committee Review

A panel reviewed __________, GS-________, (Employee) (Position Title)

________, (Organization) (Date)

Panel Report:

Required Personnel Action:

Instructions for Supervisor: You are required to discuss the results of the evaluation with the employee. After the discussion, you MUST report what was discussed and what understandings were reached, particularly regarding constructive suggestions by the Panel. Please arrange the discussion within two weeks of the date you receive this report, and document and return this Conference Report including the signature of the employee.
MEMORANDUM

Date:

From:  First Line Supervisor
[No lower than Branch Chief or equivalent]

Thru:  Supervisory chain to HFC-100

Subject:  Peer Review Evaluation of ________

To:  Chairman
Field Research Scientist Peer Review Committee
Division of Field Science/HFC-140

The attached case material is submitted in accordance with the ORA Evaluation Plan for Research Scientists for the purpose of evaluating (Name of Candidate), as required for promotion review.

Employee Information

Entered on Duty ORO
Last Promotion
Last Peer Review
Current Title & Grade
Proposed Title & Grade

Encls:
Attachment I - List of Accomplishments
Attachment II - Curriculum Vitae
Attachment III - Bibliography
Attachment IV - Position Description Form
Attachment V - Employee Performance Management System
EXHIBITS - 1 to
SUPPLEMENT 2
List of Accomplishments

This list should be restricted to actual accomplishments, not future plans or problems. The list may begin with a brief paragraph summarizing the scientist's research career by indicating total years in research, total number of publications, presentation, abstracts, and, a general statement about the researcher's scientific reputation and recognition if appropriate and/or significant.

Following the introductory paragraph, the most significant research accomplishments over the scientist's total career should be selected and listed in chronological order. Accomplishments since the last peer review should be identified with an asterisk. Up to ten accomplishments, scientists at lower grades or with shorter research careers may not have had sufficient time to produce a large number of significant accomplishments.

Each significant accomplishment should be described as concisely as possible with the primary emphasis on what was accomplished and why the accomplishment was significant. In the case of a team effort, it will be necessary to explain exactly what the scientist contributed to the total accomplishment. Since the significance of an actual accomplishment sometimes changes with time, these statements should be carefully written.

To aid in selecting accomplishments, at least five types have been identified. To help judge the quality of an accomplishment, the five types and an indication of levels of quality are listed below:

1. Literature review and analysis: Ranges from "restated with essentially no change, or reported conclusion from previously published material" to "reviewed, analyzed, interpreted, and synthesized scientific knowledge of broad scope with significant additions to established knowledge."

2. Development of knowledge using scientific principles in theoretical or experimental investigational: Ranges from "corroborated existing knowledge in a new situation using new and innovative procedures" to "made a major advance in a scientific field, or provided new technology that opened the way for extensive further development."

3. Application of knowledge to an unknown or previously unexplored area: Ranges from "applied known concepts and/or techniques to deal with a new situation" to "solved a problem of major importance to science, industry, or the public."

4. Methods development: Ranges from "used known concepts to modify and/or develop facilities, equipment or techniques of some importance to research and/or industry methodology."

5. Research Leadership: Ranges from "maintained the quantity and quality of productivity of a research team" to "caused an extensive increase in the quantity and quality of productivity of a research team" by "better coordination of research, changing the direction of a research program to a more significant area of exploration with resultant impact on science or technology, improving the scientific environment or atmosphere in which the research team functions, increasing the efficiency of the team's research capabilities, or improving the research capability of scientific personnel on the research team."

These types of accomplishments are not meant to be all inclusive, but are merely illustrative of kinds of accomplishments by FDA research scientists. More important than the type of accomplishments is the quality of that accomplishment. Each selected accomplishment should be documented by exhibits and/or publication. Exhibits should be chosen with the following in mind:

- the significance of a particular accomplishment may have increased with time,
- while past accomplishments may be important, recent accomplishments show maintenance of research competence, and
- for most situations, one or two carefully selected exhibits will be sufficient to support a well-stated accomplishment.

Exhibits should be referenced to the particular accomplishments which they support and to the publication list. When more than one publication is used to document an accomplishment, all the publications must support the one accomplishment, and no more than three should be provided.

Whenever an accomplishment cannot be supported by an exhibit or a publication, a statement signed by a knowledgeable authority (such as the supervisor or District Director) will be acceptable. The statement should elaborate on the accomplishment to provide evidence to support its significance. In addition, the statement should indicate why the accomplishment was new or could not be published. A sample format for presenting significant research accomplishments of scientists is attached to this Supplement.

Many research positions include duties and responsibilities that are not specifically research. Work of this nature which is performed on a regular and recurring basis should be documented in the position description. This includes work such as the preparation of handbooks, special assignments, review, and research may help to support the significance and impact of the research. These accomplishments may be seen as activity similar to research which assured maintenance of research competence.
List of Accomplishments
Dr. Adams completed her Ph.D. in psychology from New Mexico State University in 1979. Since that time she has worked as a junior staff fellow in the Division of Teratogenesis Research at the NCTR. During these 3 1/2 years, she has effectively served as the principal investigator on the NCTR pilot study CBTS, and has played a critical role in the development of the MON for the CBTS and in overseeing the performance of the collaborative laboratories. In the remaining half of her time, she has been engaged in independent research with a strong methods development focus. Her work has resulted in 5 published articles, 4 additional articles now submitted or in NCTR review, 11 published abstracts, 4 final reports, and 19 presentations or lectures.

1. After coming to the NCTR in 1979, Dr. Adams served as a Project Officer on contract #22-80-2000(C), "Microprocessor Based Systems to Control and Collect Data from Behavioral Studies". Under this contract, two prototype laboratory systems and a developmental system were developed for use in the NCTR pilot for the Collaborative Behavioral Teratology Study. As project officer, Dr. Adams was responsible for the technical direction given to the contractors, and for all debugging and verification of the function of these systems. Upon acceptance, the contractors then fabricated 10 additional systems, 2 for each collaborative laboratory. Development of these systems resulted in a sophisticated, efficient behavioral teratology laboratory. [Exhibit 1, #18; and #20 and #25].

2. Dr. Adams conducted a review of the literature on methods now in use in comparative developmental psychobiology studies as well as studies in developmental toxicology. This resulted in a synthesis and integration of the literature which was published as a chapter entitled "Behavioral Assessment of the Postnatal Animal: Testing and Methods Development". [Exhibit 2, #11; and #4].

3. The incumbent’s major research focus is on the development or application of new methods for use in studies of developmental toxicology. This focus is critical at this time since behavioral teratology is a newly emerging discipline, and critical issues are the validity, reliability, and sensitivity of behavioral data. Dr. Adams’ work is directed at the validation of behavioral techniques used in young animals and at establishing a historical data base on normal response values. She also has focused on the development of more sensitive techniques for measuring behavioral deficits in young animals. Her work on the ultrasonic vocalization of young rodents as diagnostic indicators of developmental toxicity is very important because this response is one of the few quantitative behaviors emitted by neonatal rodents. [Exhibit 3A, #17; Exhibit 3B, #21; Exhibit 3C, #15; #19, #26, and #28].

