

Withdrawal/Redaction Sheet

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
001. email	re: Chernobyl (2 pages)	03/08/1996	P1/b(1)
002. memo	Terry to Melanne re: Draft Remarks [partial] (1 page)	04/03/1996	b(6)
003. speech	re: Remarks of Alex Kuzma [partial] (1 page)	n.d.	b(6)
004. bio	re: Volodymr Malofienko [partial] (1 page)	04/05/1996	b(6)

COLLECTION:

Clinton Presidential Records
First Lady's Office
Melanne Verveer
OA/Box Number: 20025

FOLDER TITLE:

Chernobyl [Folder 2]

2013-0534-S

rc1707

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
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Chornobyl: Ten Years Later

by Marvin Goldman, PhD
Department of Surgical and Radiological Sciences
University of California-Davis

The violent disassembly of the Number 4 Reactor at Ukraine's Chornobyl Station at 01:24 AM on April 26, 1986, was the worst nuclear reactor accident in history. The explosion sent a cloud of radioactive particles and gases high in the night sky and, during the burning of much of the reactor core's graphite over the next 10 days, spewed out a massive quantity of volatile radioactive materials. The release was of three parts, each with a unique character and consequence.

1. About five to ten tons of nuclear fuel particles from the ruptured 200 ton core were scattered over the nearby territory; these were largely confined to the "30 Km Exclusion Zone." The fuel particles are relatively heavy and did not travel far. Nevertheless, they delivered a massive radiation dose to the surrounding area and even killed much of an adjacent pine forest. The particles contained radioactive strontium, plutonium and other nonsoluble radionuclides.

The accident killed two plant workers immediately and another 28 died over the two-three months after the accident. A total of about 200 firemen, rescue workers and shift workers received high enough doses to develop acute radiation sickness; many cases were complicated by extensive steam and radiation skin burns. Of the survivors, 14 more have died over the past decade, but only two of the deaths appear to be consequent to radiation exposure.

According to the chief biomedical officer of the Soviet Department of Health, there were some 300,000 to 600,000 "liquidators" (clean-up workers) mitigating the consequences of the accident. All the liquidators are being entered into a register; of these, perhaps some 12,000 did receive medically significant doses and are to be carefully followed. Although some of the workers, especially those involved in 1986 and early 1987, may have received significant exposures, there is now no documentation of any radiation-induced increase in cancer in these people, despite anecdotal reports to the contrary in the popular press. It should be remembered that except for leukemia, almost all radiation-induced cancers in adults require about a decade of "latency" (waiting) period before they become evident, and the decade is now complete; we will have to wait another decade before making definitive statements about leukemia risks from Chornobyl. Without a formal cancer registry and epidemiology studies, we will never really know.

2. Of special significance was the release of most of the reactor's

radioiodine and radiocesium. These volatile materials were propelled up to a height of 10 km. Most rapidly spread westward over Belarus, Ukraine; and went east into Russia. All of the northern hemisphere received detectable levels of Chornobyl's iodine-131 and cesium 134-137. Cesium is ubiquitously incorporated into all living tissues, plants and animals alike, and delivers a diluted "whole body dose" as differentiated from radioiodine, whose atoms are only concentrated in the small thyroid gland. With a 30-year half-life, radiocesium is a long term problem (it takes about seven half-lives for the level to approach zero). However, within a few years, much of the radiocesium had seeped deep into soil, was eroded from building surfaces and today poses a minimal risk where the concentrations are low and less environmentally available.

The radiocesium, with its whole body dose pattern, has been thought to be associated with a risk for leukemia as all tissues, including bone marrow, are exposed. In Ukraine and Belarus, there is no significant increase in leukemia rates in the populations of the highly dosed zones as compared to the zones which did not receive radiation (the US is funding a case-control epidemiological study on just this problem, as well as one on childhood thyroid cancer).

Based on information from study of the Japanese survivors of the atomic bombings half a century ago, an increase in leukemia would have been expected to appear within three years and might have already peaked. Perhaps the lower dose rate from Chornobyl's Cs-137 has a sparing effect on this risk. It may be too early to firmly state that there was no leukemia; there may be a slight, but not significant, upward trend.

3. Radioiodine is a special and poignant story. It has an eight day half life, so all radioiodine exposures were absorbed from the end of April to the end of June, 1986. Thereafter, there was no additional exposure. However, iodine concentrates in the small thyroid gland, thereby delivering significant doses. Newborns and infants are the most vulnerable because their gland is so small and is metabolizing and growing so rapidly.

Chornobyl's radioiodine fell on the new spring grass, was consumed by dairy cattle, transferred efficiently to milk and was responsible for most of the radioiodine doses to infants and children (direct inhalation accounted for about 5-10% of the dose).

Especially in areas where it rained while the Chornobyl cloud was passing, wet scavenging (rain washout) resulted in very high contamination levels in south-east Belarus (Gomel and Brest Regions), northern Ukraine south and west of the reactor, and Russia to a lesser extent in the Bryansk and Kaluga region. In 1990, a significant increase in infant and childhood thyroid cancers began to be evident in those who were under 15 at the time of the accident. It continues to rise and in several conferences in Belarus and Ukraine in March, I learned that the total is now over 1000 cases and is still rising (worldwide, childhood thyroid

cancer normally occurs in populations at a rate of less than 1 per million per year. There were about 600 in Belarus, some 350 in Ukraine, and 150 in Russia, as of last year. I estimate that the final toll over the next decade will add 3000+ more cases of childhood thyroid cancer. The early appearance of this many cases was unexpected, even though we knew that there was a potential for a high thyroid cancer risk.

We learned that three children had died, much fewer than the 5-10% mortality usually associated with the disease (we do not know if further mortality will be seen in these cases the years to come). Unpublished also is a possible trend toward increased rare childhood brain cancer incidence in the heavily contaminated zones.

This has to be carefully evaluated and may prove to be a false alarm, but it is a possible trend and, if confirmed, may relate to hormonal action in response to the radiation injury of juvenile thyroids.

These are all the direct radiation induced illnesses caused by exposure to radiation from Chornobyl. There is an additional and very serious result of the accident; the massive anxiety and stress incurred by worry about possible radiation consequences and by major disruption of the way of life in the impacted zones. Initially labeled "radiophobia," this stress response is exacerbated by the decline in infrastructure accompanying the dissolution of the Soviet Union. In the early hours and days following the accident, authorities were confused, misinformed and uninformed about what was happening. As a result, even though some instructions were issued regarding effective countermeasures, (e.g., interdicting contaminated milk, issuing potassium iodide pills to block the thyroid from taking up radioiodine), they were largely not carried out at the local level (if they were, I believe that many of the thyroid cancers could have been prevented).

The amount of distrust and suspicion regarding any official pronouncements still pervades the regions and lends a favorable climate for sensational claims to be given serious consideration by the public. Thus we hear about immunological diseases, gastrointestinal disorders, vegetative dystonia (a catch-all diagnosis for fatigue), eyeless pigs, five-legged cows and so on, all "caused by Chornobyl." Well meaning efforts to remove children from the area really do not reduce any radiation risk, as the children have already received almost all of their lifetime Chornobyl radiation exposure from the early plume. Today, children outside the exclusion zone are not getting dangerous exposures.

Humanitarian people and groups attempting to treat the aftermath of this disaster are finding a poor level of nutrition and public health in the impacted areas. There is much one can do to alleviate these problems, but it is not radiation risk that is being treated. This is a very sensitive issue and is subject to differing viewpoints, but the hard radiological facts are that the medically important doses have already been delivered and cannot be

"erased" by weeks in summer camp or relocation to some other country. In fact, further dislocation of children from their families may add to stress or raise unrealistic expectations. Restoring a more normal lifestyle and providing credible information which explains the difference between the facts and the fancies could be a significant contribution from the foreign "experts" (I hear too often that they would like to see less "radiation tourism" [continual fact-finding visits which provide little positive impact] and more longer-term cooperative and collaborative assistance and aid).

In summary, the facts to date about Chornobyl's true impact are the early mortality and injury to the rescue workers, the significant increase in childhood thyroid cancers and the massive stress and anxiety in the impacted population. Added is the continual sensationalism, political opportunism and skepticism about any pronouncements regarding the accident. It is a truly unique situation and one in which we can help play an ameliorating role; e.g., education via media, training of health professionals in specific areas, provision of equipment and supplies for improved public health, support of quality epidemiology and radiation dose reconstruction.

And there are still 11 more Chornobyl-like RBMK reactors in operation.

31 March 1996

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File
Chornoby/

4/3/96

Re: Draft Remarks for Chornobyl Event

Melanne -

As you'll see from the attached text -- and footnotes -- I've put a good deal into this. That guarantees nothing. But I would be pleased if this could have nearly the influence on the final product that my draft Presidential Message had on that one (thanks, of course, to the skilled input and stewardship throughout of Carlos, Victoria, and Chip Blacker).

Please take a hard read, see what you think, and pass this on to the First Lady's speechwriter[s] with your considered views.

I remain convinced in my bones that this event, covered and replayed in the community as thoroughly as it will be, can be immensely valuable in bringing Ukrainian-American (and related) voters home to Pappa in November. The policies to merit that are already in place. So what I've focused on here is the music as well as the lyrics -- emotion as well as policy.

Please give particular thought to endnote 2 and the four-word Ukrainian saying that climaxes that section of the speech. I know religious references present special difficulties. But this section as a whole has been crafted to be inclusive and even-handed, and to dovetail with the encompassing themes of the First Lady's recent travels and the reconciliatory spirit of her Bosnia event remarks. And there's no doubt its emotional/political payoff with Ukrainian-Americans throughout the country would be worth the effort -- akin to the President ending his Kiev speech with the words, "Slava Ukrainiy" [Glory to Ukraine]. (I've consulted very discretely on this point with my family and a few trusted sounding boards in the community. And such a move becomes all the more rewarding and advisable if the bandura music is out.)

In any event, please do keep me engaged in the process -- for I tend to be an even better editor than drafter ... and to pay special heed to the "plays well with others" part of the report card. Nor does my usefulness depend on this draft being used as directly as my input for the Presidential Message.

I would have fussed with this draft even more, but time is short
(b)(6) [002]
(b)(6). So I'll probably fax additional thoughts to you tomorrow or Friday -- and of course will stay in close touch on Alex Kuzma's remarks.

- Terry

Draft Remarks for the First Lady for April 10 Chornobyl Event

Welcome to the White House for our commemoration of the tenth anniversary of the Chornobyl nuclear tragedy.

This is an event of profound mourning -- and also [of] profound hope. Mourning, of course, because the people of Ukraine, Belarus, Russia and the world have suffered such grievous losses as a result of the explosion and fire at [Unit 4 of the] Chornobyl [Nuclear Power Plant early on the morning of April 26, 1986]. We pray for those who lost their lives at Chornobyl, and for all who still suffer its continuing effects, particularly the children.

But this is also a celebration of hope -- because of all that Americans and people the world over have done over the past decade in response to this unfolding tragedy. They -- you -- have answered the worst of man-made catastrophes with the best in human nature.

Even before the disaster's full magnitude was revealed, offers of humanitarian assistance began pouring in. And in the years since, their efforts have been [no less than] inspiring.

The private voluntary organizations represented in this room have supplied well over 1000 tons of medicines, medical equipment and supplies, valued in excess of \$100 million dollars, to the affected people in Ukraine, Belarus, Russia, and elsewhere. They have established special[ized] hospitals for the children of Chornobyl and their elders afflicted with thyroid cancers, leukemia, and other disorders stemming from the tragedy. They have brought doctors to the former Soviet Union and patients to the United States for special care.

Other organizations present tonight have focused on the disaster's environmental consequences. Others still are helping governments address the daunting public health challenges in the affected region[s]. A number have helped study and evaluate the disaster's long-term effects. In these and other ways too numerous to mention, the private volunteer community continues to focus the world's conscience on the consequences and lessons of Chornobyl.

Of course, these private efforts often have spurred and augmented government efforts. They have helped give rise, for example, to constructive U.S. Government programs to supply medicines and treatment for those who continue to suffer, and to study the tragedy's [lasting] effects. Here, as elsewhere, private-public partnerships have leveraged resources and transcended limitations.

You will hear more about the PVO initiatives later -- from the head of a coalition of relief organizations [and

representative of one that itself has [gotten] [moved] more than 700 tons of aid to the children of Chornobyl and their elders].

But first I want to make an overarching point about such efforts. For more important than the tons of medicines and supplies they carry is the compassion they convey -- the healing message in every contact that the world will not forget or forsake the victims of Chornobyl.

This is a message of great importance. For we know that we will never know[,] exactly[,] how much harm has been caused by Chornobyl. Learned debates in the medical and environmental communities will continue to unfold as slowly and unpredictably as the effects of the accident itself.

What is certain is America's role -- not just as a [nation] [government], but as a community. For Chornobyl [, like Bosnia,] reminds us that the world looks to America not just for might but for right -- not just for military strength or economic generosity, but to uphold certain essential values. Democracy. Self-determination. Tolerance. Community. Freedom.

We do this as a country -- but we also do it as a people. America reaffirms her standing as a beacon for the world the same way a mother or father earns the trust of a child: by doing the right thing, even when it is not the easy thing, time after time.

It is our nature and destiny as Americans to do all we can [do] about Chornobyl. For us to do this is for America to be the country that so many of our parents and grandparents and forbears dreamed about when they [sought out] [set sail for] these shores.

And I am particularly proud to be an American when I look out across this room and consider all the diverse talents and noble efforts represented here. Your good works have earned our lasting admiration and gratitude. That so many of them can be attributed to [so-called] hyphenated Americans only underscores our strength as a nation: E Pluribus Unum -- from many, one.

