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CASSINI — PRO & CON

by Shel Plotkin with excerpts from Bob Nelson
and Jim Warf

Introduction

SCFS did not take a position on this Cassini spacecraft program as we did on the previous one for Ulysses. We believed then that a solar power supply might have been available for Ulysses that had not been investigated thoroughly enough. An 8X (4X from distance and 2X from electricity demand) increase in solar energy was available for Ulysses as compared with Cassini. The problem with both spacecraft, of course, is their use of Pu²³⁸ to power the electric generation units.

The conclusion some have come to is that if we want the experiments performed and the scientific knowledge that result, we have to take the risk of using the Pu²³⁸ Radioactive Thermal Generators (RTG). As will be pointed out below, this is not necessarily the case, and the "con" side of the issue is based upon that fact.

Cassini Mission

Very briefly, Cassini is a very large spacecraft, being 22 feet in length and weighing over 12,000 lbs of which about half is liquid rocket fuel for the mission. It will take about seven years to arrive at Saturn after making two orbits around Venus, one around Earth, and one around Jupiter. At Saturn a number of instruments will collect atmospheric and planetary data. There is also a probe to be dropped onto one of Saturn's moons, Titan. Much basic educational information regarding the origins and make-up of our solar system will be obtained. Additionally, a few innova-

tive new instruments will be tested. Needless to say, the entire program is fascinating and SCFS is most supportive of the thrust of the venture.

Problems

An electric energy requirement for all the equipment in its launched configuration was determined by NASA to be 600 watts. This probably requires a nuclear power source, because Saturn is too far away to accommodate a reliable 600w solar array. SCFS and NASA agree on this point, although for Cassini, Michio Kaku said he had calculations showing solar power feasibility. Bob Nelson tried to obtain those calcs but Michio didn't respond. Thus Shel Plotkin calculated a solar array requirement for the mission, the results being 8100 ft² or 90¢ x 90¢ based upon linear power output as incident solar energy density decreases. Even if NASA's 600 watt requirement is too high by a factor of 2X, the solar array would still have to be 64¢ x 64¢ — and all this for a 20¢ long spacecraft. On the face of it Michio seems to be in error and is reluctant to discuss it with us.

There are two types of health risk accidents of concern, (1) blow-up at launch and (2) atmospheric burn-up from too close an Earth fly-by. These will be discussed below, but it should be noted that there is not really very much difference between SCFS members on this matter.

Pro

Bob Nelson (and Sandra Dawson) in *In These Times* expressed the view that NASA's worst case health risk of 120 to 1200 deaths and a 10⁻⁶ chance of burning up in the Earth's atmosphere were reasonably accurate and are an acceptable risk for this mission. It is the educational and intellectual aspects of the experiments and data collection that swings their judgment balance in favor of "launch".

Jim Warf agrees and points out that the danger from Cassini is infinitesimal compared to that from nuclear bombs. Additionally, normal risks experienced everyday are enormous compared to those from Cassini. The scientific benefits from exploring outer space are well worth the small risks involved.

Steve Aftergood from FAS, another SCFS member, agrees with Bob and Jim.

Con

Shel Plotkin points out that Michio makes good sense when he points out that Saturn is not going away. It has been there a long time and will remain available for space exploration a long time in the future. If we don't explore that planet now, we can certainly do so easily a few years hence should the choice have been to "not launch". The point of concern here is the question whether or not another type of nuclear supply is available that would not present the health risks of Pu²³⁸.

Jim Warf, in spite of deciding on the "pro" side, actually pointed out the direction we should be taking at this time. A U²³⁵ fission reactor, taking the uranium from dismantled bombs, can easily supply the power by heating thermocouples exactly the same way the Pu²³⁸ RTG units are presently doing. Besides that a fission reactor can be turned "on" and "off".

The difference, health-wise, is that the quantity of radioactive material is only 0.3 to 5.0 lbs of uranium (depending upon whether bomb-grade HEU or reactor-grade LEU is used). Besides that the health risks for uranium are only about 10⁻² that of plutonium, the 238 isotope comparison probably being even smaller. Thus it is concluded that holding back the launch to develop a better power supply would have reduced health risks by more than 10³.