4. Dr. Adams has served as a member of the PAG for the Collaborative Behavioral Teratology Study, and as principal investigator on the NCTR pilot study. This role led her to play a critical part in the early preparation of the MON for the collaborative study provided the PAG with a working document for discussion and finalization. Dr. Adams was also primarily responsible for designing the study protocols, writing the SOP’s for the conduct of the study, and developing the schedule of work. She also organized and conducted a workshop at the NCTR to train the technicians from each laboratory. These tasks have been essential for the successful accomplishment of the ongoing collaborative study. This study is important in providing regulatory information to the FDA on the status and/or necessity of behavioral screening systems. [Exhibit 4].

5. Dr. Adams has served as the principal investigator for the NCTR pilot studies for the CBTS. This role involved the scientific direction and management of both conventional teratology and postnatal studies. Due to the long-term nature of this work, it has resulted in one published paper and two posters presented at the Teratology Society meetings. This work has been carefully followed by scientists in industry, academia, and government. [Exhibit 5A, #16; Exhibit 5B, #22; Exhibit 5C, #23; and #29].
SUPPLEMENT 3
Curriculum Vitae

Each of the following headings must be listed and addressed. Even if there is nothing to report under a heading include the title of the heading and state "nothing to report." The reviewers will then know that the heading was not overlooked or inadvertently omitted.

Scientist's Name (Last, First, Middle Initial)

1. Educational Background
List the name of each institution and the dates attended, majors and minors, and degrees awarded.

2. Additional Training
List part-time or short term training not included in Educational Background. Any Government sponsored training must be listed under this heading. Give dated and duration of courses, credit hours, course hours, etc.

3. Professional Experience
List dates and a brief but sufficient description to enable the reader to determine significance and prestige. If a cash award was involved, list the amount.

4. Special Invitations
These are usually specific invitations to present a paper before scientific or industry groups, prepare a paper or a chapter for a book, conduct a seminar, etc. Be selective since the stature of the group which made invitation is as important as the receipt of the invitation. For each invitation, list the title of the presentation, date, location, and organization or purpose of gathering. Indicate which invitations were made to you personally and which ones were requested of the FDA/Centers to send a representative. If a paper was subsequently published, cross reference it to the publication list.

5. Licenses and Certifications
List professional licenses and certifications showing kind, licensing authority, year granted, current or expired, and brief description of special significance, if appropriate.

6. Membership in Professional or Honorary Societies
List each and show dates of membership and whether invited or elected.

7. Offices, Committee Assignments, or Special Assignments Held in Professional and Honorary Societies
List each and give dates.

8. Participation in National/International Scientific Meetings, Technical Conferences, Workshops, Seminars, etc.
List each, give date, location, type of meeting, title of talk or paper if one was presented, or brief description of role or reason for attendance if no paper was presented. Do not include items already listed under Special Invitations. If a paper was presented, cross reference it to the publication list. If the same meeting or conference has been attended a number of times, summarize the information rather than listing individually.

9. Outside Professional Advisory and Consulting Activities
List each, give dates, name and type of organization or situation, and type or significance of contribution. Generally, these should be activities outside of FDA which are not part of the regular work assignment. If there are numerous activities summarize information or list activities in recent years only.

10. FDA Special Assignments and Advisory Activities
These should be of a technical or professional nature within FDA but outside of the immediate work assignment or organization. Include items such as participation in hearings or testimony preparation, PL-480 Special Foreign Currency Program involvement, science advisor to General Counsel Office, Agency level task force assignments, etc. List each, give dates, and briefly describe the role and significance.

11. Other Significant Information
List or present narratively any information not covered in Items 1-11 above that is considered important in the evaluation of the individual as a research scientist. For example, include any scientific publication date given by the publishing agent. Educational and public relations efforts may also be listed under this item, as well as non-research and non-technical activities that may be a part of the incumbent's responsibilities (such as EEO counselor, safety committee representative, etc.). A brief description of the intended role or the individual meeting the goals and objectives of the organization, how well this role is fulfilled and how effective the individual is in cooperating with others, when this is necessary or desirable in the total program can be indicated. Any exceptional or extenuating circumstances that may have affected the quality or quantity of research output (either favorably or unfavorably) should be discussed if not covered under other items in the case material.
EXAMPLE - SUPPLEMENT 3
Curriculum Vitae
ADAMS, JANE R.

1. 1961-65 Kansas State University; major, Chemistry; minor, Statistics; B.S. 1965
1966-68 Kansas State University; major, Biochemistry; minor, Endocrinology; M.S. 1968

2. 1970 Michigan State University; 3 credit hours of toxicology
1973 Beckman Instruments; 20 hours short course on radiochemistry

3. 1968-70 GS-7 Chemist, FDA, BF, Washington, D.C.
1972-74 GS-11 Research Chemist, NIH, Bethesda, Maryland
1974-76 GS-12 Research Chemist, NIH, Bethesda, Maryland
1976-Present GS-12 Research Chemist, EARC, Cincinnati, Ohio, FDA.

4. Honors and Awards:
   Member, Phi Kappa Phi
   Member, Sigma Xi
   NIH Quality Step Increase 1976
   Elected Fellow, American Chemical Society, 1978

5. Special Invitations:
   (1) Invited to present a talk on "Relay Toxicity and Bioavailability of Residues," August, 1975, at the
       annual meeting of ACS, Chicago, Illinois. [Publication #15].
   (2) Invited to chair a seminar on "Drug Residues in Animal Tissues," May 1976, for AOAC,
       Washington, D.C. [Publication #18].

6. Licenses and Certifications: None

7. Membership in Professional or Honorary Societies:
   1979-present Behavioral Teratology Society (elected)
   1979-present Animal Behavior Society (elected)
   1979-present International Society for Developmental Psychobiology (elected)
   1974-present Psi Chi - Honorary Society in Psychology (invited)

8. Offices, Committee Assignments or Special Assignments Held in Professional and Honorary Societies:
   1979 Participated in the work group on "Neurological Effects/Behavioral Toxicology for the Evaluation of
   Current Environmental Research" sponsored by EPA and Penn State University, April 23-24.
   1982 Council member for the Behavioral Teratology Society. This involves serving as a liaison to the
   Teratology Society and other societies.
   1982 Nominated for position of conference Coordinator for the International Society for Developmental
   Psychobiology (election will be in November).

