REED COLLEGE

OFFICE OF
THE PRESIDENT

3203 Southeast
Woodstock Boulevard
Portland, Oregon
97202-8199

telephone
503/777-7500
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503/777-7701

March 11, 2010

A. Francis DiMeglio, Project Manager
Research and Test Reactors Branch A
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation
Washington, D.C. 20555-0001

Dear Mr. DiMeglio:

The purpose of this letter is to provide the Nuclear Regulatory Commission with assurance that Reed College will fund and carry out the required decommissioning activities for its TRIGA Mark I Research Reactor if and when this reactor is decommissioned. The cost estimate in 2010 is approximately $1 million.

Currently, we have no plans to decommission the reactor. Therefore, for purposes of planning, we are assuming that the reactor will continue to operate under a renewed license that will not expire until at least October 3, 2027. The College will continue to provide adequate annual funding for the safe operation of the reactor.

Sincerely,

Colin S. Diver
President

cc: Stephen Frantz
Peter Steinberger
Edwin O. McFarlane

RESTATED ARTICLES OF INCORPORATION
OF
THE REED INSTITUTE

ARTICLE I

The name assumed by this corporation and by which it shall be known is THE REED INSTITUTE, and its duration shall be unlimited.

ARTICLES II

The object, business and pursuit of this corporation shall be:

a. To establish and maintain at the City of Portland in the State of Oregon, an institution of learning wherein shall be taught the principles of scientific, literary and classical education, with such departments of learning, galleries of art, natural and technical museums, appliances for manual training, and such other departments and appliances as the Trustees thereof, and their successors, may from time to time prescribe.

b. To promote intellectual and moral culture; the development of the fine arts, and the diffusion of practical knowledge among the citizens of the City of Portland and of the State of Oregon, and especially deserving young men and women earning their own livelihood.

c. To take, receive, have, own, hold and sell or otherwise dispose of all the property of whatever nature or description by the Last Will and Testament of Amanda W. Reed, devised and bequeathed to the Trustees therein named, and their successors in said trust, and to manage, invest, and apply the same, or the proceeds of the sale thereof and the income therefrom arising in the manner and for the purposes in and by the said Will provided and specifically directed and as hereinbefore expressed.

d. To receive, own and hold, by gift, bequest, devise, grant or purchase, any real or personal property, and to mortgage, sell or otherwise dispose of the same for the benefit, uses or purposes of the corporation.

e. To acquire, construct, equip and maintain buildings and appurtenances necessary or convenient for the purposes aforesaid, and to do all other lawful things necessary to carry into effect the objects and purposes before enumerated.

ARTICLE III

No Trustee of this corporation shall receive compensation for his or her services as such Trustee.

ARTICLE IV

The property and business of the corporation shall be managed and controlled by a Board of Trustees. The number, qualifications, and terms of office of members of the Board of Trustees shall be as specified in the bylaws of the corporation.

ARTICLE V

The said The Reed Institute is and shall be located at the City of Portland, Multnomah County, State of Oregon.

ARTICLE VI

No trustee or uncompensated officer shall be liable to the corporation or any of its members for monetary damages for conduct as a Trustee or officer, provided that this provision shall not limit the liability of a Trustee or officer for any of the following:

a. Any act or omission occurring prior to the date when this Article becomes effective;

b. Any breach of the Trustee or officer's duty of loyalty to the corporation;

c. Any act or omission not in good faith or which involves intentional misconduct or a knowing violation of law;

d. Any unlawful distribution;

e. Any transaction from which the Trustee or officer derived an improper personal benefit or;

f. Any act or omission in violation of the Trustee's conflict of interest provisions of ORS 65.361, the prohibitions on loans and guarantees in ORS 565.364, or the prohibitions against unlawful distributions in ORS 65.367.

ARTICLE VII

This corporation is a public benefit corporation as defined in the Oregon Nonprofit Corporation Act.

ARTICLE VIII

The corporation shall have no members.

ARTICLE IX

Upon dissolution of this corporation, any assets remaining after the payment of all debts, claims and obligations shall be distributed only to such organizations as have been granted exemption from federal income tax pursuant to the provisions of Section 501(c) (3) of the Internal Revenue Code of 1954, as amended.