Other Factors

Before leaving the subject, a worst case accident is one number, not a range as NASA claims. They probably calculated realistic bad cases. A Plotkin "absolutely worst case accident" based on two unrealistic premises resulted in an estimated 30,000 deaths. Michio's 200,000 figure and Helen Caldicot's 5 billion are wrong.

Another aspect is that there is no "pecking order" to accident and health risk exposures. We are not justified in subjecting ourselves to any small risk just because another that already exists is of far larger magnitude. We do not have to substantially reduce automobile accident injuries before we address and begin reducing environmental dangers like toxic chemical exposure. We also are not obligated to go along with Cassini now just because we did not protest previous space ventures utilizing smaller but still large

CALTECH Gets Into the Nuclear Weapons Business

by John Grula

Ever since President Clinton extended the moratorium on U.S. nuclear weapons tests in 1993 and subsequently signed the Comprehensive Test Ban Treaty (CTBT) in 1996, the Department of Energy's (DOE) nuclear weapons labs have been looking for a way to keep the nuclear priesthood alive and maintain the U.S. nuclear arsenal indefinitely with continued improvements. As a result, a program called "Science-Based Stockpile Stewardship" (SBSS) was born. This program, under the guise of working to maintain the "safety, reliability, and performance" of the nation's nuclear stockpile, could command substantial sums of taxpayer money to devise ways to continue nuclear tests (which have always had the primary purpose of providing the data needed for the design of new and improved warheads) without physically detonating nuclear devices. Thus, this clever scheme would provide a way for nuclear weapons designers to con-

Pu²³⁸ RTG units. We must be careful in these health risks evaluations of not mixing "apples with oranges".

Conclusion

Cassini is gone and will probably turn out just fine. It is very disconcerting to have to conclude from our history that a major disaster is required in order to actually change technical direction and initiate the development of beneficial, safer strategies.

References

1. Nelson, R.M. and Dawson, S.M., "Countdown to Cassini", pp. 18-20, In These Times, November 2, 1997.
2. Warf, J.C., "On the Cassini Mission", unpublished paper available from SCFS or Jim.

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tinue "business as usual", even while the U.S. could claim to be adhering to the letter of the CTBT.

While SBSS involves multiple projects located at several sites around the country, the three most well-known are the so-called "subcritical tests" being conducted at the Nevada Test Site, the National Ignition Facility being developed at Lawrence Livermore Lab, and the Accelerated Strategic Computing Initiative (ASCI). In this latter project, nuclear weapon designers will use high speed computational models, simulations, and projects incorporating data from previous nuclear test explosions and data generated from other SBSS programs. Within the ASCI program, a subprogram entitled the Academic Strategic Alliance Program (ASAP; sorry for all the acronyms) was created to involve universities in nuclear weapons research.

On July 31 of this year, Caltech issued a press release about a multimillion dollar contract it had received from the DOE as part of the ASAP program. The next day, a front-page story in the *Pasadena Star News* carried the headline "Weapons Under-go Review: Caltech to be Part of 'Virtual Testing'". This article which was based on Caltech's own press release as well as comments from several Caltech personnel, reported that "Caltech will be one of five universities to use the nation's fastest, most powerful computers for 'virtual testing' of the armed forces nuclear weapons stockpile." In the article, Caltech professor Dan Meiron informs readers that "supercomputers are essential for nuclear explosion modeling," and Caltech Vice President Steven Koonin is quoted as saying, "This is an extremely challenging task, and in my mind, comparable in many ways to challenges faced at Los Alamos 55 years ago".