9. Participation in National/International Scientific meetings, Technical Conferences, Workshops, Seminars:
   1974 Attended and presented a paper at the annual meeting of the Rocky Mountain Psychological Association
   held in Denver, Colorado in May. [Publication #1]
   1979 Attended and presented a paper at the Teratology meetings held in Sugar Loaf, Michigan in June.
   [Publication #5]
   1979 Attended the annual meeting of the International Society for Developmental Psychobiology held in
   Atlanta, Georgia in November.
   1980 Attended and presented a poster at the Teratology meetings held in Wentworth, New Hampshire in
   June. [Publication #17]
   1981 Attended and presented 2 papers at the meeting of the International Society for Developmental
   Psychobiology held in Cincinnati, Ohio in November.
   [Publication #8 and 9]
   1982 Attended and presented a poster at the Teratology meetings held in Palo Alto, California in June.
   1983 Attended and presented a poster at the meetings of the International Society for Developmental
   Psychobiology held in New Orleans, Louisiana in November.
   1984 Attended and presented a paper at an organizational meeting for the Neurobehavioral Toxicology
   Society held in Baltimore, Maryland in May. (This meeting was held as a satellite of the Behavioral
   Pharmacology Society meetings which were also attended.
   1985 Attended and presented 2 posters at the Teratology meetings held in French Lick, Indiana in June.
   [Publication #23]

10. Outside Professional Advisory and Consulting Activities: None

11. Special Assignments and Advisory Activities: None

12. Other Significant Information: None
SUPPLEMENT 4
Bibliography

List refereed publications, including Book & Book Chapters, conference or Society Proceedings, Review Articles and Theses, in chronological order with the names of all authors, and numbered sequentially. Give full reference including journal, volume, complete pagination, date and type of publication. If the information was previously published as an abstract, so indicate by referring to the appropriate abstract(s). To be listed, a scientific or technical article must have been accepted by the publishing agent and the acceptance or publication date given. Any scientific or technical article that has been completed, but no acceptance and/or publication date given by the publishing agent must be listed in the Curriculum Vitae under Item 12, “Other Significant Information.” By a line of demarcation or a heading, indicate in the list of publications those papers published or accepted for publication or manuscripts accepted for publication or manuscripts that remain unpublished if they were listed when last peer reviewed.

Publications other than refereed articles in scientific journals or bulletins should be identified, numbered sequentially, and grouped as follows:

I. Abstracts
II. Final Technical Research Reports
   (A written report that requires clearance for public release); Patents; Popular Publications; other (give specific identification).
RESEARCH GRADE-EVALUATION GUIDE

UNITED STATES OFFICE OF PERSONNEL MANAGEMENT

Position Classification Standards

(TS 52) June 1964

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INTRODUCTION

This grade-evaluation guide is intended for use across series lines in determining grade levels of research positions. It supersedes the Guide for Evaluation of Positions in Basic and Applied Research issued in June 1960 and the Appendix - Frame of Reference Illustrations issued in August 1960. The Basic concepts and structure of the 1960 guide are essentially unchanged. This revision is primarily for the purpose of refining and improving the earlier version to make it even more useful.

The guide is in two parts. Part I covers grades GS-11 through GS-15, using a point evaluation system embodying a man-in-job concept though which the qualifications, contributions, and professional standing of the incumbent are considered directly in the evaluation process. Part II provides criteria for grades GS-5 through GS-9, using a conventional narrative format. These criteria assist in defining lower limits of Degree A of the four factors for positions in Part I. Positions in grades above GS-15 are covered in the Guide for Appraisal of Scientific Positions Proposed for GS-16, GS-17, and GS-18.

CRITERIA SUPERSEDED BY THIS GUIDE

This guide supersedes the grade-level criteria for those research positions for which the guide is intended for use. Such criteria for research positions is the following published standards are specifically superseded:

(Note: There are, of course, many other series with research positions covered by the guide.)

GS-180-0 Psychology Series
GS-403-0 Microbiology Series
GS-405-0 Pharmacology Series
GS-412-0 Parasitology Series
GS-414-0 Entomology Series
GS-415-0 Nematology Series
GS-433-0 Plant Taxonomy Series
GS-435-0 Plant Physiology Series
GS-437-0 Horticulture Series
GS-440-0 Genetics series
GS-454-0 Range Conservation Series
GS-460-0 Forestry Series
GS-470-0 Soil Science Series
GS-471-0 Agronomy Series
GS-487-0 Husbandry Series
GS-800-0 Grade-Level Guide for Non-supervisory Positions
GS-810-0 Civil Engineering Series
GS-812-0 Structural Engineering Series
GS-813-0 Mechanical Engineering Series
GS-820-0 Highway Engineering Series
GS-824-0 Bridge Engineering Series
GS-830-0 Mechanical Engineering Series
GS-850-0 Electrical Engineering Series
GS-855-0 Electronic Engineering Series
GS-880-0 Mining Engineering Series
GS-881-0 Petroleum Engineering Series
GS-990-0 Agricultural Engineering Series
GS-893-0 Chemical Engineering Series
GS-1310-0 Physics Series
GS-1313-0 Geophysics Series

GS-1320-0 Chemistry Series
GS-1321-0 Metallurgy Series
GS-1350-0 Geology Series
GS-1372-0 Geodesy Series
GS-1520-0 Mathematics Series
GS-1529-0 Mathematical Statistician Series

The above standards are being retained, however, for their applicability to type of positions that do not meet the criteria for use of this guide, and for information pertaining to determination of series, titles, and specializations.

SERIES DETERMINATIONS

This grade-evaluation guide is not intended to affect series classification. Positions classified to grade by means of this guide are to be placed in the most appropriate classification series in accordance with definitions published in the Commission's 'Handbook of Occupational Groups and Series of Classes,' and amplifying material in published classification standards.

The 'man-in-job' concept applied to grade-level determinations in Part I of this guide is applicable to series determinations also. The qualifications of the incumbent are usually highly significant in selecting the most appropriate classification series for research positions.

TITLE DETERMINATIONS

The title structure in published position classification standards typically varies in accordance with the nature of the occupation. For some series such as meteorology, forestry, and psychology, there are for most positions, rather clear organizational, duty and qualifications distinctions between research and other functions. The classification standards for such series prescribe separate research specializations with Research in the title for all research positions, including those not covered by Part I of this guide, e.g., supervisory, consultant and positions at levels below GS-11.

For other series such as physics, microbiology, geology, and mathematical statistics, there are generally no significant organizational, duty and qualifications distinctions between research and many non-research positions. Accordingly, research specializations have no been established in standards for such series.

In general, it is impracticable to arrive at a generalization concerning titles or research positions for all occupations covered by this guide. Ideally, it would be desirable to rely on the position-classification standard for the occupation in question. This was suggested in the tentative draft of the revision. However, many agencies indicated in their comments that (1) the title structure in the older standards does not reflect their current views.

1 This guide should be filed immediately following the Supervisory Grade-Evaluation Guide.
2 This document is identified as a "guide" rather than a "standard" because it provides grade-evaluation criteria for positions in many occupations, rather than describing specific classes of positions in one occupation. However, it has the same force and effect as a standard and is issued under this authority of Section 401 of the Classification Act of 1949, as amended.
based on experience with the Research Grade Evaluation Guide, and (2) they prefer the use of the prefix "Research" in the titles of research positions. In consideration of the foregoing and in order to avoid excessive title changes, we are authorizing continuation of the present titling practice for research positions, as follows:

When a research position is classifiable to a series for which a standard has been issued subsequent to June 1960 (the date of issuance of the original guide), the titling instructions in that standard will be used. For research positions in series for which the standards were published prior to July 1960, agencies may continue to use the prefix "Research" in the position title. In any case, specified criteria for titling positions as "Supervisory" should be applied as appropriate.