2009-10 Reed College Trustees:

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Mr. Richard H. Wollenberg
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Longview, Washington 98632-3503

ALL ARE UNITED STATES CITIZENS
George James has dual citizenship: US/UK

2009-10 Reed College Officers:

Colin Diver
President
Reed College
3203 SE Woodstock Blvd.
Portland, Oregon 97202

Peter Steinberger
Vice President/Dean of the Faculty
Reed College

Edwin O. McFarlane
Vice President/Treasurer
Reed College

Hugh Porter
Vice President for College Relations
Reed College

Michael Brody
Vice President/Dean of Student Services
Reed College

THE REED INSTITUTE
dba Reed College

RESOLVED, that any one of the following, to wit:

Colin S. Diver, President

Edwin O. McFarlane, Vice President/Treasurer

are and hereby authorized to sell, assign, transfer or dispose of any stocks, bonds, or other securities now or hereafter owned or held by the Corporation.

RESOLVED FURTHER that the aforesaid persons are authorized and empowered to execute necessary documents for the sale, assignment or transfer of real property owned by the Corporation.

RESOLVED FURTHER that the aforesaid persons are authorized and empowered to make, collect, discount, negotiate, endorse and assign in the corporate name, all checks, drafts, notes, and other paper payable to or by this Corporation; to make and enter into any and all agreements, including, but not limited to, Special Depository Agreements and Arrangements with reference to the manner in which, the conditions under which, or the purposes for which funds, checks or other items of the Corporation may be deposited, collected or withdrawn; to delegate to others such authority in connection with any Special Depository arrangement that may be deemed appropriate, and to do and perform such other and further acts and things in connection with or pertaining to the establishment of any account or the transaction of any banking business with said Bank as they may consider proper.

RESOLVED FURTHER that the aforesaid persons are authorized and empowered to purchase or otherwise acquire real property and tangible personal property for and in the name of the Corporation; and

RESOLVED FURTHER that the aforesaid persons are authorized to execute and deliver all such documents as they may deem necessary or appropriate to purchase or otherwise acquire real property or tangible personal property in accordance with the foregoing resolution and to take any other actions that they may deem necessary or appropriate to carry out the intent thereof.

I, Kathleen Rose, Assistant Secretary of The Reed Institute, hereby certify that the foregoing is a true copy of Resolutions duly adopted by the Executive Committee of the Board of Trustees of said Corporation on the 19th day of April, 2002, to be effective on the 1st day of July, 2002, and that the same has not been repealed or amended and remains in full force and effect.

I further certify that the authority thereby conferred is not inconsistent with the Charter or By-Laws of this Corporation.

Dated 2-4-10

Seal

Kathleen O. Rose

Kathleen Rose, Assistant Secretary of
The Reed Institute

Douglas C. Bennett, Provost
Reed College
3203 SE Woodstock Boulevard
Portland, OR 97202-8199

March 9. 1992

Dear Dr Bennett:

We are pleased to provide this written report of our review of the Reed Reactor Facility (RRF) which was carried out on February 6 and 7. Our efforts were largely directed towards answering the questions posed in your letter to us of January 17 regarding the future of the facility. To that end we reviewed the draft Mission Statement, annual reports, and other documents provided us, inspected the physical facilities, and interviewed a number of Reed faculty and students involved with the facility as well as outside users and interested individuals. We are grateful to all those we talked with for their courtesy and frankness in responding to our questions.

The RRF is a potential*/ valuable educational, research, analytical, and radionuclide production resource that is currently at a crossroads with respect to its continued operation. Over the years, the facility has existed at a marginal subsistence level through the heroic efforts of a number of dedicated individuals, maintaining a low profile with Reed faculty, students and administrators through benign neglect. Recent events, including the unusual event of November 23. 1991. and the need to make more permanent staffing arrangements, have served to focus attention on the facility. Our opinion is that RRF should not be permitted to continue as an out-of-sight, out-of-mind, low profile stepchild, expected to make it on its own resources. We are pleased that the College administration has seen fit to seek external advice and to squarely face the issue of the future of the facility. While this report has been kept brief, we have attempted to provide details of our notions in a number of areas that we hope will be useful in your deliberations.