This is a holy season -- for Catholic[s] and Protestant[s], Jew[s] and Orthodox.¹ Throughout the world, Christians are celebrating Christ's resurrection, and Jews are celebrating the Exodus of the Israelites from Egypt.

So this commemoration of Chornobyl's tenth anniversary comes at a particularly apt time. For the decade since Chornobyl has been a time of remarkable rebirth, renewal and emancipation -- for Ukrainians, [among others] [especially]. Having endured the catastrophe as a colony, their homeland has emerged as an independent, sovereign nation -- finally able to make its own decisions about Chornobyl. {{A prime example is President Kuchma's courageous determination to close the plant by the year

2000 -- a decision we all have reason to be grateful for, and to see through to fruition.}} These developments are making believers even of those who never dared dream we would be saying, not just with emotion, but with truth, "Chrisstoss Voskress -- Voskressne Ukraina."²

But [of course,] the breadth of our gathering [here] [tonight] underscores that Chornobyl's meaning has spread far beyond any one [community] [ethnic or interest group]. For just as the disaster respected no borders, the response to it has demonstrated how effective we can be when we ignore arbitrary boundaries. Government to government, private voluntary organization to organization, person to person -- let us keep working toward the day when Chornobyl will be remembered not only as a tragedy, but as a signpost on the road to a safer world.

For the losses we mourn and the works we honor all call us to the same mission: to heal and nurture the victims ... to ensure their tragedy is never repeated ... to always counter fear with hope.

ENDNOTES:

after 1. For Catholics and Protestants, Easter this year is 3 days before the event; for Jews, Passover will have begun at sundown of April 3rd, and the holiday's 7th day will be the day of the event; for Orthodox Christians (a significant minority in the ethnic audience), Easter will be April 14th. So the event's falling on the 10th creates an opportunity to link the commemoration to very resonant holidays for the audience -- thus turning the event's distance from the actual anniversary of April 26th into the plus.

2. English transl: "Christ is risen -- so too will rise Ukraine."

April 30, 1996

Fili Chornobyl

COMMEMORATION OF THE TENTH ANNIVERSARY OF THE CHORNOBYL DISASTER

DATE: Wednesday, May 1, 1996
TIME: 1:00 pm
LOCATION: State Floor
FROM: Nicole Rabner

I. PURPOSE

To commemorate the tenth anniversary of the Chornobyl tragedy by saluting the efforts of the American humanitarian relief community and highlighting the leadership of the Administration. Also, to call for continuing assistance, healing and prevention.

II. BACKGROUND

April 26, 1996, was the 10th anniversary of the Chornobyl tragedy. There have been commemorative events around the country to raise awareness and additional resources for continuing assistance. You serve as honorary chair of *Chornobyl Challenge '96*, which is a coalition that has organized commemorative events around the country, including academic symposia, a non-denominational prayer service and a dinner. Other groups have organized additional events around the country.

As you know, this event was originally scheduled for April 10, 1996, but was postponed due to Ron Brown's funeral.

III. PARTICIPANTS

-HRC
-Vice President Al Gore

Program Participants

-Alexander Kuzma, Coordinator of Chornobyl Challenge '96
-Vova Malofienko, 12

Blue Room Participants

-Senator Claiborne Pell
-Rep. Nita Lowey
-Rep. David Bonior
-Ambassador and Mrs. Serguei Martinov [mahr-TI-nuff] (Belarus)
-Ambassador and Mrs. Yiliy Vorontsov [vahr-unts-UFF] (Russia)
-Ambassador and Mrs. Yuri Shcherbak [share-BAHK] (Ukraine)
-Tony Lake, NSC
-Chip Blacker, NSC
-Sandy Berger, NSC
-Carlos Pascual, NSC
-Brian Atwood, USAID

-Ambassador Richard Morningstar, State
-Ambassador Jim Collins, State
-Taras Bazyluk, State
-Laryssa Chopivksy, The Washington Group
-Hobert Earle, Conductor of the Odessa Philharmonic concert
commemorating Chornobyl
-Mr. and Mrs. Malofienko (Vova's parents)

-Approximately 180 members of the humanitarian relief community,
the environmental community, academia, and the American ethnic
community.

IV. SEQUENCE OF EVENTS

Scenario provided by the Social Office.

V. PRESS PLAN

Open Press.

VI. REMARKS

Provided by Lissa Muscatine.

THE WHITE HOUSE
WASHINGTON

TO: THE VICE PRESIDENT
THE FIRST LADY

WHAT: TENTH ANNIVERSARY OF THE CHORNOBYL TRAGEDY

WHEN: Wednesday, May 1, 1996
1:05 p.m.

WHERE: Remarks: East Room
Receiving Line: Blue Room

of Guests Approx. 180/Open Press/Business Attire

FROM: Ann Stock, Sarah Farnsworth

1:05 p.m. THE VICE PRESIDENT and THE FIRST LADY arrive in the Red Room for event briefing.

Upon conclusion of briefing, THE VICE PRESIDENT and THE FIRST LADY proceed to the Blue Room for meet and greet.

1:20 p.m. THE VICE PRESIDENT and THE FIRST LADY are announced into the East Room, accompanied by Mr. Alexander Kuzma and Vova Malofienko.

Speaking Program:

- THE FIRST LADY makes welcoming remarks and introduces Mr. Alexander Kuzma, Children of Chernobyl
- Mr. Alexander Kuzma makes remarks.
- Mr. Vova Malofienko (12 yrs. old) makes remarks and introduces THE VICE PRESIDENT.
- THE VICE PRESIDENT makes remarks.
- Following remarks, THE FIRST LADY returns to the lectern and invites guests into the State Dining Room for a reception and the Blue Room for receiving line.

1:50 p.m.

THE VICE PRESIDENT departs.

THE FIRST LADY proceeds to the Blue Room for a receiving line.

2:40 p.m.

THE FIRST LADY concludes the receiving line and departs.

FACT SHEET: THE ACCIDENT AT THE CHORNOBYL NUCLEAR POWER PLANT

In the early hours of April 26, 1986, during a test on the turbines in Chornobyl's Reactor No. 4, a catastrophic explosion in the reactor core destroyed much of the reactor building. The explosion and subsequent fire released massive quantities of radioactive substances -- radioactive iodine, cesium-137, strontium 90 -- into the atmosphere. The fire raged for nearly two weeks, before being extinguished May 10. Most of the 31 individuals officially recorded as dying during or immediately after the disaster were plant personnel or firefighters with little or no protection against radiation. Some 600,000 individuals from throughout the former Soviet Union helped with the cleanup that followed.

Although arguments persist over the explosion's immediate cause, contributing factors include basic flaws in the reactor's design, poor plant construction, the extreme riskiness of the test procedures used the night of the explosion, and a poor safety culture throughout the Soviet nuclear establishment. The affected reactor also had no containment structure.

Pripyat, a town of some 50,000 housing plant personnel and their families only two kilometers from the plant, was evacuated two days after the explosion. Further evacuations subsequently created a 30-kilometer exclusion zone around Chornobyl. Approximately two-thirds of this zone lies in Ukraine, and one-third lies in Belarus. Exclusion zones, in which habitation, farming, and other activities are restricted to varying degrees, have been designated throughout the large region affected by fallout. Closed zones, where no one may live or enter without a pass, are situated next to so-called permanent control and periodic control zones, where residents undergo health monitoring at various times. However, these restrictions and check-ups are not strictly enforced. In total, some 135,000 people were evacuated, although some individuals have refused to leave the zone.

Health Effects: Although precise figures may never be known, there is general agreement that the accident led to an increase in thyroid cancers among Ukrainian and Belarusian children, from approximately 6 cases a year before the accident to between 30-40 cases per year since 1990. There is also a prospect that we will see a rise in leukemia among

"liquidators" -- those who helped deal with the immediate consequences of the accident at the plant site -- can be attributed to irradiation. The U.S. Department of Energy and Ukraine's Ministry of Health are now discussing cooperative studies of leukemia among the liquidators.

Financial Impact: Estimates of the financial and human costs of the accident vary greatly. The Chornobyl Ministry estimates Ukraine has spent over \$3 billion in the four years since independence on Chornobyl-related health and clean-up costs. Across the border in Belarus, where the wind carried most of the heaviest concentrations of radiation, the government has been struggling with Chornobyl-related costs that have amounted to \$235 billion over the decade. More than five percent of Ukraine's draft 1996 budget--some \$695 million at current exchange rate--has been allocated for dealing with the accident's consequences. About 65 percent of this sum is devoted to direct payments--e.g. rent, utilities, medical, and other types of subsidies--to those affected by the accident, currently estimated at about 3.2 million people. The remainder is largely targeted for construction costs to resettle those in contaminated areas and for cleanup of affected areas. More than 180,000 hectares of arable land and 257,000 hectares of forest land have been rendered useless due to radioactive contamination. An additional 3 million hectares of arable land is still cultivated but has higher than normal radiation levels. In Belarus, some 25% of the land is considered uninhabitable.

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FACT SHEET: US ASSISTANCE TO CHORNOBYL

On December 20, 1995, the U.S. and its G-7 partners joined with Ukraine to undertake a comprehensive program to close Chornobyl by the year 2000. At present, over \$2.5 billion in multilateral development bank financing and \$500 million in donor grant assistance has been made available to address needs identified in the comprehensive program. To date the U.S. has contributed over \$73 million to such efforts, including support for an International Research Center for Nuclear Safety, Radioactive Waste and Radioecology that will help create an indigenous capability to solve nuclear safety and decontamination problems at Chornobyl; enhanced fire protection and operational safety improvements at Chornobyl; assistance to Ukraine's nuclear power regulator to strengthen capabilities in such areas as decommissioning and licensing; and a broad range of energy sector projects to increase efficiency and ensure that Ukraine has an economically sound power sector after closing Chornobyl.

The United States will build on these core programs with a series of new humanitarian and technical assistance initiatives in Ukraine and Belarus during the tenth anniversary year of the Chornobyl accident. This paper describes those new initiatives.

HUMANITARIAN

Delivery of Humanitarian Assistance

A special combined humanitarian assistance surface and airlift mission to Ukraine, Belarus and Moldova was initiated to support the Chornobyl tenth anniversary project. The mission provided over \$15 million in assistance - \$5 million in donated medical equipment and supplies was shipped by surface and over \$10 million in donated medicines was airlifted to Chisinau on April 23, Kiev on April 25 and Minsk on April 27. Ambassador-designate Richard Morningstar, Special Advisor to the President and Secretary of State for NIS Assistance, along with other US and Ukrainian officials, met the airlift in Kiev. In addition to US government stocks, major donors who contributed to this effort included Eli Lilly and Company, Monsanto-Searle, Project Hope Foundation and Americares. The US government organized the deliveries through the non-governmental organization Counterpart and provided the

transportation for the deliveries. Many other donor organizations have been active in making contributions over the past four years, resulting in humanitarian contributions to Ukraine and Belarus transported by the US Government totaling over \$265 million.

TECHNICAL ASSISTANCE

Chornobyl Sarcophagus

Of the many problems Ukraine faces in dealing with the shutdown of the Chornobyl nuclear power plant, that of the sarcophagus is one of the most difficult. An acute lack of resources and the severe radiation environment has caused the present sarcophagus, which was built hastily following the Chornobyl accident, to deteriorate. The absence of alarm systems, lack of adequate radiation monitoring, physical decay, and leaks pose immediate and serious risks to the workers at the site, including those operating Unit 3 adjacent to the sarcophagus. Interim measures are necessary to stabilize the sarcophagus and reduce the risk of collapse.

The EU, U.S., Germany and Ukraine are supporting a collaborative initiative to develop short and long-term measures to stabilize the sarcophagus. Short-term options should be completed in mid-1996, allowing work to begin later this year. The U.S. government proposes to dedicate \$33 million in new assistance funds over two years to jumpstart implementation of a solution to the sarcophagus problem. Resources will be devoted to improving conditions for workers at the sarcophagus, specific interim stabilization measures, and a long-term multi-donor solution. This will demonstrate our commitment to realizing quick results on one of the most serious problems.

Additional safety equipment for Ukraine nuclear reactors

Continuing the US program to improve the safety of operating nuclear power plants in the NIS, the Department of Energy will provide \$4 million in additional display and control systems for those reactors without containment systems; these safety displays have the capability to monitor and shut down a facility before a crisis occurs.

Regulatory assistance on nuclear fuel use

The Nuclear Regulatory Commission will provide assistance to Ukraine to develop regulatory institutions for managing the purchase, licensing and use of nuclear fuel.

Energy Efficiency in Ukraine

One of the key objectives of the program in support of Chornobyl closure is adequate and reliable energy in the future. The USG is proposing to devote \$15 million to energy efficiency measures that will respond to priorities in Ukraine. These measures are proposed in the context of overall energy sector reform in Ukraine that is helping to establish rational pricing and payments signals. Funds would be used to assist in the immediate improvement of industry energy efficiency and the development of private Ukrainian energy efficiency service companies (ESCOs); support an energy savings pilot project that would target Ukraine's municipal energy problems including, for example, the water utilities; address crucial components of power sector reform such as load management bidding to the energy market; support the exploration of alternative energy sources; and support an energy efficiency project preparation initiative that would identify efficiency projects for industries and buildings to be financed by the multilateral banks and private investors.

Treatment of breast cancer

The US government will undertake an effort to screen, diagnose and treat victims of breast cancer in those areas most effected by radioactive contamination resulting from the Chornobyl accident. Existing hospital partnerships in Ukraine and Belarus will administer part of this effort.

Support for decontamination of milk

US government agencies will be supporting the final research and testing of a new technology for removing radioactive contamination from milk and other liquid foods in Ukraine. Selentec, a US firm based in Atlanta, will receive funding from several USG agencies to help develop, test and work toward a product that removes cesium from liquids like milk and fruit juice. While still at a very early stage, the technology is promising enough for the Department of Energy to commit \$80,000 for the joint development of test procedures for the process and another \$480,000 to apply the technology to Ukrainian milk production. USAID will also provide funds for the project.