Part I
Evaluation of Research Positions
GS-11 Thru GS-15

COVERAGE

Part I of this guide is intended for use in the grade-level evaluation of positions engaged in basic or applied research in the biological, medical, agricultural, physical, or mathematical sciences, in engineering, or in psychology, when the positions involve either (1) the personal performance, as the highest level function and for a substantial portion of the time, or professionally responsible research; or (2) the direct and personal leadership of and participation in the activities of a research team or organization. The primary basis of selection for the position is competence and capability in the performance of research rather than capability in supervising and managing a research organization.

Concepts

"Research", as the term is used above, is systematic, critical, intensive investigation directed toward development of new or fuller scientific knowledge of the subject studied. It may be with or without reference to a specific application. Such research includes, but is not limited to, theoretical and experimental investigations (1) to determine the nature, magnitude and inter-relationships of physical, biological, and psychological phenomena and processes; (2) to create or develop theoretical or experimental means of investigating such phenomena and processes; and (3) to develop principles, criteria, methods, and a body of data of general applicability of use by others.

The term "professionally responsible" is intended to set a lower limit to the level of positions covered by Part I of this guide. This floor, which translates to GS-11 in the classification grade structure, means that, as a minimum prerequisite to evaluation by means of Part I, positions must operate at the level of responsibility typically associated with the independent performance of research investigation.

The term "independent performance" is not intended to exclude supervisory assistance in the form of general guidance as to scope and objectives, or advice and consultation during the planning, execution or evaluation stages, provided the incumbent retains personal responsibility of actually planning and conducting the study, and for organizing, evaluating, and documenting the results. It also does not exclude critical review of the product in terms of the care and thoroughness with which the scientific method was followed, the relevance of conclusions to the data, possible omissions, etc. Specific direction as to the plan of attack, detailed definition of the problem before assignment to the incumbent, the taking over of analysis, inference, or reporting by others are limitations on independence.

A member of research team working on large problems which are not segmented into project assignments that can be conducted independently may be considered to meet this minimum criterion if (a) he fully participates as a professionally responsible member of the team in the substantive aspects of the work, and (b) he makes a contribution that may be regarded as equivalent to independent performance of limited by complete research project assignment.

In the research situation, team leadership, or supervision of a small unit, is commonly based on, and "carried" by, personal competence in research rather than by supervisory and administrative skill. Consequently, this guide provides for the classification of such supervisory positions by the same criteria as non-supervisory research position. On the other hand, some positions involving team leadership or supervision of a small unit, and nearly all positions involving direction of larger research organizations, require in addition to research competence marked supervisory and administrative ability. They are therefore to be classified, in part, by other criteria.

The crux of the distinction between the two situations, of course, lies in the actual operation of the operation of the positions rather than in the number of subordinates. A supervisory position for which research competence forms the primary basis for selection and evaluation should be classified under this guide as a "team leader"; a position for which supervisory or administrative abilities are the paramount considerations in the selection and evaluation process require the use of other standards. In some situations, it will be desirable to use both this guide and the Supervisory Grade-Evaluation Guide to appraise the grade level of the position.

Related functions

In terms of characteristics of the work situation, research and development activities may be thought of as a spectrum from basic research, at one extreme, through applied research to development, test, and evaluation at the other extreme. The coverage of the guide is deliberately focused on the basic and applied research end of the spectrum.

This is not to imply that positions in basic and applied research are necessarily any more grade-worthy than positions in development, test and evaluation, or that the development, test and evaluation functions do not also call for a high degree of originality and inventiveness. Rather, the guide is focused on basic and applied research because of the differences in work situations, and the differences in language and criteria which are useful in determining grade levels.

For example, it is least possible to define or measure basic research assignments, or the expectations in terms of results. For development, test and evaluation, the assignment frequently becomes a fairly definable thing and the desired results are known. Further differences extend even to the personal interests spectrum.
There are, obviously, many positions in the "gray area" between the extremes, i.e., many positions which involve a combination of applied research and experimental development. The application of this guide to such positions must be a matter of judgment, based on determining whether there is sufficient involvement in research to render the guide applicable.

This guide is intended for use in the evaluation of positions which are essentially full-time research positions. It may also be used to appraise the research portion of mixed positions. However, in some cases, particularly where research and other functions are intertwined, it will be difficult to determine whether a position is as a whole a research position for which this guide is a suitable measuring instrument. To use this guide to evaluate such positions, all the following criteria should be satisfied:

1. The position is predominantly characterized by systematic investigation of theory, experimentation, or simulation of experiments.
2. The work is characterized by research-type application of the scientific method including problem exploration and definition, planning of the approach and sequence of steps, execution of experiments or studies, interpretation of findings, and documentation or reporting of findings.
3. There is a clear requirement for the exercise of creativity and critical judgment, variation in which may materially affect the nature of the end product.
4. The qualifications, stature, and contributions of the incumbent have a direct and major impact on the level of difficulty and responsibility of the work performed.
5. Research capability as demonstrated by graduate education and/or research experience is a significant requirement in selection of candidates.

Exclusions

This guide is not intended for use in classifying positions involving the management coordination or administration of programs of research where such responsibilities represent the controlling or paramount features in the assignment; positions primarily responsible for monitoring research grants or contracts; positions of consultants who are not involved in the personal performance or participating leadership of research; positions involving the performance of limited elements of research work; positions involving primarily engineering development, test, and evaluation; positions involving primarily library type research; positions involving research in such social sciences as history, geography, economics, and anthropology; positions limited to the conduct of field surveys to collect scientific data on natural phenomena, such as the collection of meteorologic, hydrologic, oceanographic, geologic, or biologic data; or positions limited to collection and identification of entomological or other specimens for scientific collections.

Obviously, some positions are not clear-cut. The conduct of field surveys for the purpose of collecting and reporting data, as such, is not within the narrow definition of research in this guide and is specifically excluded from coverage of this guide. However, some scientists engaged in such work may be making "theoretical and experimental investigations" and developing "principles, criteria, methods and a body of data of general applicability." The fact that the scientists use research methods and interpret his findings in the light of established principles and hypotheses has little bearing on the decision if the position does not satisfy the coverage criteria. The purpose of the work, as determined by responsible management, usually governs whether or not the position requires the conduct of substantial research of the type covered by this guide as a integral part of the work.

THE INTERACTION OF THE RESEARCH SITUATION AND THE RESEARCHER

The duties and responsibilities of a research position are especially dependent upon the interplay between the research situation or assignment (within an appropriate job environment) and the individual qualities of the incumbent. Creativity and originality are inherently of central importance in a research situation, because the purpose of research is to extend man's knowledge and understanding. Yet, while the job situation may call for creativity and originality, the extent to which these qualities are actually brought into play is dependent in large part on the incumbent. Furthermore, while non-research situations are typically structured as to breadth (necessarily so, in order to fix responsibility and prevent functional overlapping) the research situation is typically expandable in breadth in accordance with the incumbent's capabilities. Hence, it is recognized that where the nature of the research situation involves a high potential for original and creative work, the work of the position may be performed at any one of several levels, depending in part and his motivation. This leads to what may be termed a "man-in-job" concept, based on the interaction of the assignment and the incumbent.