So, there it is in a nutshell. What can you do to help? Please write a letter to Caltech president David Baltimore expressing your opposition to his university's participation in the ASAP program. Send it to the following address:

President David Baltimore
California Institute of Technology
204 Parsons-Gates
Pasadena, CA 91125

Secrecy & Accountability in U.S. Intelligence

The following excerpts are from a paper by Steve Aftergood for a *Center for International Policy Seminar on Intelligence Reform*, October 9, 1996

Questions of secrecy and accountability have figured prominently in the most important intelligence controversies of the past several years. While U.S. intelligence agencies have done an astonishingly poor job of protecting the nation's secrets from foreign adversaries, they have been more successful in blocking access by American citizens of the most basic of categories of intelligence information.

There has always been a degree of secrecy in U.S. governments, particularly in intelligence matters, and it has always presented a conflict with American ideals that remains unresolved.

Three Categories of Secrecy

Among the many types of information that are classified by the government in the name of national security, it is possible to distinguish three general categories: genuine national security secrecy, political secrecy, and bureaucratic secrecy.

Genuine national security secrecy pertains to that body of information which, if disclosed, could actually damage national security in some identifiable way. Of course, this begs the crucial question of what "national security" is, what constitutes "damage" and how the meaning of these terms may change over time. One category would include things like design details for weapons of mass destruction and other military technologies, as well as those types of information that must remain secret in order for diplomatic and intelligence functions to be performed. The sensitivity of this kind of information is the reason we have a secrecy system in the first place, and when its working properly this system positively serves the public interest.

The second category is political secrecy, which refers to the deliberate and conscious abuse of classification authority for political advantage, irrespective of any threat to national security. This is the smallest of the three categories but it is also the most dangerous to the political health of the nation. Perhaps the most extreme example of political secrecy in intelligence historically was the classification of CIA behavior modification experiments on unknown human subjects, as in the MKULTRA program. To guarantee the permanent secrecy of this activity, most MKULTRA records were destroyed in the early 1970s, although the CIA continues to classify many such records today. But this category also includes more petty abuses like the classification of the intelligence budget, which serves to limit official public discussion of intelligence priorities and performance but does nothing to enhance the security of Americans.

The third category is what may be called bureaucratic secrecy. This has to do with the tendency of all organizations to limit the information that they release to outsiders so as to control perceptions of the organization, as classically described by Max Weber. Bureaucratic secrecy appears to be the predominant factor in current classification practice, accounting to the majority of the billions of pages of classified records throughout the government.

There is inevitably a subjective factor in the assignment of a particular unit of information into one of the three categories of secrecy. The borders of the three categories may sometimes be blurred in practice. Furthermore, information that falls in one category at one moment will often belong in another category at some later date. Responsible classification management—i.e., the elimination of all but genuine national security secrecy—therefore depends to a large degree on the good judgment and the good will of the managers. Failing that, it depends on the steadfast advocacy of congressional overseers. And when that fails, responsibility reverts to the public.

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Abolition 2000

Abolition 2000 is a global network of more than 700 citizen action groups from around the world that formed to call on all nuclear weapons states to complete negotiations by the year 2000 for complete elimination of their nuclear arsenals within a time frame and urges that immediate steps be taken to reduce the nuclear threats by complying with the intent of international treaties.

The facts about nuclear weapons are quite obvious. They pose an intolerable threat to all humanity and to the planet. There is no doubt that if the people of the world were more fully aware of the inherent danger of nuclear weapons and the consequence of their use, they would reject them, and not permit their continued development, possession and acquisition.

Such treaties such as the Comprehensive Test Ban Treaty (CTBT) exist. However, without a meaningful commitment to nuclear disarmament by all the nuclear states, (especially the U.S., U.K., France, Russia and China) treaties become somewhat ineffective. It allows the nuclear states to maintain their existing arsenals and even develop new designs by other means such as computer generated simulations.

If the nuclear weapon states continue to brandish nuclear weapons as a symbol of their power, eventually others will want to have them. This hypocrisy and double standard will no doubt be argued by the countries who wish to acquire nuclear arsenals of their own. Unless all nuclear weapons are abolished universally, it is likely that they will spread to even more countries.

Nuclear weapons are held by a handful of states which insists that these weapons provide security benefits, and yet reserve this right to "security" uniquely to themselves. This situation is highly discriminatory and thus creates an unstable atmosphere in the international political arena. It cannot be sustained. As The Canberra Commission Report states "The possession of nuclear weapons by any state is a constant stimulus to other states to acquire them."