Mobile test laboratory

The United States is providing the Ukrainian Ministry of Environment with a state-of-the-art mobile laboratory to test air, water and soil for contamination. The value of the equipment and accompanying training programs is about \$1. million. The laboratory will be delivered to Ukraine in the summer 1996.

###

FACT SHEET: CHORNOBYL CLOSURE

On December 20, 1995, the Group of Seven (G-7) countries signed a Memorandum of Understanding with Ukraine to implement a comprehensive program to support the closure of the Chornobyl Nuclear Power Plant, the site of the world's worst civilian nuclear power reactor accident on April 26, 1986. The memorandum signed by Ukraine and the G-7 is intended to lead to closing the remaining two operating units of Chornobyl by the year 2000, with a related objective of restructuring Ukraine's energy sector to run more efficiently and according to internationally accepted safety standards.

Background: Ukraine's economic prosperity requires a stable and secure energy supply. Ukraine is one of the most energy-intensive countries in the world, importing roughly half of its energy supply -- 90% of it from Russia. In 1994, thermal plants generated 57.4% of Ukraine's electricity; nuclear (34.1%), hydro (6.1%) and small industrial (2.3%) plants generated the balance.

Memorandum of Understanding (MOU): Ukraine's MOU with the G-7 puts Chornobyl closure in the context of Ukraine's effort to restructure its power sector. The MOU outlines a comprehensive program with four elements: power sector reforms to create a national electricity market; least-cost power supply and efficiency investments to meet national power demand; nuclear safety issues associated with decommissioning; and the social impacts of closing the plant. The MOU creates a unique multilateral mechanism to reach these goals which has already mobilized over \$3 billion of G-7, international financial institution (IFI), and other donor resources, over \$2.3 billion of which is IFI financing.

PROJECTS UNDER THE COMPREHENSIVE PROGRAM

Power sector restructuring: A competitive power system with market-based electricity prices and commercially viable generation and distribution companies is essential to Ukraine's energy future. On July 1, 1995, the breakup of Ukraine's monopoly power system was completed resulting in four thermal generation companies, two hydropower companies, a nuclear company, and a transmission company. Furthermore, twenty-seven joint-stock electricity companies have been created to own and operate low-voltage networks. The key next step is to

implement a competitive power market, the "Energomarket". To support these efforts, the World Bank increased proposed funding for its power sector reform loan to \$300 million and is expediting the loan, including \$30 million for retroactive reimbursements for fuel.

Least-cost energy investments: The G-7 and Ukraine agreed to indentify and mobilize financing for least-cost investments to meet national power demand as Ukraine restructures its power sector. President Chirac, on behalf of the G-7, has obtained assurances from the World Bank and the EBRD of their cooperation. These investments will include demand and supply-side measures. A preliminary least-cost study points to priority investments for conventional power plant rehabilitation, building new pumped storage facilities, and completion to international safety standards of two nuclear plants at Rovno and Khmelnytsky. The EBRD, Euratom, the European Investment Bank and the European Union (EU) are preparing detailed feasibility assessments to determine whether the completion of these two reactors would satisfy environmental, safety and financial feasibility requirements.

Improved energy efficiency: While estimates for potential energy savings vary, representative projections for electricity savings are 10-15% of total power demand. Retail price reform, improved tariff collection, and restructuring/privatization of industrial and municipal enterprises will reduce energy intensity, reduce waste, and improve productivity and competitiveness. The U.S. is developing a special grant package to develop bankable energy efficiency projects for IFI financing, as well as demonstration projects for low-cost/no-cost efficiency technologies.

Nuclear safety plan: The plan includes G-7 and EU support for decommissioning Chornobyl, managing nuclear waste from the 1986 accident, and short-term upgrades for Unit 3. A decommissioning plan is now complete, and \$173 million in grants from the multidonor Nuclear Safety Account (NSA), the EU and Canada have been mobilized for waste treatment facilities. The U.S. has initiated additional \$10.8 million in safety upgrades, and the NSA has developed an additional \$15.5 million safety package. The EU and Ukraine have agreed on criteria for a cost-effective, environmentally sound solution to the sarcophagus problem; experts from Ukraine, the EU and G-7 countries expect to have interim stabilization measures ready in mid-summer and a final solution ready by November.

Social impact: Chornobyl's closure will affect 5,000 workers at the plant and the 30,000 inhabitants of Slavutich and the Chornobyl region. The EU and the U.S. are helping Ukraine develop a plan that addresses dislocation, job creation, retraining, and the need for long-term financial sustainability in the region.

Financing: The MOU is a cooperative effort in which the G-7 will mobilize international financing to supplement Ukraine's domestic resources. International financing will be based on the principle that IFI loans will be mobilized for bankable, income-generating projects while grant funds will be considered for appropriate non-income generating projects. Ukraine and the G-7 will meet twice yearly at the policy level and twice yearly at the technical level to accelerate implementation of the MOU.

###

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- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

Remarks of Alex Kuzma

As Coordinator of Chornobyl Challenge '96, I am grateful for this opportunity to say a few words on behalf of all those who have risen to a deathly challenge by restoring life -- and hope.

To the First Lady, I say Thank You for bringing us [all] together today. Your presence and encouragement in the childrens' hospitals of Belarus and Ukraine has been more important than you can imagine.

To the Vice President, I express our gratitude for helping restore America's global environmental leadership.

And to the President and the entire Clinton Administration go our heartfelt thanks for helping [us] keep the world's attention focussed on Chornobyl -- and for recognizing that many of its greatest challenges are yet to come.

The Chornobyl relief community is a remarkable [microcosm] [slice] of America -- including medical professionals and environmentalists, corporate sponsors and young volunteers, ethnic communities and religious organizations. So many distinguished organizations and individuals are represented in this room. Many more could not be here.

None of us could have taken on this monstrous challenge alone. We have made some hard-won progress only by working together. Just as the disaster of Chornobyl defied borders, so coping with it has broken down barriers -- and stretched what we thought was possible.

Let me offer just a few illustrations:

- * Dr. Mona [REDACTED] (b)(6) works miracles over the phone. Her persuasive appeals to company executives have helped secure priceless donations of ultrasound equipment, leukemia medications, even an MRI system.
- * Schoolchildren in Spring Valley, New York, Orange, Connecticut, Cambridge, Massachusetts and other towns across America have raised tens of thousands of dollars to save the lives of their counterparts in Belarus and Ukraine.

*

[REDACTED]
(b)(6)

[003]

- * A brilliant retired chemist, the late [Dr.] Volodymyr Hordynsky, spends the last four years of his life establishing the finest blood testing laboratory in Eastern Europe. Today his legacy is helping save the lives of children with leukemia and non-Hodgins lymphoma.

These few brief stories cannot do justice to the outpouring of generosity and courage we have seen from hundreds of unsung heroes. But they do hint at the miracle of how a tragedy on another continent has evoked the best in the American spirit.

That tragedy was, of course, a product of its time and place. So I find it fitting we come together on this particular day. For May Day 1986 was a day of infamy -- with children in Minsk and Kiev absorbing terrible levels of radiation, marching in parades the [Soviet] authorities assured everyone were harmless.

For those children and all who love them, those parades began a journey whose conclusion we cannot yet know. What we [can and] do know is what the Talmud teaches -- that to save one life is to save the world.

I would now like to introduce a very brave boy who knows firsthand Chornobyl's consequences. Vova Malofienko is one small slice of the world [that] I am so very grateful America has been able to save.

Vova was 5 and suffering from leukemia when he came to the United States in 1990. He is with us today thanks to outstanding treatment received from Dr. Molly Schwenn in Boston and Dr. Kamalaker at Beth Israel Medical Center in Newark. He first came to America under the auspices of CCRF and Paul Newman's Hole in the Wall Gang Camp for children with cancer.

Vova is joined today by his parents, Olya and Alexander. Though their son has recovered, they have not forgotten all the families and children who remain in the Chornobyl region, and whose futures remain in doubt. Though the Malofienkos had to leave them, they have not left them behind.

Here, in America, we have grown to love Vova for his courage, his wonderful sense of humor, his gentle zest for life that turned out to be his special saving grace. His one life spared has enriched so many others. So it fills me with joy to introduce to you our dear friend, an everyday advocate for all the children of Chornobyl, Vova Malofienko.

Remarks of Vova Malofienko

Dear Mrs. Clinton -- Dear Mr. Vice President:

I am very happy to be here today, to thank America for saving my life. And to say "keep doing what you're doing" for all the other [children] [kids] like me that I had to leave behind, who might be getting sick because of Chornobyl.

I especially want to thank *** , Paul Newman, the actor who....

When I first came here I did not speak much English, but there were many people at *** who became my friends and helped me get through a very hard time in my life.

America is an amazing country. You are so lucky to have freedom and such good hospitals and great doctors [and kind/generous people].

Where I [come] [came] from, [the city of] Chernihiv, the hospitals are not as modern as in America, and not everyone can be taken care of as well as I have been -- especially children and old people. Lots of radiation from Chornobyl fell on Chernihiv, and today, many children have thyroid cancer and leukemia. [full stop]

My Doctors, who Alex named, were fantastic. In Ukraine, there are wonderful doctors and nurses too, but they don't always have all the things they need. Here, [at my hospitals in Boston and Newark,] my doctors had everything they needed to make me better. It was hard but it worked. [significant pause] I am grateful.

Mrs. Clinton, I want to thank you and the President for not forgetting the children like me. Your trip and hospital visits -- and now again today -- have reminded everyone that children are getting sick from Chornobyl, and the whole world needs to help.

I know you wrote a book called "It Takes a Village" to raise a child. I haven't read it ... yet. But I can tell you also know that it takes a village to HEAL a child. I am grateful you are helping send this message all over the world.

I want to thank everyone in this room and all the people who could not be here.

I know you have worked hard. You probably get tired; I know grown-ups do -- and I did when I was still sick [and going to the hospital]. But even if you are tired, you can't stop now. You are doing so much good and still there are more children to be healed.

Please don't stop until no more kids are getting sick from Chornobyl. I want all the children I had to leave behind to feel how I feel today: healthy, and [free] [normal] ... and grateful.

Thank you -- and God bless [you] [America].

Remarks of the Vice President

April 26, 1996 2:42PMPM/Spalter

MELANNE - AS PROMISED:

Remarks by Vice President Al Gore 10th Anniversary of Chernobyl Memorial The White House April 30, 1996

Let me begin by thanking you, Mrs. Clinton, for that nice introduction and for your moving words. We are all in your debt for all the hard work you do to ease the pain and lift the lives of so many people around the world. Your deep concern for the future of the peoples of Ukraine, Belarus and Russia as well as all those who were affected by this tragedy has touched the hearts of all of us here today.

(ACKNOWLEDGMENTS FROM ADVANCE)

Ten years ago, when reactor #4 of the Chernobyl nuclear power plant disintegrated in blast of steam, flaming graphite, and deadly radionuclides, the promise of spring gave way to long sad winter of unspeakable suffering that still remains with us to this day.

From that moment on, life for all of us around the world would never be the same.

The Chornobyl tragedy caused the complete social disintegration of whole communities. It caused dangerous radiation exposure of over half million courageous men and women involved in the clean-up and medical care of survivors. In all, well over 50 million curies of radioactivity were released during the accident. This is more than one hundred times the radiation emitted by the atomic explosions over Hiroshima and Nagasaki -- about one million times as much as the Three Mile Island accident of 1979.

And the effects are still with us today. They are measured in the anxiety of young Ukrainian and Belarusian and Russian parents who hope and pray that their newborns will grow healthy and whole. They are measured by the degraded natural resources that trace a poisoned arc across Ukraine, through Belarus, into Russia, and reaching as far as Scandinavia. They are measured by the uncertainty that we all share about whether another Chornobyl someday might explode.

But as Mrs. Clinton so eloquently reminded us, out of this mire of tragedy also has emerged great stores of hope, and deep reservoirs of resolve. Selfless men and women -- thousands and thousands of them -- risked their lives to protect those of others. And courageous leaders like you here today are working tirelessly to relieve suffering. We salute you, and we honor you for your heroic efforts.

Let there be no doubt: all Americans stand with you. President Clinton is determined to do whatever we can to overcome this tragedy, and to ensure that all reactors everywhere are

safer, cleaner, and forever free from the sort of catastrophe we remember on this important anniversary.

That's why in the past two years, the United States has delivered one hundred of tons of medical supplies to the hospitals of Ukraine, Belarus and Russia. In cooperation with several visionary private voluntary organizations, we've launched Operation Provide-A-Spe to send critical supplies to maternity hospitals and cancer wards throughout the region. We've also launched through USAID innovative partnerships between American and Ukrainian health providers to improve the efficiency and quality of health care in Ukraine. And our National Cancer Institute, together with the Nuclear Regulatory Commission and the Department of Energy are hard at work examining the health effects of the accident on children and clean-up workers so that treatment and care might be improved. And just a few days ago, on April 26th, we delivered over twelve million dollars in additional aid and medical relief, including a mobile laboratory to enable Ukraine's government to monitor radiation and environmental contamination throughout the country.

But that's not all. Only a few weeks ago, we watched proudly as President Clinton joined his G-7 and Russian counterparts at the nuclear summit in Moscow to work towards the day when no Chernobyl can ever happen again. During this summit, President Kuchma announced his commitment close one of the two remaining Chernobyl reactors by the end of this year. Already we've provided \$61 million in direct assistance to Ukraine to help promote greater nuclear safety. As we speak, our experts are working side by side with their colleagues in

Ukraine to improve the safety of their nuclear plants and to strengthen its nuclear regulatory body.