This concept is not unlike the principle, long recognized in many non-research positions, that the qualifications of the incumbent may materially modify the position as actually performed. There are, however, two factors which make it particularly important and desirable to recognize this man-in-job concept in research positions. First, because of its "unlimited ceiling," and "expandable breadth," the research situation is much more likely to provide opportunity for full play of the incumbent's capabili-
ilies than the frequently more structured and limited non-research situation. In the second place, it is likely that in the non-research situation the incumbent's impact on the job will be reflected in ways (such as additional duties or function; greater authority for action; more difficult assignments where the difficulty of assignments can be predicted; less supervisory review, etc.) which are less subtle, and which can be identified and measured by more conventional means.

In recognition of the fact that the incumbent's personal qualifications do, in a research situation, have a profound impact on the dimensions of the job which results, this guide provide for considering both the research situation or assignment, and the qualification for the scientist who occupies the situation or assignment. These factors together constitute the position actually being performed and form the basis for determining grade level.

**CLASSIFICATION OF VACANT POSITIONS**

The "man-in-job" concept expressed above would seem to lead to difficulty in classifying vacant positions. The difficulty is, however, more apparent than real. A vacant position may be classified either (1) on the basis of a total factor pattern consonant with the qualification to be required of any candidate selected for the position (then, obviously, the qualification requirements should not be compromised in the selection process without reconsidering the impact of such compromise on the classification); or (2) if a candidate has been tentatively selected, in consideration of the factor pattern appropriate to his qualifications. Then, obviously, the position evaluation must be reconsidered if the tentatively selected candidate is not finally appointed, and other candidates of different qualifications are considered.

**RELATIONSHIP TO GRADES OF SUPERVISORS**

This guide is expressly designed to recognize the grade value of non-supervisory performance which involves a very high degree of technical independence, a high degree of originality, and a high level of professional recognition and contribution. It is based on the thesis that while supervision is one ladder to higher-level responsibility in scientific work, there is another ladder - the ladder of personal creativity and scientific contribution. While a good supervisor can do much to create a favorable climate and to stimulate creativity and originality, in the final analysis, creativity and originality come from within the person who displays them.

Since these factors are personal to the incumbent, are subject to "supervision" to only a very limited degree, and are an alternate ladder to high-level work, it is not considered necessary that supervisors of research work always be in higher grades than any of their subordinates. In other words, it may be possible for the contribution of a highly creative non-supervisory researcher to merit the same grade (for different reasons) as the contribution of the supervisor of the organization or unit. Nor is it considered that this situation can exist only where the supervision is purely administrative in nature. Technical supervision, including overall evaluation of results and guidance as to priorities of research to be undertaken, may be present without necessarily

limiting the originality and creativity of subordinates.

Thus, positions graded under this guide may, in some instances, be properly classified in the same as, or conceivably (albeit rarely), in a grade above that of the supervisor of the position. This can occur when the grade of the researcher is determined by highly independent personal performance and his personal creativity, stature, and contributions.

As indicated under "Coverage," many supervisory research positions may be classified under the team leadership criteria in this guide. Additional guidance in the evaluation of supervisory positions will be contained in the Supervisory Grade-Evaluation Guide, Part II, to be issued shortly.

**FACTORS FOR EVALUATING RESEARCH POSITIONS**

While the specifics of subject matter dealt with will vary according to the scientific or engineering field involved, grade levels of research positions have been found to depend on essentially the same elements, regardless of subject field. In this guide, these common elements have been grouped into the following four factors:

I. The research situation, or assignment
II. Supervision received
III. Guidelines and originality
IV. Qualifications and scientific contributions

Factor IV, Qualifications and Scientific Contributions, is double weighted to reflect its importance and to offset what would otherwise be a disproportionate orientation toward the assignment and work situation in the other factors. It is recognized that there is considerable overlap between these factors. However, each is focused on a different aspect of the job-incumbent relationship. By considering and rating them separately, somewhat more precision and a greater degree of consistency can be obtained in the final evaluations than would be possible if a single overall evaluation were made.

The following notes relate to application of the factors:

**Factor I, The research situation, or assignment**

This factor deals with the nature, scope and characteristics of current studies being undertaken by the incumbent. The level credit for this factor should be based on a sufficient span of time to reflect the norm of current assignments rather than isolated and atypical projects. However, this factor is intended to reflect the situation or assignment in the current job, rather than a summation of the incumbent's assignments over a long period of time.

In the case of a true team leader, i.e., one who is considerably more than a straw boss, a level should be credited which reflects the scope and character of projects being conducted by his team. In the case of a team member, the level should be based not the total projects carried by the team, but upon the specific projects, or portion of the team, but upon the specific projects, or portion of the team, carried by the incumbent.

It is the inherent difficulty and complexity of the research problem(s) which determine the level to be assigned for this factor not the question of whether research is the basic or applied.

For measurement purposes, the primary consider-
ations in the research assignment are its scope and complexity, its objectives, the means of accomplishment, and the expected end result. The breadth of the problem and the depth or intensity of the required investigation are basic issues. The extent of related research studies, the extent to which objectives can be defined, the number of unknowns, the critical obstacles, and the variety and intensity of the knowledge which must be brought to bear for the solution of problems are also appropriate measures of relative difficulty and complexity.

In considering the expected end-product of research effort, the impact of the results on scientific theory and practice may be of significance. Also, important in consideration of the end-product are the extent and complexity of the validation processes required, the necessity for conversion of abstract concepts to hardware and/or to readily understood statements of theory, and the fruitfulness of the product in solving the initial situation and in opening new areas of investigation.

**Factor II, Supervision received**

This factor deals with the supervisory guidance and control exercised over the position of the researcher, and also relates to the current job situation. Considerable, care is required to evaluate this factor. In a research situation, a considerable amount of effective supervision may exist with only a minimum of formal supervisory contact. On the other hand, consultations with colleagues of higher, lower or equal standing in the organization are essential to maximum effectiveness of researchers at all levels, and should be distinguished from supervision.

The effect of controls upon the positions may be measured by the incumbent's freedom for determination of course of action, and the degree of finality of his recommendations and decisions. Also to be considered are the manner in which he receives his assignments, the opportunity for procedural innovation, and the degree of acceptance of his final product.

**Factor III, Guidelines and originality**

This factor deals with the creative thinking, analyses, syntheses, evaluation, judgment, resourcefulness, and insight that characterize the work performed in the current job situation.

Guidelines usually consist of the literature in the field, procedures, and instruction; or precedent situations which may be adapted or modified to meet the requirements of the current situation. Points to be considered in relation to these guidelines are: (1) the extent and nature of the available written guides, (2) the intrinsic difficulty encountered in applying the guides in terms of their ready adaptability to the current situation, and (3) the degree of judgment required in their selection, interpretation, and adaptation.