The world is also facing a new and growing threat, namely nuclear terrorism. Such valuable resources as substantial scientific expertise and economic resources must be directed toward the sectors of society where the needs are most stringent; these

include the environment, health, education, renewable energy sources, sustainable development and economic conversion.

It is clear that nuclear weapons diminish all aspects of a society. The security they promise is an illusion; because states which possess these weapons, themselves become targets for nuclear bombs.

The opportunity now exists to make a new and clear choice which would enable the world to conduct its affairs without nuclear weapons. Creating a nuclear weapons free world would be a great triumph for humanity. A unique opportunity exists in the aftermath of the Cold War to eliminate these instruments of genocide from the Earth.

Abolition 2000 focuses attention directly on the crux of the present nuclear bomb problem. Hopefully, sufficient coordinated support for this Abolition 2000 effort will result in the nuclear powers mentioned above recognizing that their nuclear bomb stockpiles actually threatens themselves as well as the less powerful countries of the world.

The SCFS Executive Board passed a resolution which will be sent to the executive boards of a number of organizations whose reputations indicate they would support our position. Obtaining support from executive boards is much easier and hopefully more influential than simply collecting individual signatures. The Nuclear Age Peace Foundation in Santa Barbara (the group that published our paper on disposal of high-level nuclear waste) is taking the lead in this Abolition 2000 effort. While some of our SCFS members have expressed a lack of confidence regarding this effort, we have to point out the Freeze movement some years ago looked to be similar when first initiated.

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Rocketdyne Worker Epidemiology Study by UCLA

SCFS, as a member of the Rocketdyne Cleanup Coalition (RCC), provided one representative on the oversight Advisory Panel, AP. The recent final report was only on the radioactive exposure of the workers. It was believed that a worker study was the only feasible accurate evaluation of Rocketdyne's past activities adversely affecting people's health. When the study began, Assembly representatives Terry Friedman and Richard Katz with assistance from Cathy Wright demanded that the community be represented on the oversight panel. After many differences of opinion over the years, the AP finally agreed that the UCLA report was excellent and the work was performed accurately. Rocketdyne, of course, disagrees and tried to "water down" the final report over the objections of the entire AP. It should be noted that one of the people on the Advisory Panel was Alice Stewart, the world's most renowned radiation epidemiologist.

About 5,000 employees were included in the study out of workforce data base of about 60,000. The study was a mortality study, i.e. only deaths were included, as compared to a morbidity study which would include incidents. The reason for this was that deaths could be tracked through a national registry without having to locate where former employees had moved to. The total number of people included is small for such studies, but that is compensated for by being able to track the worker cohort for a much longer period of time that is usually possible.

While the L.A. Times played down the study and ran it a day late, this was after the normal staff intended to run it as a major front page story. We hear that a corporate decision was made at the "highest levels" to downplay this study. The Daily News, on the other hand, ran the news as their major story of the day along with giant headlines.

Joe Lyou from CBG, Committee to Bridge the Gap, gave one of our Midnight Special Bookstore lectures on this material. Without getting into detail, there were several major conclusion from the work:

1). A significant number of exposed workers have died prematurely from radiation exposure while working for Rocketdyne. It can be expected that data from future studies will continue in the same vain.

2). The effects of low levels of ionizing radiation are 6-8 times more damaging to a person's health than has previously been believed. (This confirms the results of two other studies at Hanford and Oak Ridge by Alice Stewart/George Kneale and Steve Wing.)

3). The "age-effect" originally proposed by Alice Stewart was confirmed, i.e. susceptibility varies with age in a "U" shaped manner, the point of equality being at birth and about 45 years of age.

Present radiation standards are much too high and should be lowered. Alice Stewart has pointed out that use of Hiroshima and Nagasaki bomb survivors for formulating our standards has been an error. She points out that the surviving people in those two cities have to have been among the healthiest in the population in order to have withstood the radiation. Therefore, our U.S. standards regarding how much radiation a human being can safely be subjected to are in error by perhaps the UCLA 6X to 8X figure or even larger as has been indicated in other studies.