And as importantly, as part of a broader energy efficiency initiative now underway, we've also been working with the great industrial nations -- known as the G-7 -- to help Ukraine honor its commitment to close and clean-up the Chornobyl reactor sites, and to reduce its fuel bill by \$1 billion every year by the year 2000. I am pleased to note that at the Moscow nuclear summit, President Kuchma pledged to close one of the two Chornobyl reactors by the end of the year which is well ahead of schedule. But we still have much work before us.

Can we meet these goals? I believe we can, but there is a great deal of funding still required. And there are numerous logistical details to work out. Yet underlying all these efforts is our strong belief that the people of Ukraine have the resilience, the will, and the fortitude to get the job done and throw off the yoke of their Soviet legacy once and for all.

One just needs to look at the breadth and pace of economic reform underway in Ukraine, at the extraordinary spirit of the Ukrainian people, and at the steady leadership of President Kuchma to know Ukraine, perhaps as no other country with Soviet-era reactors, can sustain the effort needed to modernize its energy system and face the future free from the burdens of its Soviet past.

Chornobyl, after all, wasn't simply mistake of science. It was caused first and foremost by man. It was product of closed authoritarian system that had little concern for the welfare of its people. The Soviets failed to design safe nuclear plant. They failed to operate it safely. When it disintegrated, they failed to contain the damage, and failed to evacuate and decontaminate promptly. And in the end, they failed utterly to be honest about what happened.

In retrospect, I think it was no surprise that just like the faulty nuclear reactor it created, the Soviet system also imploded into ash and dust. Chornobyl -- perhaps more than any other symbol of Communist era, exposed the weakness and corruption of the Soviet system. As Secretary of State Christopher rightly said when he visited Kiev last month, and I quote, "one of the surest safeguards against another Chornobyl is skeptical, open, democratic, questioning society."

This, perhaps, is the most enduring lesson of Chornobyl -- a lesson we'd do well to remember on this anniversary, that only in freedom can people claim their rightful destiny to live in safety and security. Only in freedom can people insist on public health systems that work and on natural resources that are safeguarded and protected. Only in freedom can people say and mean "no" if arrogant bureaucracies of the sort that ran rampant in the Soviet Union ever again try to make dangerous decisions about dangerous technologies.

Today, at long last, the people of Ukraine and Belarus and Russia have enormous opportunities before them. The promise of democracy and reform burns brightly, and the dream

of a Europe no longer at risk of nuclear disaster slowly is becoming reality. But the future of reform is not certain. A grand struggle is underway between those who would move forward, and those who would retreat back. President Clinton and I -- and each of us here today -- are not neutral bystanders. We know which forces we want to prevail. And we have a stake in their prevailing. We have the capacity through economic assistance, through the generous private and voluntary efforts, and through rigorous diplomacy, to help them do so. And I know we will not fail, that we shall never waiver.

Thank you all very much.

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HOBART EARLE, Music Director

Sunday Afternoon, April 28, 1996, at 2:00

IVES The Unanswered Question (1906)

DANKEVYCH "Taras Shevchenko"
Symphonic Poem (1939)

MAHLER Symphony No. 10
Adagio (first movement)

Intermission

KOLESSA Orchards Blooming in the Carpathians (1950)

SKORYK Carpathian Concerto (1972)

COPLAND Appalachian Spring (1944)

The Odessa Philharmonic's 1996 U.S. tour commemorates the tenth anniversary of Chernobyl.

First Lady Hillary Rodham Clinton
Honorary Chair, Chernobyl Challenge '96

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The taking of photographs and the use of recording equipment are not allowed in this auditorium.
The Filene Memorial Organ in the Concert Hall contributed by Mrs. Jouett Shouse.
Baldwin is the official piano and electronic organ of the Kennedy Center.

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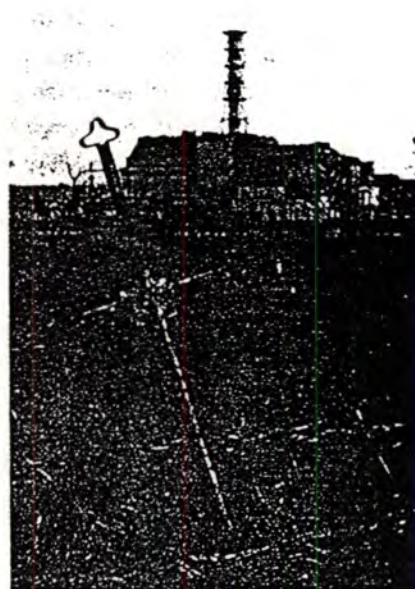


Smart Rooms

Alex P. Pentland

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The computer on your desk may soon become part of the walls of your office, the furniture in your home and the clothes on your back. Systems that can track people, recognize their faces, and interpret speech, expressions and gestures have become a reality. Using this technology, researchers are building "smart rooms" in which, free from wires and keyboards, people can browse multimedia displays, play with virtual animals or control programs by sign language.



CONFRONTING THE NUCLEAR LEGACY

Ten Years
of the Chornobyl Era

Yuri M. Shcherbak

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A decade ago reactor number 4 at the Chornobyl nuclear power plant exploded, showering much of eastern Europe with radioactive debris. The Ukrainian ambassador to the U.S., who was a medical researcher in Kiev and one of the first physicians to treat the wounded, looks at the medical aftermath of the accident. He also contemplates what additional technological and political measures need to be taken to contain the lasting danger. First in a series.

Ten Years of the Chornobyl Era

*The environmental and health effects
of nuclear power's greatest calamity
will last for generations*

by Yuri M. Shcherbak



"It seemed as if the world was coming to an end....I could not believe my eyes; I saw the reactor ruined by the explosion. I was the first man in the world to see this. As a nuclear engineer I realized all the consequences of what had happened. It was a nuclear hell. I was gripped by fear."

These words were written to me in 1986 by the head of the shift operating the reactor that exploded at the Chornobyl nuclear power plant in northern Ukraine. The explosion and a resulting fire showered radioactive debris over much of eastern Europe. The author of the words above, along with several others, was later jailed for his role in the disaster, although he never admitted guilt.

Subsequent official investigations have shown, however, that responsibility for this extraordinary tragedy reaches far beyond just those on duty at the plant on the night of April 25 and early morning of April 26, 1986. The consequences, likewise, have spread far beyond the nuclear energy industry and raise fundamental questions for a technological civilization. Before the explosion, Chornobyl was a small city hardly known to the outside world. Since then, the name—often known by its Russian spelling, Chernobyl—has entered the chronicle of the 20th century as the worst technogenic environmental disaster in history. It is an internationally known metaphor for catastrophe as potent as "Stalingrad" or "Bhopal." Indeed, it is now clear that the political repercussions

from Chornobyl accelerated the collapse of the Soviet empire.

Because of the importance of this calamity for all of humanity, it is vital that the world understands both the reasons it happened and the consequences. The events that led up to the explosion are well known. Reactor number four, a 1,000-megawatt RBMK-1000 design, produced steam that drove generators to make electricity. On the night of the accident, operators were conducting a test to see how long the generators would run without power. For this purpose, they greatly reduced the power being produced in the reactor and blocked the flow of steam to the generators.

Unfortunately, the RBMK-1000 has a design flaw that makes its operation at low power unstable. In this mode of operation, any spurious increase in the production of steam can boost the rate of energy production in the reactor. If that extra energy generates still more steam, the result can be a runaway power surge. In addition, the operators had disabled safety systems that could have averted the reactor's destruction, because the systems might have interfered with the results of the test.

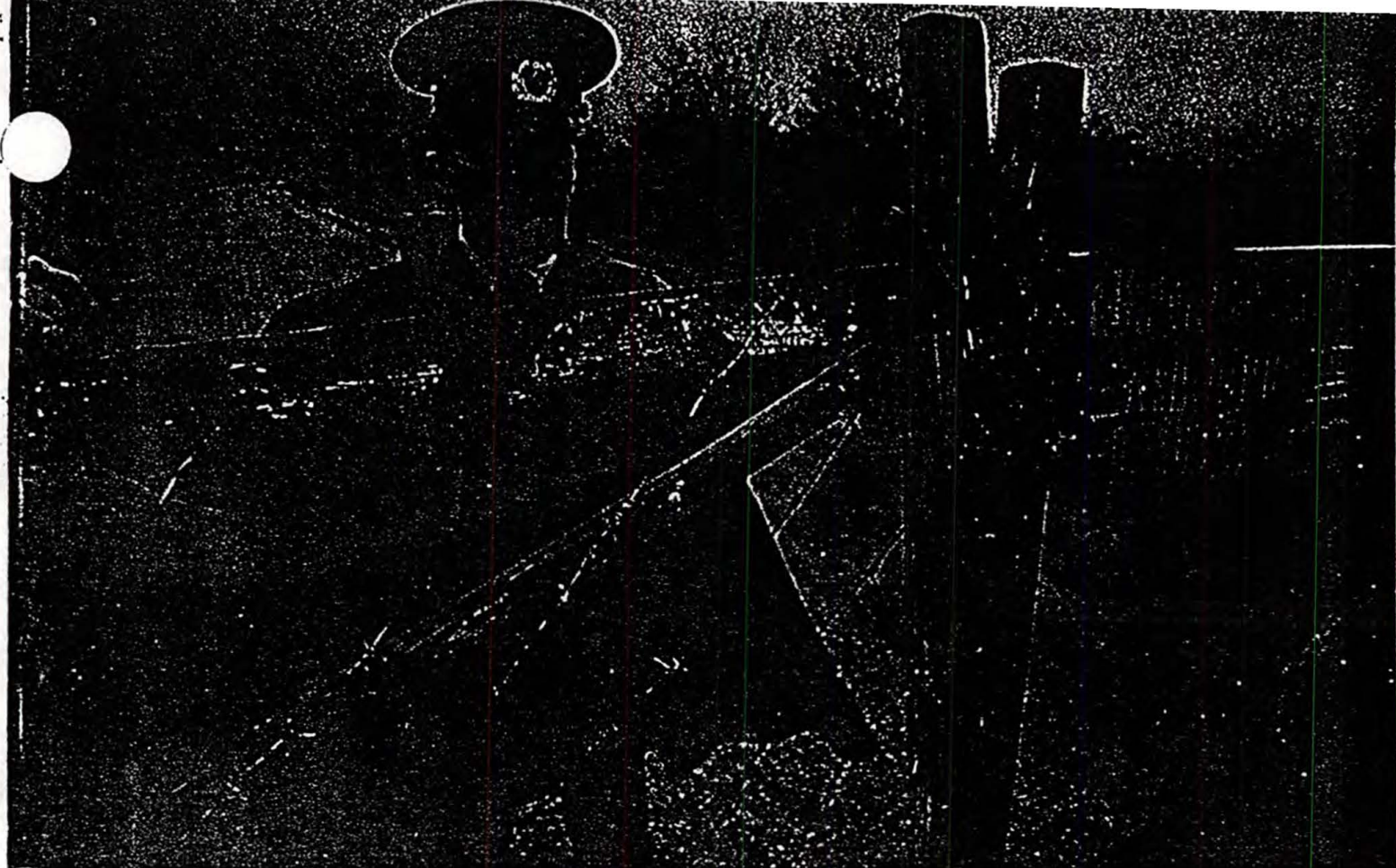
At 1:23 and 40 seconds on the morn-

ing of April 26, realizing belatedly that the situation had become hazardous, an operator pressed a button to activate the automatic protection system. The action was intended to shut the reactor down, but by this time it was too late. What actually happened can be likened to a driver who presses the brake pedal to slow down a car but finds instead that it accelerates tremendously.

Within three seconds, power production in the reactor's core surged to 100 times the normal maximum level, and there was a drastic increase in temperature. The result was two explosions that blew off the 2,000-metric-ton metal plate that sealed the top of the reactor, destroying the building housing it. The nuclear genie had been liberated.

Despite heroic attempts to quell the ensuing fire, hundreds of tons of graphite that had served as a moderator in the reactor burned for 10 days. Rising hot gases carried into the environment aerosolized fuel as well as fission products, isotopes that are created when uranium atoms split apart. The fuel consisted principally of uranium; mixed in with it was some plutonium created as a by-product of normal operation. Plutonium is the most toxic element known, and some of the fission products were far more radioactive than uranium or plutonium. Among the most dangerous were iodine 131, strontium 90 and cesium 137.

A plume containing these radioisotopes moved with prevailing winds to the north and west, raining radioactive particles on areas thousands of miles



FORBIDDEN ZONE: militiaman controls access to a town in the district of Narodichi, a region evacuated after the explosion

and fire at the nearby Chernobyl plant caused a shower of dangerously radioactive fallout across eastern Europe.

away. Regions affected included not only Ukraine itself but also Belarus, Russia, Georgia, Poland, Sweden, Germany, Turkey and others. Even such distant lands as the U.S. and Japan received measurable amounts of radiation. In Poland, Germany, Austria and Hungary as well as Ukraine, crops and milk were so contaminated they had to be destroyed. In Finland, Sweden and Norway, carcasses of reindeer that had grazed on contaminated vegetation had to be dumped.

Widespread Effects

The total amount of radioactivity released will never be known, but the official Soviet figure of 90 million curies represents a minimum. Other estimates suggest that the total might have been several times higher. It is fair to say that in terms of the amount of radioactive fallout—though not, of course, the heat and blast effects—the accident was comparable to a medium-size nuclear strike. In the immediate aftermath of the explosion and fire, 187 people fell ill from acute radiation sickness; 31 of these died.

Most of these early casualties were firefighters who combated the blaze.