In assessing the impact of creativity found in the position, three considerations are important. The first consideration involves the requirement for original and independent creation, analysis, reasoning, evaluating, judging, and choosing between alternative methodologies. Also to be considered is the required interpretation of findings, translation of findings into a problem solution, and recording of these findings and interpretations in a form usable by others as well as in application to specific end-products. The third consideration is the impact of theories, principles, concepts, techniques, and approaches developed by the incumbent upon the scientific field of his research effort.

**Factor IV, Qualifications and scientific contributions**

This factor is not restricted to present and immediate past job performance. It is intended to focus on the total qualifications, professional standing and recognition, and scientific contributions of the researcher, as these bear on the dimensions of the current research situation and work performance. Particular care must be observed to consider only those features of the factor which have a significant impact on the job.

The degree of Factor IV is expressed in part in terms of standing and recognition in a specialized field. A researcher who is a recognized specialist in one field may be re-assigned to a related field without change in degree of Factor IV, when it is expected by management that the researcher will probably perform at substantially the same level of competence after a reasonably short orientation period.

In evaluating this factor, consideration should be given to a negative findings, which may be contributions to knowledge and guides to further research just as much as "positive" findings.

In some research situations, security regulations or other circumstances prevent publication of research results, and make it impossible to evaluate the work on the basis of its impact on the larger scientific community. In such cases, the work will have to be evaluated by means of the best possible judgment of its importance and the impact it would have if it could be published.

Undue emphasis not be accorded mere number of publications; their quality and scientific significance, and especially the number of quality contribution, are more important.

Regency of accomplishment is important. Although the total history of accomplishment is considered, recent research of similar activity which assures maintenance of research competence is essential to full credit for past accomplishments.

Research positions of the type covered by this guide are characterized by a continuing personal struggle to keep abreast of rapidly advancing and changing disciplines. In resolving border-line determinations of degree of this factor, consideration should be given to whether the incumbent is engaged in current and vigorous professional development.

In evaluating the degree of Factor IV, Qualifications and Scientific Contributions, consideration must be given to the level of education completed. In general, research positions covered by this guide are of such nature that a bachelor's or higher degree is typically a requirement. (Some but not all qualification standards for research positions include such a requirement.) Moreover, for some types of work, particularly basic theoretical research, graduate education is generally regarded as almost essential to the professional stature represented by the higher degree levels of Factor IV. On the other hand, a doctorate in and of itself would not warrant more than Degree A. However, a researcher with a Ph.D. whose graduate work demonstrated superior research ability (as defined in applicable qualification standards) may be assigned Degree B.
EVALUATION SYSTEM

Each of the four primary factors which must be evaluated has a very wide degree range. To serve as key points for evaluating each factor as it applies to a particular position, three degrees A, C, and E with point values of 2, 6, and 10, respectively (values 8 and 16, in Factor IV), because we have not been able to develop language precise enough to express these degrees without some overlapping of words. However, degrees B and D and their point values are an integral part of the plan, and are to be used when an element is determined to fall between the defined degrees.

Ordinarily, the use of point values between any two of the five degrees (e.g., 3 points for the a degree of Factor I between A and B) is not recommended. Under most circumstances, such refined distinctions in judgment cannot be reliable, may create an impression of more refinement may only result in a false appearance of precision. However, the use of these values is not precluded under circumstances in which their use is supported by sound judgment.

The evaluation system involves a separate determination of the proper degree (A, B, C, D, or E) for each factor; assignment to each factor of the point value of the degree assigned; and conversion of the total point value to a GS-grade by means of the Grade Determination Chart and accompanying instruction. If a position fails to measure up to degree A for a factor, it need not be assigned any points for that factor. (Failure to measure up to Degree A for Factors I or II would preclude use of Part I of this guide.)

The definition of Degree E for each of the four factors is followed by a definition titled "In Excess of Degree E." These definitions do not illustrate specific degrees, nor do they have assignable point values, but rather are intended to provide additional guidance concerning the extent of Degree E. Thus, these "In Excess of Degree E" statements are useful elements of the guide for appraisal of positions in grades GS-15 and below. If, for one or more factors, a position exceeds Degree E (not necessarily to the extent shown by the "In Excess of Degree E" statement) additional points may be assigned by extrapolation.

These "In Excess of Degree E" statements of the factors point up the absence of a GS-15 ceiling on researcher positions. Although these higher levels of the factors are not directly translatable in terms of specific grades above GS-15, they are useful as indicators of positions which support allocation above GS-15.

Evaluation systems of this type have been found to be useful aids to the formulation, recording, and consolidation of a series of judgments. The fact that subjective judgment are quantified should not be allowed to obscure the fact that they are judgments and that final decision should rest on sound application of judgment rather than upon uncritical application of numbers. In applying a degree definition the definition as a whole, in its total context, must be applied not isolated words or phrases.

The inter-relationship and interaction of the factors need to be considered carefully in assigning factors degrees. In general, the correlation of the factors (and good management practice) would tend to preclude more than a 2-degree difference between the factor degrees assigned to different factors. For example, the scope and complexity of the actual research situation (as distinguished from what it might be) need to be correlated with the ability and competence of the incumbent. Thus, if a researcher with Degree E qualifications were to undertake what is generally regarded as a typical Degree A assignment, his depth of insight and penetration and original approach could convert the routine Degree A assignment to a complex Degree C or higher assignment.

PROCEDURAL SUGGESTIONS FOR USE OF EVALUATION SYSTEM

The procedures for application of this guide are, of course, a matter for agency determination. The guide may be applied by procedures ranging from normal use by position classifiers (with adequate care and attention given to ascertaining from subject-matter specialists the degree of novelty and complexity of projects and the contributions and professional status of the incumbent), to application by a panel with joint researcher-classifier membership.

However, because statistical evidence indicates that more reliable results may be expected if panels are used, the use of panels is recommended. Since some of the judgments called for by the guide can best be made by researchers, with their fund of relevant technical knowledge, and since joint participation on the panel affords an excellent opportunity for close cooperation and the merging of the contributions which can be made by professional personnel and by classifiers, joint researcher-classifier membership on panels is recommended.

If panels are used, we suggest that they include a reasonable diversity of disciplines to assure a better perspective with respect to the relationship of the specific position to broader areas of research. (The limited statistical evidence available indicated that panel members in other disciplines than that of the position being rated can rate accurately if the facts regarding the position are clear.)

Where panels meet as a group, and reach an understanding as to job facts before they undertake to evaluate the job, results seem to be more consistent than where a dossier concerning the job is passed around and each attempts to rate the job without prior discussion. However, care needs to be exercised to confine discussions prior to rating to facts, and to avoid prejudicing the individual ratings by premature expressions of conclusions. The individual raters should rate independently. Because of the importance of subjective judgments of knowledgeable scientists and engineers in the evaluation process, the classification record should identify the scientists and engineers who provided the appraisals, individually or as members or panels.

Some agencies that have reported successful use of evaluation panels in the use of the guide have limited the use of panels to positions at GS-13 and above in order to reduce the workload on key professional personnel. Other organizations report that collateral values derived from the use of evaluation panels warrant the additional effort and cost of using the panel method at lower grades, as well.