The decision facing the College is simple: either continue operation of the facility under revised circumstances, or decommission the facility. The decision should be made swiftly and without equivocation and should be implemented rapidly. Should the decision be made to decommission, then a plan should be immediately drawn up to put in place the necessary staffing and other financial resources to initiate and complete the task expeditiously and with as little fanfare as possible. We would estimate the decommissioning would take at least two years and an expenditure of at least $500,000.

If the decision is made to continue operation, which is our personal recommendation, a solid commitment from the administration must be made to guarantee the necessary funds, personnel, and administrative support to refurbish this long-neglected facility and ensure its operation as a first class educational facility and ancillary resource for at least the next 10 to 20 years. The situation that currently exists must not be allowed to occur again, where a severely understaffed and underfunded facility is having difficulty recovering from a situation that it should be able to take in its stride. We expand considerably on this recommendation in addressing the questions you raised for us below.

1. Mission Statement. The draft Mission Statement given us contains several excellent analyses and suggestions, and is very comprehensive in scope. From discussions during our visit, it was not clear that this has yet had extensive review and input from many Reed individuals, including faculty, students, alumni, or community advisors and thus mainly represents the view of one hard-working and enthusiastic individual. As such it is extremely commendable.
We would suggest, however, that it is absolutely vital for the continuation of successful operation at RRF that a Mission Statement be adopted both in the legal and philosophical sense by a broad constituency at Reed. This is not to say that everyone at Reed should support the reactor, but to argue strongly that unless a substantial number of key

individuals are convinced that RRF has a kev role to plav in the overall mission of Reed College, the proper operation of the facility will never be assured. A facility such as RRF. while started as the vision of a single inspired individual, Arthur F. Scott, cannot be sustained through decades of regulation and change by relying solely on the dedication of a single individual at any one time.

We propose that the Mission Statement could gamer support from a larger Reed constituency by being recast to provide a greater emphasis on the educational benefits that RRF can provide, both directly and in a supportive role, to the College and the surrounding community (through the Consortium). The Statement should be clear that ancillary applications of RRF. such as in medicine, industry, law enforcement, and environmental analysis, while also very important, are secondary to the primary educational mission.

To expand on the view expressed above, we see RRF as providing Reed College students with unique opportunities provided at no other liberal arts college. So far. this has not been fully exploited. Most science curricula should incorporate experiences based on the presence and availability of RRF. Such experiences can vary from single laboratory exercises in Introductory level courses to entire courses based around radiochemistry. applications of radioisotopes, or uses and effects of radiation. Further, all Reed students should be engaged in some way in the "nuclear debate" and its relationships with global concerns for environmental damage - the risks of nuclear power on the one hand, but the dangers of global warming through excessive use of fossil .fuels on the other. This encompasses many smaller issues of benefit *vs* risk analysis in applications of radiation and radioisotopes in modern medicine, for example, that liberal arts students who will be future leaders should be learning how to address. At Reed, they can have first-hand experience by examining the reactor and its operation both in theory and in practice. A study of the entire range of safety issues of operation of RRF can form a positive and secure basis for scale-up to state, national or global concerns that will be far more educationally sound than usual remote arguments based only on literature, emotion, and lack of direct knowledge.

The few students we had a chance to talk with during our visit clearly left the impression that the RRF had made a difference to them either in their initial decision to come to Reed, or in their subsequent experience at Reed. We think this could become an expanded opportunity for Reed to provide a different, but unparalleled experience. At no other facility (possibly in the world!) do undergraduates have a chance to become so involved with the daily management of a highly technological, but safe, facility such as RRF. While this has already had an impact on the career and personal development of a significant number of past Reed students, with more focus and resources this opportunity could be more widely available.

As part of the primary teaching mission. KRF provides unique opportunities for thesis research. With greater support, more Reed students could avail themselves of this opportunity. Secondarily, RRF can also serve the greater Portland educational community not only for similar student coursework and research, but as a resource for teacher

education and general public education. It should be possible for courses initiated at Reed to be credited for students at other institutions to enhance these opportunities and the utilization of the Reed facility. With more staff time *{vide infra)* available to develop such relationships, creative uses of RRF in education will increase.

2. Physical Plant Upgrading. The radiochemistry laboratory adjacent to the reactor requires renovation and needs to be provided with suitable instrumentation to meet the educational mission described above as well as to support ancillary uses of the facility.