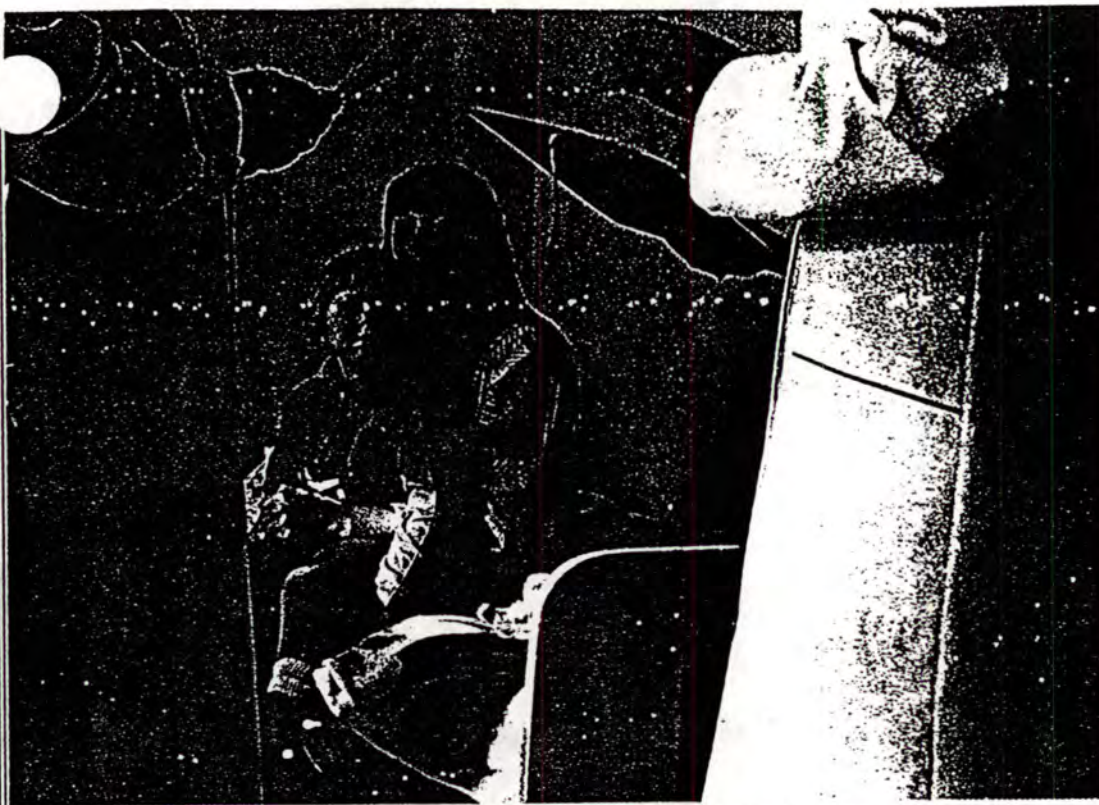
The destroyed reactor liberated hundreds of times more radiation than was produced by the atomic bombings of Hiroshima and Nagasaki. The intensity of gamma radiation on the site of the power plant reached more than 100 roentgens an hour. This level produces in an hour doses hundreds of times the maximum dose the International Commission on Radiological Protection recommends for members of the public a year. On the roof of the destroyed reactor building, radiation levels reached a frightening 100,000 roentgens an hour.

The human dimensions of the tragedy are vast and heartbreaking. At the time of the accident, I was working as a medical researcher at the Institute of Epidemiology and Infectious Diseases in Kiev, some 60 miles from the Chernobyl plant. Sometime on April 26 a friend told me that people had been arriving at hospitals for treatment of burns sustained in an accident at the plant, but we had no idea of its seriousness. There was little official news during the next few days,

and what there was suggested the danger was not great. The authorities jammed most foreign broadcasts, although we could listen as Swedish radio reported the detection of high levels of radioactivity in that country and elsewhere. I and some other physicians decided to drive toward the accident site to investigate and help as we could.

We set off cheerfully enough, but as we got closer we started to see signs of mass panic. People with connections to officialdom had used their influence to send children away by air and rail. Others without special connections were waiting in long lines for tickets or occasionally storming trains to try to escape. Families had become split up. The only comparable social upheaval I had seen was during a cholera epidemic. Already many workers from the plant had been hospitalized.

The distribution of the fallout was extremely patchy. One corner of a field might be highly dangerous, while just a few yards away levels seemed low. Nevertheless, huge areas were affected. Although iodine 131 has a half-life of only



AWAITING A THYROID EXAMINATION, a young patient and her mother sit anxiously at the Kiev Institute of Endocrinology. In the days and weeks following the 1986 accident at Chernobyl, an estimated 13,000 children inhaled aerosols containing high levels of iodine 131, which collects in the thyroid. Among Ukrainian children, thyroid cancer rates have increased roughly 10-fold.

VLADIMIR STOMIN

eight days, it caused large radiation exposures during the weeks immediately following the accident. Strontium 90 and cesium 137, on the other hand, are more persistent. Scientists believe it is the cesium that will account for the largest radiation doses in the long run.

All told, well over 260,000 square kilometers of territory in Ukraine, Russia and Belarus still have more than one curie per square kilometer of contamination with cesium 137. At this level, annual health checks for radiation effects are advised for residents. In my own country of Ukraine, the total area with this level of contamination exceeds 35,000 square kilometers—more than 5 percent of the nation's total area. Most of this, 26,000 square kilometers, is arable land. In the worst affected areas there are restrictions on the use of crops, but less contaminated districts are still under cultivation.

The heavily contaminated parts of Ukraine constitute 13 administrative regions (oblasts). In these oblasts are 1,300 towns and villages with a total population of 2.6 million, including 700,000 children. Within about 10 days of the accident, 135,000 people living in the worst-affected areas had left their homes; by now the total has reached 167,000.

Yet it is clear that the authorities' attempts to keep the scale of the disaster quiet actually made things worse than they need have been. If more inhabitants in the region had been evacuated promptly during those crucial first few days, radiation doses for many people might have been lower.

The region within 30 kilometers of the Chernobyl plant is now largely uninhabited; 60 settlements outside this zone have also been moved. Formerly busy communities are ghost towns. The government has responded to this unprecedented disruption by enacting laws giving special legal status to contaminated areas and granting protections to those who suffered the most. Yet the repercussions will last for generations.

Multiple Illnesses

The medical consequences are, of course, the most serious. Some 30,000 people have fallen ill among the 400,000 workers who toiled as "liquidators," burying the most dangerous wastes and constructing a special building around the ruined reactor that is universally referred to as "the sarcophagus." Of these sick people, about 5,000 are now too ill to work.

It is hard to know, even approximately, how many people have already died as a result of the accident. Populations have been greatly disrupted, and children have been sent away from some areas. By comparing mortality rates before and after the accident, the environmental organization Greenpeace Ukraine has estimated a total of 32,000 deaths. There are other estimates that are higher, and some that are lower, but I believe a figure in this range is defensible. Some, perhaps many, of these deaths may be the result of the immense psychological stress experienced by those living in the contaminated region.

One medical survey of a large group of liquidators, carried out by researchers in Kiev led by Sergei Komissarenko, has found that most of the sample were suffering from a constellation of symptoms that together seem to define a new medical syn-

drome. The symptoms include fatigue, apathy and a decreased number of "natural killer" cells in the blood.

Natural killer cells, a type of white blood cell, can kill the cells of tumors and virus-infected cells. A reduction in their number, therefore, suppresses the immune system. Some have dubbed this syndrome "Chernobyl AIDS." Besides having increased rates of leukemia and malignant tumors, people with this syndrome are susceptible to more severe forms of cardiac conditions as well as common infections such as bronchitis, tonsillitis and pneumonia.

As a consequence of inhaling aerosols containing iodine 131 immediately after the accident, 13,000 children in the region experienced radiation doses to the thyroid of more than 200 roentgen equivalents. (This means they received at least twice the maximum recommended dose for nuclear industry workers for an entire year.) Up to 4,000 of these children had doses as high as 2,000 roentgen equivalents. Because iodine collects in the thyroid gland, these children have developed chronic inflammation of the thyroid. Although the inflammation itself produces no symptoms, it has started to give rise to a wave of cases of thyroid cancer.

The numbers speak for themselves. Data gathered by the Kiev researcher Mykola D. Tronko and his colleagues indicate that between 1981 and 1985—before the accident—the number of thyroid cancer cases in Ukraine was about five a year. Within five years of the disaster the number had grown to 22 cases a year, and from 1992 to 1995 it reached an average of 43 cases a year. From 1986 to the end of 1995, 589 cases of thyroid cancer were recorded in children and adolescents. (In Belarus the number is even higher.) Ukraine's overall rate of thyroid cancer among children has increased about 10-fold from preaccident levels and is now more than four cases per million. Cancer of the thyroid metastasizes readily, although if caught early enough it can be treated by removing the thyroid gland. Patients must then receive lifelong treatment with supplemental thyroid hormones.

Other research by Ukrainian and Israeli scientists has found that one in every three liquidators—primarily men in

their thirties—has been plagued by sexual or reproductive disorders. The problems include impotence and sperm abnormalities. Reductions in the fertilizing capacity of the sperm have also been noted. The number of pregnancies with complications has been growing among women living in the affected areas, and many youngsters fall prey to a debilitating fear of radiation.

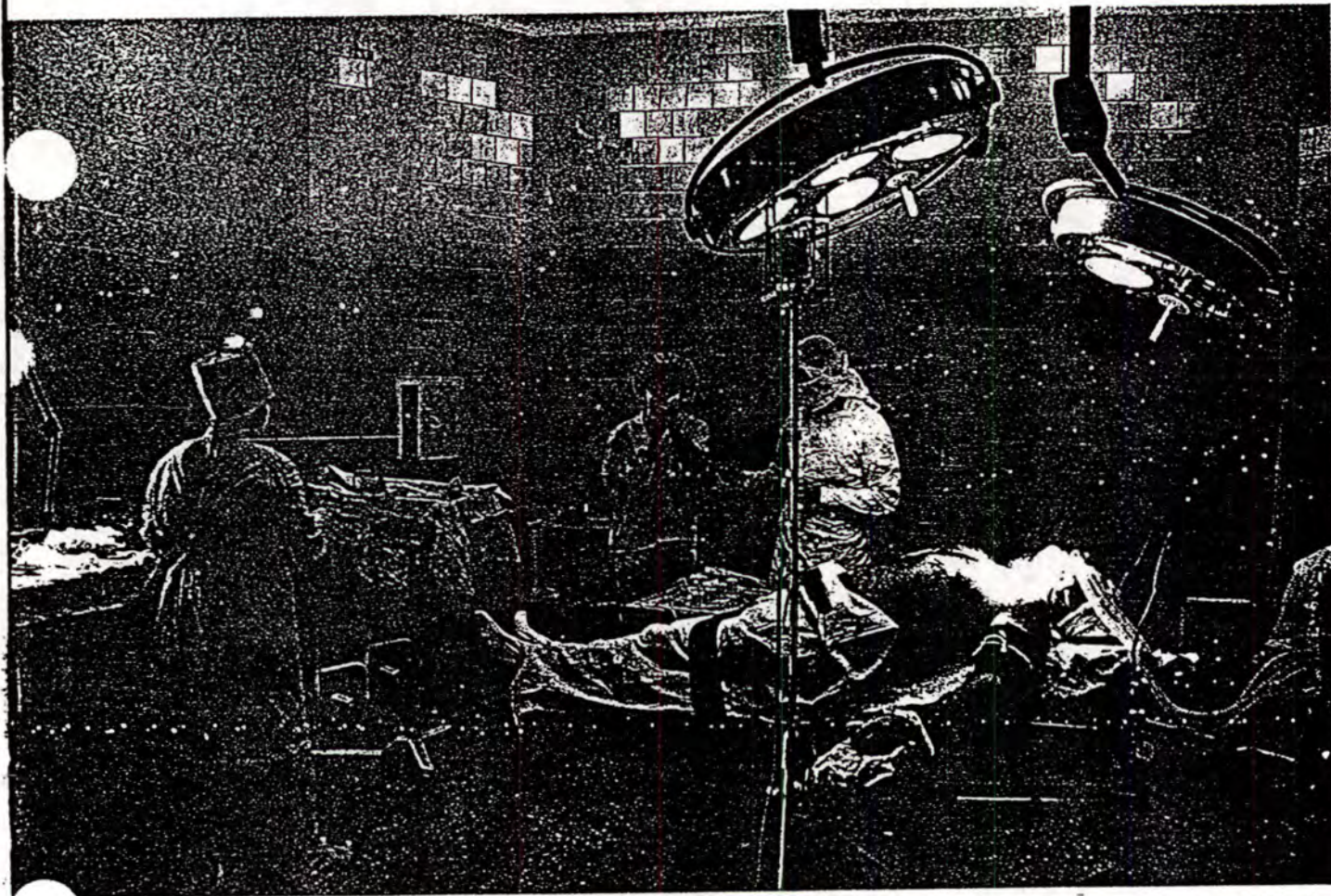
The optimists who predicted no long-term medical consequences from the explosion have thus been proved egregiously wrong. These authorities were principally medical officials of the former Soviet Union who were following a script written by the political bureau of the Communist Party's Central Committee. They also include some Western nuclear energy specialists and military experts.

It is also true that the forecasts of "catastrophists"—some of whom predicted well over 100,000 cancer cases—have not come to pass. Still, previous experience with the long-term effects of radia-

tion—much of it derived from studies at Hiroshima and Nagasaki—suggests that the toll will continue to rise. Cancers caused by radiation can take many years before they become detectable, so the prospects for the long-term health of children in the high-radiation regions are, sadly, poor.

The hushing up of the danger from radiation in Soviet propaganda has produced quite the opposite effects from those intended. People live under constant stress, fearful about their health and, especially, that of their children. This mental trauma has given rise to a psychological syndrome comparable to that suffered by veterans of wars in Vietnam and Afghanistan. Among children evacuated from the reactor zone, there has been a 10- to 15-fold increase in the incidence of neuropsychiatric disorders.