Information regarding achievements, publications, appearance before professional organizations, reviews, of the researcher's work, etc., will need to be

Footnote:
4 For detailed information concerning the analysis and the results obtained, see "A Rating Scale Method for Evaluating Research Positions," by H. Alan McKeen, John Mandel and Mary N. Steele, in July-August, 1960 Issue of Personnel Administration.
probably confusing, may create suspicion, and likely will be misunderstood. Remembering that the single responsibility and action of a panel is to make a classification decision, that a ten point difference exists between grade levels, and that regency of accomplishment is essential just to maintain grade level, many conference reports might well read:

'Congratulations! You have been retained in grade. Keep up the good work'.

When constructive suggestions from a classification point of view (usually related to making more quality research accomplishments) can be made, they should be clearly and concisely stated. Highly subjective, personal, or controversial information that is difficult to write understandably should not be included in the report but if deemed significant should be communicated orally to the appropriate person(s).

The format for the Career Evaluation Report is attached. (Exhibit 3)
DEGREE DEFINITIONS

Factor I: The research situation, or assignment:

Degree A (2 points)
Projects consist of scientific investigations of limited scope, with readily definable objectives, which require only fairly conventional techniques. Such investigations may stand alone as studies of specific phenomena or problems, or they may be segments in a structure of related investigations. In either case, the specific assignment typically requires the incumbent to perform or to participate responsibly in all phases of the complete research process including problem definition, planning, execution, analysis, interpretation, and reporting of findings.

Projects may be studies in new areas, where the objectives are clear-cut and fairly conventional means can be used; they may involve applying existing theory or methods to new classes of subjects, or to classes of subjects previously experimented with, under various controlled changed in conditions; or they may involve reruns or adaptations of previous studies in the light of changes in theory, improvement in techniques and instrumentation, etc.

Projects are expected to result in a publishable addition to scientific knowledge or in a comparable contribution to the development of a new or recognizably improved method or technique.

Degree C (6 points)
The incumbent is responsible for formulating and conducting a systematic research attack on a problem area of considerable scope and complexity. The scope of the problem area is typically such that it must be approached through a series of complete and conceptually related research studies. These may be carried out personally by the incumbent, or by a team of which the incumbent is the leader. In terms of complexity, problems are typically difficult to define; require unconventional or novel approaches; require sophisticated research technique; and/or present other features of more than average difficulty.

Characteristically, research studies of this scope will result in a series of publishable contributions to knowledge which will (a) answer important questions in the scientific field, account for previously unexplained phenomena, and/or open significant new avenues for further study; (b) represent an important contribution to the validation or modification of scientific theory or methodology relating to the topic area; (c) result in important changes in existing products, processes, techniques or practices; and/or (d) be definitive of a specific topic area.

Degree E (10 points)
At this level, the research situation consists of:

(1) Responsibility, ordinarily as a team leader, for formulating and guiding a research attack on problems in applied research which have been recognized as critical obstacles to progress or development in areas of exceptional interest. The solution of such problems would represent a major advance, opening the way for extensive related development; or

(2) Responsibility for attacking basic research problems which have been recognized as exceptionally difficult and unyielding to research analysis so that their solution would represent an advance of real significance.

While it is not possible to stipulate "success" in the solution of such problems, for the research situation to be evaluated at this level a reasonable expectation of fruitful work on problems of such difficulty and magnitude is presupposed. In any case, a significant rate of progress is expected; or

(3) Responsibility as a team leader for attacking problems of such scope and complexity as to require subdivision into separate phases of which several are characteristics of Degree D. (Position of this type necessarily involve substantial supervisory responsibility.)*

*Excess of Degree E

The research situation is characterized by:

(1) Responsibility as a team leader for formulating and guiding a broad scale attack on problems in frontier areas of critical importance to major national programs. The project is of such complexity and scope that it must be subdivided into a number of separate experimental and theoretical research phases, several of which are typical of Degree E of this factor; or

(2) Responsibility for attacking basic research problems of such fundamental interest, extraordinary difficulty, and resistance to attack that (a) there have been numerous attempts by highly competent scientists to explore the area and to gain a fundamental understanding of the processes or phenomena; (b) new hypotheses, concepts, and techniques must be developed for attack, and interpretation; and (c) the successful performance of the work will lead to the major modification or important extension of current theory.

In either (1) or (2) above, the assignment and leadership exercised influence the shaping of agency program goals, advancement of programs and understanding in the total field, and the planned activities of numerous scientists in Government, academic institutions, and private industry.*

Factor II: Supervision received

Degree A (2 points)
Most typically, the specific problem is assigned by his supervisor with general instructions as to scope and objectives of the study. The study may, however, be suggested by the incumbent, and undertaken after supervisory approval. The incumbent confers with his supervisor regarding definition of the problem, its relationship to broader research goals of the activity, and the development of a plan of attack.

The direction and guidance thus received are aids to the incumbent in the critical problem definition and

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5 Substantive changes in degree definitions as compared to the 1960 version of this guide are marked by asterisks.
planning stages, but do not remove his personal professional responsibility for the completeness and adequacy of these steps. From this point, incumbent is expected to take responsibility for the study and pursue it to completion, showing problems ordinarily entailed in accomplishment of the work with only occasional reference to the supervisor. Decisions that materially change the nature of the work (e.g., decisions to discontinue work, change emphasis, or change plan of attack) originate elsewhere or are approved by the supervisor.

Incumbent interprets results of own work, and prepares reports and papers which are reviewed for inclusion of necessary supporting information, completeness, clarity, and results. Work is reviewed for adequacy of method, for completeness and for results.

Degree C (6 points)
In programmed or applied research, the researcher is typically assigned a broad problem area; in basic research he may not be given an "assignment," but may work with substantial freedom within an area of primary interest. In either event, he is allowed substantial freedom within an area of primary interest. In either event, he is allowed substantial freedom in identifying, defining and selecting specific problems for study, being responsible for determining what appear to be the most fruitful investigations and approaches to the problem area.

The researcher is responsible, with little or no supervisory assistance, for formulating hypotheses, for developing and carrying out the plan of attack, for coping with novel and difficult problems requiring *modification of standard* methods, for analyzing and interpreting results, and for preparing comprehensive reports of findings.

The supervisor is kept informed, through occasional discussions, of general plans and progress of the work. The supervisor approves plans which call for considerable investments of time or equipment; and is responsible for final decisions concerning direction of work, and concerning changes in or discontinuance of important lines of investigation, particularly if they involve abandonments of what had been thought to be promising lines of investigation or of a substantial research investment. However, the researcher's professional judgment is relied on to such an extent that his recommendations are ordinarily followed. The supervisor attempts to create a climate conducive to the generation of ideas though staff discussions, seminars, etc. The researcher has full responsibility for decision regarding use of equipment and other resources made available to him. His completed work and reports are reviewed principally to evaluate overall results.