We were somewhat dismayed to observe that RRF is physicalry separated from the new Arthur F. Scott Chemistry Center, which has psychological and perhaps symbolic overtones as well. Serious, urgent planning consideration should be given to making the north entrance to the facility into the main entrance to the facility and connecting it to the new building by a covered walkway. If the old chemistry building is to become the psychology department, we believe it will cause unacceptable friction between academic units, and inhibit future uses of the facility (for tours, students at all hours, etc), as well as raise real safety concerns, for the entrance to be through the psychology department. The present entrance can remain as an emergency exit. To our inexperienced architectural eyes, it would seem that the north entrance could rather easily be remodelled to include a small entry lobby to serve as the security and safety checkpoint. Visitors and personnel responding to emergencies can then view the reactor through the hallway window before entering the facility itself. The purely experimental facilities will then be more towards the "rear" and impact tour use less, for example. Consideration might be given to renovation of the smaller laboratory rooms and office space to provide office space for staff, *{vide infra)* The facility should be refurbished and future general maintenance scheduled with the goal of maintaining a clean, smart, and professional appearance to attract confidence from regulators and potential users and supporters. It is likely the proposed changes can be accomplished for less than the costs of decommissioning.

3. Instrumentation. The process of upgrading the facility control and safety systems, which has begun under DOE sponsorship, should continue at as rapid a pace as possible with the College providing necessary matching support. It is possible that local industry might support radiological safety monitoring instrumentation (CAM, ARM, Stack Monitor, etc) acquisition, or help to extend the life of existing instruments by providing resources for maintenance to keep such instruments in good condition. Staff can be encouraged to pursue these and other funding opportunities if not stretched to the limit to maintain daily operations. In addition to the instrumentation needed for the renovated radiochemistry laboratory, the facility needs modem counting equipment for both gamma spectroscopy and beta spectroscopy to support the primary educational mission and to enable better service to ancillary users. Such a facility should expect to serve as a general facility for all departments employing radioisotopes. More useful service to the outside community can be given if the facility is able to maintain measurement traceability to NIST standards (achievable at modest cost), and develops a formalized quality assurance program. These features would enhance the ability of RRF to attract contract work from regional industry and government.

4. Staffing. A major issue for the continuation of facility operations is staffing: this facility has. since its inception, been minimally staffed. Given increased regulatory requirements over several years, the need for greater public accountability, and the need to develop more effective utilization of the facility, basic level staffing must be increased.

Two professional FTE is the minimum recommended, with at least 1.5 FTE devoted directly to facility operations, while 0.5 FTE could be devoted to teaching responsibilities. Both individuals would be expected to hold Senior Reactor Operator Licenses for the facility. We suggest that the one individual with a 0.5/0.5 assignment should be the facility Director with clear responsibility for overall management of the facility. The other would serve as full time Associate Director for Operations and have responsibility for all day-to-day operations including supervision and training of operators and meeting regulatory requirements. The Director would have primary responsibility for building off-campus (Consortium) and on-campus relations and would hold a regular faculty appointment (with the 1/2 time teaching load). Assistance with maintenance of the Consortium would be provided by the Associate Director who might also hold a faculty appointment, or at the least an adjunct appointment that would enable him or her to participate in the educational program, for example by supervising thesis research students, or by offering credit classes for teachers.

We strongry support the continuation of the student operator program. Even more training might be offered In the area of radiological health and safety. We might envision parallel programs leading to "reactor operator" or to "radiological safety associate" as better meeting the needs for the facility and the campus than a single track program. However, the facility must clearly establish responsibilities for scheduling operations and maintenance. Such responsibility should remain with the Associate Director in consultation with a student Reactor Supervisor in order that reliable services can be offered by RRF. Students can have priorities unrelated to their reactor position that do not always blend well with operation of the facility within the strict regulatory environment or with offering reliable service to either on-campus or off-campus users.

As noted above, it is important that the Reactor Facility Director be a full faculty member acceptable to an existing department. It is most likely that the appropriate fit to Reed and the RRF needs will be found with an individual with a background in radiochemistry or nuclear analytical chemistry, or use of these methods in related areas such as geochemistry. Such individuals will have had some experience in regulatory issues and in reactor utilization. Obviously, willingness to make a strong contribution to undergraduate education and some experience with internal and external development of resources are essential.