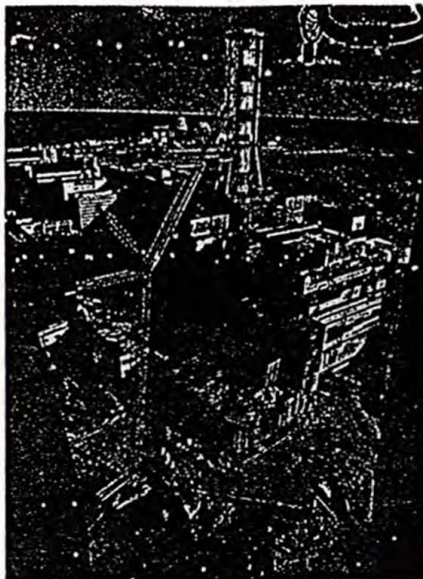
The catastrophe and the resulting resettlement of large populations have also caused irreparable harm to the rich ethnic diversity of the contaminated areas, particularly to the so-called *drevly-*



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THYROID OPERATION will remove the cancerous gland from a patient in an attempt to prevent the spread of the disease. The operation, carried out at the Kiev Institute of Endocrin-

ology's cancer clinic, is the only treatment for cancer of the thyroid. The patient will then have to take thyroid hormones for the rest of his life to replace those no longer produced in his body.



BURNED-OUT REACTOR was photographed from the air not long after the disaster (*left*). A concrete-and-steel sarcophagus was hastily built (*right*) to contain dangerous radioisotopes; it is

now decaying at an alarming rate. An international consortium proposes to surround it with a stronger structure, but construction would cost about \$300 million and take five years.

ary, woodland people, and *polishchuks*, inhabitants of the Polissya region. Unique architectural features and other artifacts of their spiritual and material culture have been effectively lost as abandoned towns and villages have fallen into disrepair. Much of the beautiful landscape is now unsafe for humans.

The Ukrainian government, which is in a severe economic crisis, is today obliged to spend more than 5 percent of its budget dealing with the aftermath of Chernobyl. The money provides benefits such as free housing to about three million people who have been officially recognized as having suffered from the catastrophe, including 356,000 liquidators and 870,000 children. Ukraine has introduced a special income tax corresponding to 12 percent of earnings to raise the necessary revenue, but it is unclear how long the government can maintain benefits at current levels.

Today the Chernobyl zone is one of the most dangerously radioactive places in the world. In the debris of the ruined reactor are tens of thousands of metric tons of nuclear fuel with a total radioactivity level of some 20 million curies. The radiation level in the reactor itself, at several thousand roentgens per hour, is lethal for any form of life. But the danger is spread far and wide. In the 30-kilometer zone surrounding the reactor are about 800 hastily created burial sites where highly radioactive waste, including trees that absorbed radioisotopes from the atmosphere, has been simply dumped into local pits.

These dumps may account for the substantial contamination of the sediments of the Dnieper River and its tributary the Pripyat, which supply water for 30 million people. Sediments of the Pripyat adjacent to Chernobyl contain an estimated 10,000 curies of strontium 90, 12,000 curies of cesium 137 and 2,000 curies of plutonium. In order to prevent soluble compounds from further contaminating water sources, the wastes must be removed to properly designed and equipped storage facilities—facilities that do not yet exist.

Cost of Cleanup

The two reactors that are still in operation at the Chernobyl plant also pose a major problem (a fire put a third out of action in 1992). These generate up to 5 percent of Ukraine's power; the nuclear energy sector altogether produces 40 percent of the country's electricity. Even so, Ukraine and the Group of Seven industrial nations last December signed a formal agreement on a cooperative plan to shut down the whole Chernobyl plant by the year 2000. The agreement establishes that the European Union and the U.S. will help Ukraine devise plans to mitigate the effects of the shutdown on local populations. It also sets up mechanisms to allow donor countries to expedite safety improvements at one of the reactors still in use. In addition, the agreement provides for international cooperation on decommissioning the plant, as well as on the

biggest problem of all: an ecologically sound, long-term replacement for the sarcophagus that was built around the ruin of reactor number four.

The 10-story sarcophagus, which is built largely of concrete and large slabs of metal and has walls over six meters thick, was designed for a lifetime of 30 years. But it was constructed in a great hurry under conditions of high radiation. As a result, the quality of the work was poor, and today the structure is in need of immediate repair. Metal used in the edifice has rusted, and more than 1,000 square meters of concrete have become seriously cracked. Rain and snow can get inside. If the sarcophagus were to collapse—which could happen if there were an earthquake—the rubble would very likely release large amounts of radioactive dust.

In 1993 an international competition was held to find the best long-term solution. Six prospective projects were chosen for further evaluation (out of 94 proposals), and the next year a winner was selected—Alliance, a consortium led by Campenon Bernard of France. The consortium's proposal, which entails the construction of a "supersarcophagus" around the existing one, unites firms from France, Germany, Britain, Russia and Ukraine. The group has already conducted feasibility studies. If the project goes forward, design work will cost \$20 million to \$30 million, and construction—which would take five years—upwards of \$300 million. Final disposal of the waste from the accident will take

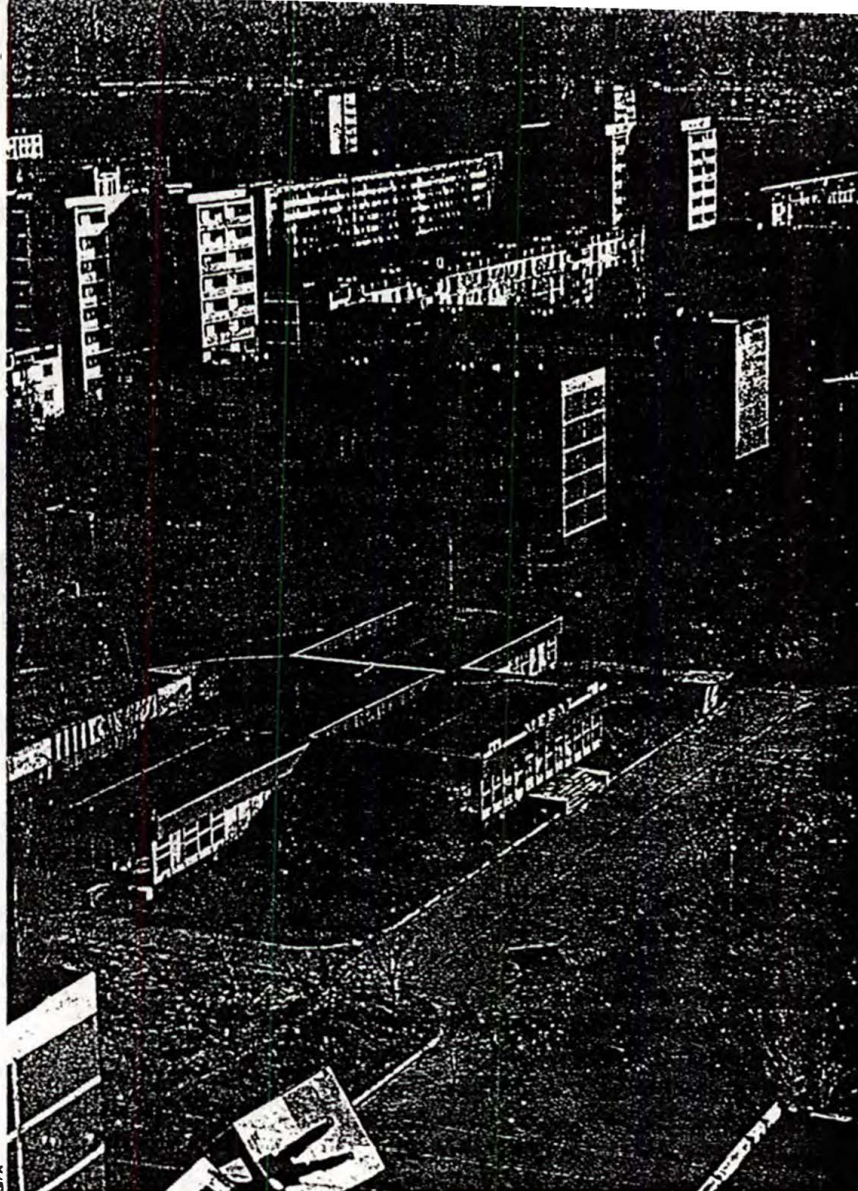
30 years. One possibility being explored is that the waste might be encased in a special glass.

Chornobyl was not simply another disaster of the sort that humankind has experienced throughout history, like a fire or an earthquake or a flood. It is a global environmental event of a new kind. It is characterized by the presence of thousands of environmental refugees; long-term contamination of land, water and air; and possibly irreparable damage to ecosystems. Chornobyl demonstrates the ever growing threat of technology run amok.

The designers of the plant, which did not conform to international safety requirements, are surely culpable at least as much as the operators. The RBMK-1000 is an adaptation of a military reactor originally designed to produce material for nuclear weapons. There was no reinforced containment structure around the reactor to limit the effects of an accident. That RBMK reactors are still in operation in Ukraine, Lithuania and Russia should be cause for alarm.

The disaster illustrates the great responsibility that falls on the shoulders of scientific and other experts who give advice to politicians on technical matters. Moreover, I would argue that the former Soviet Union's communist leadership must share the blame. Despite then President Mikhail S. Gorbachev's professed support for glasnost, or openness, the regime hypocritically closed ranks in the aftermath of the tragedy in a futile and ultimately harmful attempt to gloss over the enormity of what had occurred.

The event offers a vivid demonstration of the failures of the monopolistic Soviet political and scientific system. The emphasis under that regime was on secrecy and on simplifying safety features in order to make construction as cheap as possible. International experience with reactor safety was simply disregarded. The calamity underscores, further, the



GHOST TOWN: Pripjat, a once vibrant city of 45,000, was home to many of the workers from the Chornobyl plant. It was evacuated after the accident and remains deserted.

danger that nuclear power plants could pose in regions where wars are being fought. Of course, all such plants are potentially vulnerable to terrorist attack.

Chornobyl has taught the nations of the world a dreadful lesson about the

necessity for preparedness if we are to rely on nuclear technology. Humankind lost a sort of innocence on April 26, 1986. We have embarked on a new, post-Chornobyl era, and we have yet to comprehend all the consequences. ■

The Author

YURI M. SHCHERBAK is ambassador of Ukraine to the U.S. He graduated from Kiev Medical College in 1958 and has advanced degrees in epidemiology. Besides having published extensively in epidemiology and virology, he is the author of 20 books of poetry, plays and essays. In 1988 Shcherbak founded and became leader of the Ukrainian Green Movement, now the Green Party. In 1989 he won a seat in the Supreme Soviet of the U.S.S.R., where as an opposition leader he initiated the first parliamentary investigation of the Chornobyl accident.

Further Reading

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LEVEL 1 - 16 OF 16 STORIES

Copyright 1996 The New York Times Company
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April 21, 1996, Sunday, Late Edition - Final

SECTION: Section 4; Page 7; Column 1; Week in Review Desk

LENGTH: 1637 words

HEADLINE: Word for Word: Chernobyl Witnesses;
After Meltdown, Unsung Heroes Talk of Rads, Duty and Vodka

BODY:

NUCLEAR safeguards were at the top of the agenda last week as President Clinton and other leaders gathered in Moscow for a nuclear summit conference. The meeting coincided with 10th-anniversary commemorations of the explosion and fire at the Chernobyl reactor complex in Ukraine, which killed untold numbers of people and spewed radiation across much of Europe.

The participants probably didn't need any reminder of the shortcomings of the former Soviet Union's nuclear program, but for vivid new insights they can turn to the latest Bulletin of the Atomic Scientists. It includes in-depth interviews with a handful of workers close to the Chernobyl accident, which occurred 10 years ago this Friday. Now there are plans to shut the reactor. And all of the workers are middle-aged and have ailments presumably stemming from the radiation they endured. They were interviewed by Sergei Kiselyov, a correspondent for Literaturnaya Gazeta. Excerpts follow.

Yuri Korneev was a turbine operator at Chernobyl's ill-fated Unit 4 in the early-morning hours of April 26, 1986. His task was to shut down a turbine during a test of emergency power systems -- the test that touched off the explosion and fire at the reactor:

Usually I went through the procedure without any problems. But this time something went wrong. At the moment when the turbine stopped working, there was a sudden explosion in the area of the tubing corridor. I saw it with my own eyes, heard it with my own ears. I saw pieces of the reinforced concrete wall begin to crumble, and the reinforced concrete roof of our Turbine 7 began to fall.

In a few seconds the diesel apparatus kicked in, and emergency lights went on. I immediately looked at the roof of the engine room. It was crumbling in layers. Falling pieces of concrete were slowly coming closer to my turbine.

A Lucky Moment

It was all so unexpected. It was difficult to figure out what was happening. The explosion and crumbling of the roof took only a minute, maybe even less. Right after that, a shift supervisor, Boris Rogoshin, and the [now] deceased deputy chief engineer ran into the turbine room from the control center. I was



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ordered to take care of Turbine 8 and not to pay attention to anything else.

I will not go into the technical details. Let me just say that I got lucky when, as a result of the explosion, the ceiling slabs fell from the reactor on the top of the seventh turbine room, which was turned off, and not on my Turbine 8. I was also lucky when, a few minutes after the explosion, a multi-ton lead plug that closed a reactor channel fell within a meter of where I stood.

I was completely in the dark . . . While I was busy with the turbine, an electrician, Baranov -- who later died in the hospital in Moscow -- ran in and started pumping out the hydrogen that cooled the turbine generator. His actions prevented another explosion.