Needless to say, the Rocketdyne workers were never knowingly subjected to radiation in excess of what the standards allow. This is according to the records used in the study and in spite of all the nuclear accidents they had had over the years. Most people don't know that the first nuclear meltdown in the world occurred right here in Los Angeles in Simi Valley. Atomics International (now Rocketdyne) announced at that time that "fuel separation" occurred in some of the fuel rods in their 20MW reactor which the public needn't worry about. Approximately 20% of the core melted in that 1958 accident as nearly as we can tell.

At present we are waiting for UCLA to complete what was to be a similar worker mortality study from chemical exposure at the site. However, some time ago UCLA informed the RCC that Rocketdyne had "lost" all the chemical exposure data from 1984 back. Much discussion has taken place on this matter throughout the radiation exposure part of the study. First Rocketdyne announced that a "deranged" employee

who they didn't know the name of had destroyed the data. Next when they were accused of lying, their story changed to the data being lost when Rockwell purchased North American Aviation which included Atomics International and Rocketdyne. Recently when they were accused of lying again with this irrational concoction, their story changed to the data having been found and given to UCLA. Finally, UCLA claims they have yet to see the material.

Needless to say, UCLA will be having a difficult time performing as their contract specified. Exactly what action the AP will take remains to be seen. Such manipulation on the part of Rocketdyne management is unbelievable, since there is no good reason for it and no way they can avoid establishing themselves as being dishonest.

It should be noted that all this epidemiology work is in addition to the cleanup work the RCC is also trying to oversee.

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Task Group Reports

1). The Rocketdyne Cleanup Coalition (RCC) is involved with several separate activities at as explained elsewhere in this newsletter, there is a severe problem obtaining the exposure data before 1984. Cleanup of the Simi Valley Rocketdyne facility is continuing, except that now Rocketdyne has to reappraise the level of contamination at the site. Just as the RCC charged in the first place several years ago, Rocketdyne/DOE did it all wrong and now are being forced by EPA to reevaluate. (This is probably a "first" for EPA.) Needless to say, the cleaning up that has been done needed doing anyway. It is just very disconcerting having to deal with these Rocketdyne/DOE/DHS people who appear to be very incompetent at times but then on reflection their behavior is about what one would expect from a "fox in charge of cleaning up the chicken coop".

2. The Midnight Special Lecture Series for 1997 was as follows: "Disposal of High-Level Nuclear Waste" by Jim Warf/Shel Plotkin; "UN and the New Scientific Order" by Roger Dittmann; "Rocketdyne Epidemiology Study; Experience of the RCC" by Dan Hirsch; "Preventing Breast Cancer" by Joel Swartz; "LA Transportation" by John Bachar/Shel Plotkin; "Alternate Energy Systems" by Jim Warf/Shel Plotkin; "Nuclear Medicine" by Jim Warf; "Hiroshima-Nagasaki Day Commemoration" with Roger Dittmann/Jonathan Parfray; "Smog-Free Combustion" by Shel Plotkin; "Ozone Layer vs. Greenhouse Effects" by Jim Warf; "Rocketdyne Epidemiology Study by UCLA" by Joe Lyou; and "EM Health Hazards" by Shel Plotkin.

3. Abolition 2000, as described elsewhere in this newsletter will involve trying to get other organizations to pass the same resolution our SCFS Executive Board passed. Organizational approval allows us to claim support from the entire membership without having to obtain each individual signature. Considering the worldwide effort toward facilitating the abolition of nuclear bombs our task actually involves forcing the U.S. government to agree. However, analyses exist indicating that the U.S. uses its nuclear bomb stockpile to force the rest of the world into accepting U.S. hegemony. If this is really the case, a truly gigantic effort will be required to rid the world of these monstrous weapons.

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Those living outside the Los Angeles area might want to consider using a credit card and paying a \$6.00 shipping/handling fee for the first book and \$.50 for each additional book.

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