5. Financing. There are a number of avenues for support for the operation of the RRF. It is important to appreciate that none can develop without adequate staff time to work on them. It is suggested that past practices, which may have included expecting key staff to "raise a portion of their own salary" may not be fruitful in today's competitive environment. It is important for the administration to recognize that the ability to compete for external resources is. in many instances, dependent on being able to offer routine and reliable services from the RRF. It is also important for the College to accept that full self-support should not be a goal for RRF. If the facility is perceived to play a genuinely broad educational role, it should receive basic support for that role, much as an interdisciplinary department might.

Traditional sources of Income include charges and/or recharges for Isotope production or neutron activation analysis. Cost recovery may be possible for specialized courses such as teacher education, and TAG. and Joint projects with other educational institutions where their students use facilities such as the radiochemistry laboratory at Reed. Consortium

support in conjunction with PGE and other interested industries can probably be increased. It is Important to include all items In any cost-recovery program. In the experience of one of the reviewers, it Is easy to overlook "hidden" costs In creating a cost recovery system that ends up putting a heavy burden on existing staff, who compensate by "donating" time to the project, preventing them from having sufficient time left for administrative needs. For example. If neutron activation analysis "service" is to be performed, proper allowance must be made for all supplies needed, including vials, standards, rabbits, and liquid nitrogen, waste disposal and radiological control, a fair contribution to instrument maintenance, and for staff and/or student labor including time for training, sample and standard preparation, and for data processing including quality control checks. As a related issue, RRF should make sure it commits to establishing a reputation for high quality, reliable, service, rather than for sporadic, cost-cutting, lower quality performance designed simply to raise funds.

Some support for instrumentation improvement will likely continue to be available through the Department of Energy. Grants for undergraduate research should be possible through NSF and/or DOE. It is possible to look to these, as well as regional agencies, as sources of support for undergraduates from other institutions to do work at RRF. All such utilization, if fully meeting its fair cost share, will contribute to the overall fraction of cost recovery for the RRF budget.

It does not appear that the general Reed College supporters - alumni and supportive local community - have yet been asked to support RRF. If the reactor can be firmly placed as a showcase within the Reed mission, support contributions might be forthcoming. Former reactor operators appear to have strong positive feelings about the reactor and wish to see it succeed. A program which would solicit contributions towards specific aspects of facility needs (e.g: a fund to guarantee student operators a certain amount of support) might appeal to such individuals.

Clearly the potential income from private sources is limited. There are some positive signs within governmental agencies, based partly on manpower need projections[1] £, that might result in increased support opportunities for small reactor facilities. Private foundations may also be moving in directions more favorable to nuclear science education. In seeking support from outside, the unique aspects of RRF should be stressed, such as:

Location of the reactor on the campus of one of the outstanding small liberal arts colleges in the U.S.
Genuine integration of the reactor into the educational mission of the College *(vide supra).*
Reactor operations designed to heavily involve undergraduates in training to manage the facility.
RRF as a genuine community resource, providing unique education opportunities to the entire region
including teachers, and TAG programs.
• Location of the reactor in Portland and adjacent to the Seattle-Puget Sound area can serve specific needs of
the technical, educational and medical communities in this region.
• Genuine community acceptance as evidenced by the community response following the unusual occurrence
of November 23, 1991.

t. University Research Reactors in the United States - their Role and Value. National Academy Press. 19S8.
2. Training Requirements for Chemists in Nuclear Medicine, Nuclear Industry, and Related Areas. National Academy Press, 1988.

6. Administrative. The administrative structure at present includes two formal "oversight committees", one for operations and one for safety. This arrangement is

unusual and seems unnecessarily complex. There also seems to be a problem in having committee members who lack interest in their assignment. We recommend that there be a single oversight committee responsible to the College administration for assuring that the facility operates safely and meets its State and Federal (NRC) license commitments. To do this the Reactor Safety Committee needs at least one member who has expertise in nuclear engineering or nuclear science, one who has professional radiological safety qualifications, one who represents Reed's academic community, and one who represents the local off-campus community. The Campus RSO and the Facility Director should serve as ex officio members. The committee should have a charter which allows it to exercise its audit and policy and procedure review functions effectively to meet the Technical Specification requirements, but which assumes that daily operations are not its direct concern. Licensed student senior operators should be invited to attend but will not vote.