After everything was done, an eerie silence fell on the turbine room. There was a small balcony; Baranov and I went out for a smoke. Underneath us on the street, we saw pieces of Unit 4 and chunks of graphite thrown there by the explosion. Only later we realized what the radiation level was like on that balcony, and how many extra roentgens we were exposed to during our smoke.

Nikolai Gorbachenko was a radiation monitor at the power station:

My shift began at midnight on April 26. I had to take measurements in the reactor rooms of Units 3 and 4, and check the data units. I checked Unit 3; but on my way to Unit 4 I remembered it was in the process of being shut down, so I decided there was nothing for me to do there. I was really lucky that I wasn't at the reactor when it exploded.

I returned to my duty room to have some tea. Then we heard a flat and powerful thud. My colleague and I decided the turbine operator had produced a hydraulic hit, which sometimes happens during the shutdown of a turbine. At that moment we heard another flat thud. The lights went out; the light on the control panel of Unit 4 went out as well. Just as in a horror film, the blast blew out the double doors that had been latched. Black-red dust started coming out of the ventilation vent. In a few seconds the emergency lights went on. We put on our gas masks . . .

My boss sent me to Unit 4 to find out what the radiation situation was like there. . . . With my low-power dosimeter I wasn't able to measure the radiation level. I returned to my post and told my superiors what I had seen.

Then two guys walked in. They said: "Hey, buddies, help us find a comrade of ours, Vladimir Shoshunok. He's been gone for 30 minutes and we haven't heard from him. He's supposed to be in the upper landing across from the turbine room."

A Burn From a Hand

So I went with the two men to look for their comrade. In the darkness we made our way through piles of rubble, and went up to the landing. Everything was in shambles, steam was coming out in bursts, and we were up to our ankles in water. We made our way to the structure where the man we were looking for was supposed to be. . . .

Suddenly we saw him lying unconscious on his side, with bloody foam coming out of his mouth making bubbling sounds. We picked him up by the armpits and



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carried him down. At the spot on my back where his right hand rested I received a radiation burn. He died at 6 A.M. in the Chernobyl hospital, never having regained consciousness. The two guys who looked for him with me later died in a Moscow hospital. . . .

I started to feel terribly weak and nauseated. I was taken to the hospital. A friend of mine, who worked in the emergency room, saw me in the waiting room. He took me aside, gave me 500 grams of pure alcohol [about a pint], and told me to drink that. I drank it and washed it down with water. Then I called my wife and told her I was O.K. Later on, the doctors told me that the alcohol, which I drank on an empty stomach, helped me a lot [That may be true, in a sense, but there is no evidence that alcohol counters the effect of radiation, editors at the Bulletin said].

Leonid Shavrej, a member of a nearby fire brigade assigned to cover the Chernobyl complex, was on a late-night break in the middle of a 24-hour shift at the station house:

Shortly after I lay down in the guard room, there was a loud thud that made the windows rattle. I jumped up immediately. The emergency signal kicked in almost at the same moment. We jumped out on the street, ran toward our trucks, and heard the dispatcher yell that there was a fire at the atomic station. We looked up and saw a mushroom cloud; it also looked like the chimney above the Unit 4 reactor was half gone. . . .

We were never instructed on how to work in radioactive conditions -- despite the fact that the fire station was attached to a nuclear power station.

First we conducted routine scouting. . . . We entered the turbine room of Unit 4. We saw broken glass and pieces of concrete. There was so much vibrating that the walls were trembling. . . .

I ran outside, turned the trucks around and, with the four firemen in my squad, climbed the outside stairs to the roof of the turbine room. We turned the hoses on and extinguished small fires. The cover of the roof was so hot that our boots were getting stuck in it.

When I climbed down for another hose, I saw the commander of our fire division, Maj. Leonid Teliatnikov. . . . Teliatnikov gave us an order to stand guard on the roof of the turbine room. We carried out his orders. Thus we spent a few senseless hours on the roof with pieces of graphite from the reactor lying around us. We learned later how high the radiation levels were there at the time.

Later Teliatnikov was awarded the highest order of recognition in the former Soviet Union for skillful firefighting in the first hours after the explosion of Unit 4. He was given the Golden Star of the Hero of the Soviet Union. After a while he was also promoted to major general.

Col. Anatoli Kushnin, the head of the chemical defense unit of the Soviet air



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force assigned to fight the reactor fire, arrived at Chernobyl at 2:30 A.M.:

We immediately got to work. In order to put out the reactor fire, the decision was made to dump sand over it from above. It was necessary to form teams to fill sacks with sand, which we later dropped into the reactor core. Then we dropped lead into the reactor. There was a supply of boric acid at the station. We also dropped boric acid. Since the rods used in stopping a nuclear chain reaction are made of pure boron, boric acid could help to retard the reaction as well. . . .

All this work fell on military pilots. At the time, there were 80 helicopters and airplanes of various types deployed in Chernobyl. . . . As the head of the chemical service, I was responsible for the radiation safety of the staff. . . . For example I told the helicopter pilots to cover the floors of their machines with sheets of lead. . . .

Repeated Exposure

Our military pilots worked zealously. I don't remember a single case when someone showed fear, a lack of discipline or disobeyed orders. By May 4 the pilots had buried the reactor core in sand despite conditions that were difficult and dangerous. The dosimetric devices on these helicopters measured radiation levels of up to 500 roentgens an hour. In the first days after the accident these dosimeters went off scale. The crews were exposed to enormous radiation doses during their flights over the reactor. . . . Recently, military test pilot Anatoly Grishchenko died in the United States. He was the one who tried to lift a huge dome over the exploded reactor with the biggest helicopter in the world, the MI-26. He didn't succeed, but he was exposed many times to huge doses of radiation. He wasn't even told about that for a while.

GRAPHIC: Photos: Korneev.; Gorbachenko.; Shavrej. (Photographs by The Bulletin of The Atomic Scientists)

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LEVEL 1 - 15 OF 16 STORIES

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April 23, 1996, Tuesday, Final Edition

SECTION: OP-ED; Pg. A17

LENGTH: 935 words

HEADLINE: The Chernobyl Curse . . .

BYLINE: Jessica Mathews

BODY:

On April 26, 1986, Chernobyl Unit 4 exploded, releasing 200 times as much radiation as Hiroshima and Nagasaki combined. In the 10 years since, only one indisputable result has become clear, and that is the one least recognized in the West. We know now that the catastrophe played a substantial role in the collapse of the Soviet Union. We cannot yet even guess at what human, environmental and economic cost.

Don't think of Chernobyl as a past event. It is a still unfolding story. If it were a book, we would be perhaps one-third of the way through. The later chapters are still unwritten.

The Soviet regime's immediate reaction to the explosion was to lie and to launch a massive coverup that would continue for years. Those who lived near the reactor were told that it was just a fire, that there was no danger, even as party members and their families fled. Foreign broadcasts were jammed. Only after suffering days of unnecessary radiation were the first 100,000 people evacuated.

The coverup stayed intact until 1989, when maps were released showing the extent of contamination and additional, belated evacuations were ordered. Pravda ran a front-page account by a "liquidator," as cleanup workers are known, who reported that while dosimeters showed his group being exposed to 70 roentgens, his supervisor would record 1.5 because, "I don't have the right to record any dose that high. . . . The bosses would chew me out."

As the truth leaked out, Ukraine, where Chernobyl is located, and Belarus, where most of the radiation fell, erupted in outrage. Soviet abuses, people realized, were not a thing of the past. The revelations, writes then-U.S. Ambassador Jack Matlock in "Autopsy of an Empire," "galvanized hatred" for the regime. At a crucial moment Chernobyl legitimized anti-Soviet national movements, not in the peripheral Baltics, but in the very heart of the U.S.S.R..

The fury drove into politics men who were to drive later events. Physicist Stanislav Shushkevich, who was to become the head of state of Belarus and whom Matlock describes as playing "a key role in destroying the Soviet Union," was one. Epidemiologist Yuri Shcherbak, who founded the Ukrainian Greens and from a seat on the Supreme Soviet forced the first investigation of Chernobyl, and who is now ambassador to the United States, was another. How many tens of thousands



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of other scientists, doctors, technicians, bureaucrats and cleanup workers were similarly radicalized we shall never know.

In the heart of the Kremlin, too, the effects were profound. Defense Minister Dmitri Yazov later confessed that Chernobyl destroyed his conviction that nuclear war could be fought and won. More important, the calamity proved that continuing secrecy, propaganda and manipulated news could never be compatible with real reform of the Communist system.

Partly as a result of the coverup, and partly because of the lack of prior health data, it is unlikely that Chernobyl's health effects, even the number of deaths, will ever be known. Russia uses the official figure of 31 deaths so far. The Ukrainian Greens estimate 32,000. The Ukrainian government uses a figure of 8,000.

Time may not greatly clarify the picture. The 800,000 heavily exposed liquidators are, intentionally, scattered all over the former Soviet Union. Where their records exist, they are almost certain (see above) to be inaccurate. Civilian records are not much better. There is clear evidence of a wave of thyroid cancer among children. It is too soon to see adult thyroid cancer, leukemias or other long-latency cancers. Damaged immune systems, cardiac and reproductive disorders and other illnesses are being tracked, but it may never be possible to sort out the effects of radiation from those of extreme stress. About all one can say now, and perhaps for decades, is that the figure of 31 deaths is a travesty.

Exposures continue. Thousands of settlements and millions of acres have been abandoned, including much of Belarus's best agricultural land, and 400,000 people have been evacuated. But at least 300,000 more, and perhaps many times that number, still live on land that is unacceptably dangerous by Western standards. Others eat radioactive vegetables. Thirty million people drink water from contaminated rivers.

Belarus estimates that it spends 15 percent of its GDP on Chernobyl's aftermath; Ukraine spends 5 percent of its budget. Both amounts meet only a small fraction of the human need. Cleanup of the vast, contaminated areas cannot even be thought of. Even the reactor itself is still a danger: The sarcophagus built to contain huge amounts of radioactive dust is crumbling.

Could it happen again? It's difficult to know just how dangerous the dozens of Soviet-built reactors are. Conditions at many have been reported to be awful, but Western contractors and governments with Soviet-era reactors have a strong interest in exaggerating safety risks that the United States and Europeans might pay to fix. On the other hand, there may not be much need to exaggerate. West Germany, which took a close look at some of these reactors, provides a clue: Within a year after unification, it had closed all six of East Germany's reactors and the five that were under construction.

Thousands of ghost towns in Russia, Ukraine and Belarus are silent testimony to much of what was wrong with Soviet communism. Whether they will ultimately have anything definite to say about the benefits and costs of nuclear energy, remains for the future.

The writer is a senior fellow at the Council on Foreign Relations.



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LEVEL 1 - 14 OF 16 STORIES

Copyright 1996 The Washington Post
The Washington Post

April 23, 1996, Tuesday, Final Edition

SECTION: OP-ED; Pg. A17

LENGTH: 241 words

HEADLINE: . . . And a Cry From Belarus

BYLINE: Yelena Levchenko

BODY:

I am from Gomel, a town in Belarus only 80 miles from Chernobyl. When people ask me about what happened there 10 years ago, I give my own example.

I have two children -- Anatoly, my son age 10, and Tatayna, my daughter who is 14. When my daughter was 6, she had osteomyelitis hip-coxal articulation as a side effect of flu. In plain, nonmedical language, this means her bones had become infected. She was in a hospital for two months.

During the first week, the doctors said she likely would not survive. In the second week they said they would have to amputate the leg. Later, they said only that she would be lame. But thanks to God and the doctors, she can now walk normally. Her immune system is very weak, however; she has colds every month.

The legacy of Chernobyl will be with Belarus for hundreds of years. The tragedy is human, but it also costs us a lot in the economic sense. It has been reported that the the potential expenses from the Chernobyl disaster amount to approximately 30 times the country's whole budget.

Through no fault of their own, Belarussians have become victims of this tragedy, with consequences we cannot afford. The economy is in deep crisis, production has dropped sharply. The resources of both public and very small private sectors are already exhausted. Belarus cannot help itself.

The writer is a visiting researcher at the Graduate Public Policies Program at Georgetown University.

GRAPHIC: Photo

LANGUAGE: ENGLISH

COUNTRY: BELARUS;

LOAD-DATE: April 23, 1996April 23, 1996



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LEVEL 1 - 10 OF 16 STORIES

Copyright 1996 The New York Times Company
The New York Times

April 25, 1996, Thursday, Late Edition - Final

SECTION: Section A; Page 8; Column 5; Foreign Desk

LENGTH: 801 words

HEADLINE: Inherited Damage Is Found In Chernobyl Area Children

BODY:

Ten years after the disastrous nuclear accident at the Chernobyl power plant in the Ukraine, scientists report that they have found inherited genetic damage in people exposed to the fallout.

Such damage has not been observed before, but it was not associated with illness, and researchers do not know whether it will ultimately affect health.

A study being published today in the journal Nature says children born in 1994 in Belarus, to parents who lived there in 1986 when the reactor melted down, had twice the normal rate of a certain type of mutation.

The children studied came from 79 families living about 300 kilometers (186 miles) from Chernobyl in the Mogilev district of Belarus, a region severely polluted by radioactive and chemical contaminants from the accident.

The most striking finding was that the genetic damage took the form of so-called germline mutations: changes in DNA in sperm and eggs. Such mutations are passed on from generation to generation.

Researchers did not test the sperm and eggs of the parents, but inferred that since the children were born years after their parents' exposure, their mutations were inherited and thus would have had to have occurred in the parents' germ cells.

Although the researchers said that chemical pollution might have contributed to the mutations, they thought the more likely cause to be radiation.

If the researchers prove correct, the finding is a first: germline changes have never been detected before in people exposed to radiation, not even the survivors of the atomic bombing of Japan or their children.

But the Chernobyl accident differed from the bombing in important ways. The bombs released an enormous amount of radiation all at once, while the radiation from Chernobyl was less intense but longer lasting.