Degree E (10 points)
Technical supervision is nominal *and consultative in nature.* The researcher works under broad administrative supervision, which is *generally limited to approval of staffing, funds, and facilities,* and broad agency policies. Within the framework of management objectives, priorities, and pressures for results, the researcher is expected to locate and explore the most fruitful areas of research in relation to the agency’s program and needs and the state of the science involved; to take complete responsibility for formulating research plans and hypotheses and for carrying them through to completion; and to take full technical responsibility for interpreting findings, including interpreting their applicability to activities and interests of the agency, and their broader applicability to basic scientific methodology. Within the agency, these interpretations are accepted as technically authoritative, and become the basis for necessary administrative action. They are, of course, subject to further test and ultimate validation or modification by the scientific community and management decisions on the use of the results of research.

In Excess of Degree E
The supervision received is characterized by:
(1) a degree of confidence in and reliance on the researcher's productivity, competence, and judgment such that there is an unusual level of support of his recommendations and his most novel and as yet seemingly fruitless investigations;
(2) responsibility such that interpretation, recommendations and conclusions having major impact on matters of real urgency and significance are furnished other agencies and the professional community without reference to or knowledge of higher authority in the agency, and
(3) a supervisory relationship that fully reflects recognition of the researcher as both (a) a top technical authority in his field in the agency and (b) a distinguished and brilliant scientist.

Factor III: Guidelines and Originality

Degree A (2 points)
Existing theory and methods are generally applicable to most, though not necessarily all, parts of the problem. Available material may contain some inconsistencies, may be partially un-confirmed, and/or may suggest several different possibilities of dealing with the problem at hand. The originality required of an incumbent at this degree is primarily the development of a complete and adequate research design for his specific problem, based on use of sound professional judgment in selecting and adapting from available possible methods and techniques those best suited to the immediate problem. This may involve the application of highly complex (but established) experimental techniques, or some modification of details of technique or method. This degree involves only a limited amount of innovation or modification of procedures and techniques.

Degree D (6 points)
In basic research, available guides and precedents, e.g., existing literature in the field, are limited in usefulness (are contradictory, contain critical gaps, are only partially related to the problem) or may be largely lacking because of the novel character of the work being done. A high degree of originality is required in defining problems which are very elusive and/or highly complex, in developing productive hypotheses for testing, in identifying significant problems for study in developing important new approaches, methods, and techniques, and interpreting and relating the significance of results to other research findings.
In applied research this degree typically involves development and application of new techniques and original methods of attack to the solution of important problems presenting unprecedented or novel aspects. This includes application of a high degree of insight to isolate and define the critical features of the problems; and application of a high degree of originality and ingenuity in adapting, extending, and synthesizing existing theory, principles and techniques into original and non-obvious combinations or configurations, and in defining and conducting the specific research studies necessary for the solution of the problem dealt with.

Degree E (10 points)
This degree of originality is represented by:

(1) Creative extension of existing theory or methodology, or significant contribution to the development of new theory of methodology which is of such scope as to supplant or add new dimensions to a previous framework of theory or methodology (for example, the new theory may represent a higher abstraction which includes relevant prior knowledge, at least as special cases of the new and which accounts for phenomena which may have been inconsistent with prior theory); or

(2) Responsibility (particularly in applied research, for applying a very high degree of imagination and creativity in the solution of problems of marked importance (for example, to the scientific field, to national defense, to health, to major segments of the national economy, etc.), for which there is an almost complete absence of applicable guidelines, pertinent literature, and methodology.

*In Excess of Degree E

The work is characterized by the application of such unusual productivity, creativity, and depth of insight into the fundamental nature of phenomena and their relationship as to produce a substantial variety of new methods and techniques, of new approaches to formerly intractable problems, of identification of new problems to be attacked, and of important new concepts and discoveries, inclusive of the type described in Degree E of this factor. New areas are opened up for exploration, the findings have widespread applicability to other fields of science and technology, and there is likely to be a major stimulus to scientific and technological effort and achievement in the field of endeavor.*

Factor IV: Qualifications and scientific contributions

Degree A (4 points)
The researcher typically performs independent research, or serves as a full member of a research team. He has demonstrated, through satisfactory planning and execution of one or a few research studies, ability to define his problems clearly, to perform the necessary background research, to develop an appropriate plan of attack, to execute the research plan, to organize and evaluate the results, and to prepare acceptable reports of findings, with some guidance as to objectives and occasional consultations during the progress of his study.

Work may be expected to result (or has resulted) in co-authorship, in a secondary role, of one or more major papers or reports of considerable interest to the scientific field, or in primary authorship of one or more minor papers or reports which will serve (or have served) chiefly to fill narrow blanks in an existing framework of knowledge, or corroborate existing theory, or to report findings of limited scope.

The researcher serves as a source of information on his own research projects, principally to researchers within his own laboratory or *sphere of investigation, and on related or similar projects elsewhere.*

Degree C (12 points)
At this degree, the researcher has demonstrated his ability as a mature, competent and productive worker. He will typically have authored one or more publications of considerable interest and value to his field (as evidenced by favorable reviews, by citation in the work of others, by presentations of papers to professional societies, etc.) and/or he will have contributed inventions, new designs or techniques which are of material significance in the solution of important applied problems.

His contribution involves leadership of a productive research team, or, leadership in the conception and formulation of productive research ideas (as evidenced by the fact that his ideas have been the basis for productive studies by others, within or outside his immediate organization), and/or highly productive (in terms of both quantity and quality) personal performance of research of such originality, soundness, and value as to have marked him as a significant contributor to his professional field. He is beginning to be sought out for consultation by colleagues who are, themselves, professionally mature researchers. Further evidence of his emerging recognition may be selection to serve in important committee assignments of professional groups. He is qualified to speak and deal responsibly concerning technical matters in his area of immediate specialization with researchers within and outside his own organization.

Degree E (20 points)
At this degree, the researcher has demonstrated outstanding attainment in a broad, or in a narrow but intensely specialized field of research. He will typically have authored a number of important publications, of which at least some have had a major impact on advancing the field, or are accepted as definitive of important areas of it, and/or he will have contributed inventions, new designs or techniques which are regarded as major advances in basic or applied research, and which have opened the way for extensive further developments of great importance to the scientific field, to the agency, or to the public.

Contributions at this degree are of such importance and magnitude that they serve to move the art forward to the extent that other researchers must take note of the advance in order to keep abreast of development in the field.

He is sought as a consultant by colleagues who are, themselves, **specialists in his field; he speaks authoritatively regarding his field in contacts within
and outside the Government. Invitations to address *national* professional organizations, and recognition in the literature of his field through favorable reviews and numerous citations by others are further typical evidences of attainment. *For purposes of comparison with private employment, the level of attainment contemplated at this degree may be considered to be roughly comparable to that of a full professor at a major university.*

*In Excess of Degree E*

The incumbent is a nationally recognized authority and leader in an area of widespread scientific interest and investigation. He will typically have received honors and awards from major national organizations for his accomplishments. He is sought as an advisor and consultant on scientific and technological programs and problems which extend well beyond his own field. His reputation as a scientific leader is such that he serves as a recruiting attraction for recent graduates who seek opportunities to work under his inspiration and guidance in order to catch some of his imaginative flair, critical judgment, and research technique. *His personal competence is likely to be a major consideration in agency sponsorship of programs in his field.*

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