To assist in education and training of student operators in management of the facility, an informal Operations Committee can meet to assist the Associate Director for Operations in his or her duties. This group, consisting of all student licensed operators, with auditing attendance of operators in training, could assist with review and scheduling of operations and maintenance. It would be clear that final responsibility for organizing operations and maintenance rests with the Associate Director. Only in this way can regular routine operations at the facility be assured.

Conclusion. In conclusion we stress again the unique nature of the RRF, and its great potential as an educational tool, evidenced by the high Interest in and enthusiasm for the reactor expressed by at least one group of Reed students. The existence of the reactor does influence students to attend Reed. We note the high degree of community acceptance, and the opportunities for ancillary uses of the RRF for research, isotope production, and specialized analyses by neutron activation. Taken together with the growing recognition that nuclear science education is important and deserving of support, we believe the future portends well. If the decision is made to continue operation of the reactor, the RRF should be incorporated as a full and valued part of the overall Reed College educational mission.

Finally we note the need to proceed with haste to make a final decision and to commit the resources needed to pursue either continued operation or decommissioning. The present acting Director, J. Michael Pollack has single-handedly kept the facility operational, maintained both on-campus and off-campus relations, and tried to plan for its future. This task is simply too great for one person and he is at or near burn-out. His efforts are commendable and worthy of some recognition.

We thank all of those who assisted us with our review, and the excellent hospitality shown by all connected with the College. Should you have any questions or desire further amplification of our ideas, please do not hesitate to call on us.

Sincerely yours.

Ronald L. Kathren
Washington State University
at Tri-Cities

George E. Miller
University of California, Irvine

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PORTLAND-SALEM

02/18/10

Consumer Price Index, All Items, 1982-84=100 for All Urban Consumers (CPI-U)

SEMI-ANNUAL AVERAGE

YEAR	1st Half	2nd Half	ANNUAL AVERAGE
1985	105.6	107.8	106.7
1986	108.1	108.3	108.2
1987	109.9	111.9	110.9
1988	113.6	115.9	114.7
1989	119.3	121.6	120.4
1990	124.9	129.8	127.4
1991	132.8	135.1	133.9
1992	138.8	140.9	139.8
1993	143.6	145.8	144.7
1994	147.7	150.1	148.9
1995	152.5	153.9	153.2
1996	157.2	160.0	158.6
1997	162.6	165.5	164.0
1998	166.1	168.1	167.1
1999	170.8	174.4	172.6
2000	176.4	179.5	178.0
2001	181.2	183.6	182.4
2002	183.5	184.0	183.8
2003	186.0	186.5	186.3
2004	189.8	192.5	191.1
2005	194.5	197.5	196.0
2006	199.8	202.5	201.1
2007	206.653	210.460	208.556
2008	214.619	216.159	215.389
2009	214.102	217.191	215.647
2010			

OVER-THE-YEAR PERCENT CHANGE

YEAR	1st Half	2nd Half	ANNUAL AVERAGE
1985			
1986	2.4	0.5	1.4
1987	1.7	3.3	2.5
1988	3.4	3.6	3.4
1989	5.0	4.9	5.0
1990	4.7	6.7	5.8
1991	6.3	4.1	5.1
1992	4.5	4.3	4.4
1993	3.5	3.5	3.5
1994	2.9	2.9	2.9
1995	3.2	2.5	2.9
1996	3.1	4.0	3.5
1997	3.4	3.4	3.4
1998	2.2	1.6	1.9
1999	2.8	3.7	3.3
2000	3.3	2.9	3.1
2001	2.7	2.3	2.5
2002	1.3	0.2	0.8
2003	1.4	1.4	1.4
2004	2.0	3.2	2.6
2005	2.5	2.6	2.6
2006	2.7	2.5	2.6
2007	3.4	3.9	3.7
2008	3.9	2.7	3.3
2009	-0.2	0.5	0.1
2010			

Table of over-the-year percent increases. An entry for 2ndHalf 2005 indicates the percentage increase from 2ndHalf 2004 to 2ndHalf 2005 (in this example 2.6 percent).