Unlike the bombs, Chernobyl released a great deal of the radioactive isotope cesium 137. The body cannot distinguish cesium from potassium, an essential nutrient, and so the cesium is taken up by cells and becomes an internal source of radiation.



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In addition, the reactor at Chernobyl spewed out an array of non-radioactive chemical pollutants, including highly toxic heavy metals.

So far, the major health problem blamed on the meltdown has been an increase in thyroid cancer in children around Chernobyl, due to emissions of radioactive iodine.

In addition, many residents show chromosome damage, which in some cases can lead to leukemia or other cancers, though not enough time has passed for those diseases to develop. Increases in birth defects and miscarriage have also been reported, but some researchers dispute those findings.

Anxiety in the region runs so high that many researchers say they think it is causing more illness than the radiation is.

The families that were studied in Belarus were healthy, and researchers do not know what the newly discovered mutations mean. The uncertainty is based on the type of DNA that was examined.

The researchers chose regions called minisatellites, which are prone to mutation and likely to show changes when exposed to an agent capable of damaging genes. Mini satellites are good screening tools for mutation, but they are not functioning genes and their purpose is unknown. Mutations in them may not be important.

"The minisatellites have nothing to do with regions that affect health, cancer, mortality and so on," said the study director, Dr. Yuri Dubrova, a genetics researcher at the Russian Academy of Sciences and the University of Leicester in England. "What we can safely say from our data is that the mutation rate in these particular genetic locations is two times higher after the accident.

"We cannot say anything about what is going on in the rest of the genome."

Dr. Lynn Wiley, a professor of developmental biology in the medical school at the University of California at Davis, said: "I believe what this team is reporting, but I don't know what to make of it. We don't know how good a marker or sentinel the minisatellites are for what's happening in the rest of the genome."

A more skeptical view was taken by Dr. James Neel, a geneticist and physician at the University of Michigan, who conducted extensive studies on Japanese atomic bomb survivors and their children.

Dr. Neel said his research did not point to germline effects, nor did a recent study of minisatellite regions in Japanese subjects.

"This new work implies a sensitivity to the genetic effects of radiation that's far, far in excess of either experimental work with fruit flies or mice, or our own studies in Japan," Dr. Neel said. "This is not the study that's going to establish that effect. I would urge them to repeat this work just as soon as possible.

"This is such a sensitive subject. There's near hysteria in Russia over it."



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LEVEL 1 - 5 OF 16 STORIES

Copyright 1996 The New York Times Company
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April 26, 1996, Friday, Late Edition - Final

SECTION: Section A; Page 30; Column 1; Editorial Desk

LENGTH: 785 words

HEADLINE: Editorial Notebook;
Chernobyl Reconsidered

BYLINE: By PHILIP TAUBMAN

BODY:

The first Government bulletin, circulated by the Tass news agency, was deceptively innocuous.

"An accident has occurred at the Chernobyl atomic power plant as one of the atomic reactors was damaged. Measures are being taken to eliminate the consequences of the accident. Aid is being given to those affected. A Government commission has been set up."

It was late evening on April 28, 1986. As I scanned the announcement with Serge Schmemmann, my colleague in the Moscow bureau of The Times, we suspected the flat language masked a serious accident. Serge soon had a Swedish diplomat on the phone, who reported an ominous increase in radiation levels over his country.

In the days that followed, as the magnitude of the disaster emerged, I should have more clearly recognized that the Chernobyl catastrophe was a manifestation of the political, moral and technological rot that was metastasizing in the Soviet system and would soon kill it.

Looking back, the signs of decay reflected in the accident, 10 years ago today, seem remarkably telling.

The timing of the Government announcement was itself a symptom of the secrecy and manipulation of information that were choking the Soviet political system. The Government waited nearly three days after an explosion blew off the top of reactor No. 4 at Chernobyl and spewed radioactive debris into the air to disclose that there had been a nuclear accident. Not a word about radiation was included in the first statement.

During those three days, with the world unaware, a plume of toxic gases and dust laced with plutonium, iodine 131, strontium 90 and cesium 137, some of the most deadly elements in the universe, spread across the western Soviet Union, Eastern Europe and Scandinavia.

The Soviet information blackout was the reductio ad absurdum of Soviet censorship, depriving millions of people of vital information about a deadly threat.



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While news of the accident was suppressed, Communist Party and Government officials learned of the danger and moved hurriedly to shield their families and friends. The moral void at the core of the Soviet system was evident as trains crowded with the relatives of Communist officials in Kiev rolled into Moscow, while for days most residents of the Ukrainian capital remained oblivious to the danger, wondering why municipal trucks kept watering down the streets.

In Pripyat, the town closest to the destroyed reactor, hours passed before any effort was made to warn people of the danger. As reactor technicians and firemen who had responded to the explosion streamed into the local hospital, already gravely ill from intense radiation exposure, the children of Pripyat played in the streets, women hung the laundry out to dry in the spring sun and young men gathered for a soccer match.

It was not until 24 hours after the explosion that residents were told to remain inside, and another day before Pripyat was evacuated. By then residents were complaining about an acrid smell -- the odor of burning graphite in the exposed reactor core.

The delay was a product of a paralyzing fear that gripped the Soviet bureaucracy, long terrorized by Lenin, Stalin and the leaders who followed them. The Chernobyl plant director, Nikolai Fomin, initially dismissed word from his aides that the reactor had exploded, and was slow to raise the alarm. As a result, according to Grigory Medvedev's 1989 book about the accident, "The Truth About Chernobyl," the first calls to officials in Kiev and Moscow reported the reactor was intact.

The design and construction of the reactor, and the reckless experiment that led to the explosion, exposed the failures of Soviet technology. Western experts considered the uranium-graphite reactors at Chernobyl and other Russian nuclear power plants less stable and safe than models used elsewhere, but the Soviet ministries responsible for their operation ignored the concerns.

The night of the accident, operators had powered down the reactor in a way that made the core less stable. Inexplicably, they also disengaged critical safety systems. When the reactor started to destabilize, they panicked and took action that inadvertently set off a power surge in the core that produced the explosion. The combination of arrogance and incompetence was characteristic of Soviet technology in the 1980's, as Moscow fell further and further behind the West in electronics and other advanced fields.

In the years since the accident, Chernobyl has been described as a disaster that speeded the collapse of the Soviet Union. That may be true, but more accurately, I think, Chernobyl was the reflection rather than the cause of a dying political system. PHILIP TAUBMAN

LANGUAGE: ENGLISH

LOAD-DATE: April 26, 1996



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LEVEL 1 - 3 OF 16 STORIES

Copyright 1996 The Washington Post
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April 27, 1996, Saturday, Final Edition

SECTION: A SECTION; Pg. A20

LENGTH: 759 words

HEADLINE: Ukrainians Celebrate Village Life That Evaporated in Chernobyl's Cloud

BYLINE: James Rupert, Washington Post Foreign Service

DATELINE: VELIKI KLISCHI, Ukraine

BODY:

When hundreds of people from this farming village held a picnic last Sunday, a passerby might have found it odd. For one thing, they held it in the cemetery, sharing food, drink and songs among the graves.

For another, it was only among Veliki Klischi's dead that you could find the living. The rest of the village stood silent and overgrown with weeds, as it has for years, since radiation from the Chernobyl nuclear disaster, which occurred 10 years ago yesterday, forced its people to move away.

For these farming families of northern Ukraine, the celebration was no oddity. It was Providna Nedilia -- "Accompaniment Sunday" -- when Ukrainians pack picnic hampers and gather at the graves of their forbears, renewing their spiritual connection both to the past and to the community. The traditional feast provides a poignant annual homecoming for the people of Veliki Klischi, who were evacuated six years ago to a village 90 miles away.

Veliki Klischi stands in mute testimony to the Ukrainians' links to their lands and tradition -- and to the fact that the 20th century has been cruel here. Before the village succumbed to Chernobyl's radiation, it had survived two wars, a famine, the brutal rule of Soviet leader Joseph Stalin and decades more of Soviet repression since 1900.

In the village's dusty lanes, a Geiger counter registered radiation levels three to four times higher than in nearby uncontaminated areas.

At the village's center, a serene portrait of Soviet state founder Vladimir Lenin gazes from the facade of the looted former headquarters of the Lenin's Path Collective Farm. The farm was formed after Stalin ordered peasants' lands seized -- a step that Ukrainians resisted until the Soviet army appropriated the country's grain, causing a famine that killed an estimated 5 million Ukrainians.

Across one street, a monument lists close to 100 villagers killed in World War II, when the Nazis occupied this region for two years. Across another street painted in bright blue and green stands the Church of Saint Nikolai the Miracle Worker.



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Early on Sunday, the only person in sight was a short woman wrapped, despite the warmth, in a coat and scarf. Hanna Prokopchuk, 67, lives in a neighboring village but comes periodically to clean the church and check on Vera Avramchuk, 66, Veliki Klischi's sole inhabitant.

Avramchuk lives in a small house at the village's edge. "It's difficult for her," said Prokopchuk, "but she doesn't want to go anywhere else." A major problem is that, with the village depopulated, foxes roam unhindered "so she can't keep chickens," Prokopchuk said.

Soon, the village's silence was broken by a parade of buses and cars rumbling to a halt outside the church. Men and women, mostly elderly, piled out of the vehicles, carrying satchels bulging with their picnic meals. Many wept and embraced.

Within minutes, the village's side lanes were dotted with silent people gazing disconsolately at the houses they had once lived in, fingering the door latches, checking to see how high the water stood in the wells.

Others prepared the church service. The villagers have reestablished their parish in the village of Lisovka, where they live now, "but we have no church building," said Halia Stelnikovich. "We took the icons from this church and put them in an ordinary house."

The church was the center of Veliki Klischi, Stelnikovich said. "In our hearts, this was so even in Soviet times," she said. Several times, "the Communists tried to close it . . . but the village wrote petitions to Moscow and kept it open."

The congregation has a rookie priest from Lisovka, 19-year-old Yaroslav Vovkovich. In white vestments, he led the service at the Veliki Klischi church as a choir of elderly women sang. Vovkovich intoned prayers for the members of the congregation, mentioning scores by name.

When the choir wavered, he halted the stately liturgy, turned from the altar and pleaded, in the exasperated voice of a 19-year-old: "Ladies! Please keep it going!"

After the service, the parishioners trooped up a lane to the cemetery. There, men cleared weeds and brush, while women laid clean towels on the graves of relatives. On them they piled decorated breads, Easter eggs and candies in a symbolic invitation to the souls of departed ancestors to join in the feast.

"It has always been important for us to remember our dead," said Stelnikovich, "but now it's more emotional. We miss not only our parents and grandparents buried here, but the whole life we had here."

LANGUAGE: ENGLISH

COUNTRY: UKRAINE;

LOAD-DATE: April 27, 1996April 27, 1996



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SUE VOGELSINGER

733 15TH STREET, NW • SUITE 202 • WASHINGTON, DC 20005 • (202) 347-2666 • Fax: (202) 393-6504

April 30, 1996

Memo to: Mrs. Clinton
From: Sue Vogelsinger

There are three radio interviews set for tomorrow in connection with book promotion. They are all in Atlanta.

3:55 p.m. **TAPED** WSB/Atlanta.
Interview with **Lisa Campbell**. This is the number one station in the market. They will use the interview in news shows tomorrow and Thursday morning.

4:05 p.m. **TAPED** WGST/Atlanta
Interview with **Dennis O'Hayer**. The station is the flagship station for Georgia Radio Network. Dennis had recently bought a copy of the book for his girlfriend and is suppose to get it when she is through reading it. Bob Houghton is the general manager. He attended your high school reunion party at the White House last year.

4:15 p.m. **TAPED** WAOK-AM/WVEE-FM/Atlanta.
Interview is with **Hal Lamar**. The interview will be live on WAOK-AM and will be replayed the following morning on WVEE-FM. The station was recommended by the White House Media Relations office.

All interviewers have received my memo and the Simon and Schuster press release.

To: Mrs. Clinton
Fr: Liz Bowyer
Da: 4/30/96
Re: Atlanta radio interviews

In preparation for your interviews with Atlanta radio stations tomorrow, you might want to know that you are scheduled to visit the Media Play store in Alpharetta, Georgia from 6:00 - 8:00 pm on Thursday. This is the only event scheduled in Atlanta.

The only program/individual from Georgia that you highlighted in *It Takes A Village* was Rosayln Carter (p. 113).



United States Department of State

Washington, D.C. 20520

UNCLASSIFIED FAX

PM/SC

Room 2835

FAX Number: (202) 647-0937.

DATE: April 4, 1996PAGES: 2 of 3TO: Melanne Verveer
Office of the First Lady

FAX Number: 202/456-6244

FROM: Lawrence J. Mire
Action Officer
Nuclear Reactor Safety/PM/SC

Phone Number: 202/647-6425

SUBJECT: Blind memo from DI/OWTP on the health effects of Chernobyl.

MESSAGE OR INSTRUCTIONS: FYI

Acknowledge Receipt Yes: ☐ No: ☐

Apr. 4. 1996 12:10PM



No. 3323 P. 2

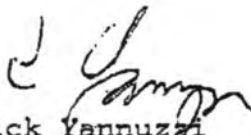
Office of the Director

The Executive Secretary

4 April 1996

NOTE FOR: John Dobrin

Attached is a blind memo from
DI/OWTP on the health effects of
chernobyl'. If you have any questions
please phone your OWTP poc directly.
Thank you.


Rick Yannuzzi

Apr. 4, 1996 12:10PM

No. 3323 P. 3

4 April 1996

MEMORANDUM

SUBJECT: Chernobyl' and the Children of Poland

1. Radioactive material--iodine, cesium, and strontium--has been detected in Poland as a result of fallout from the 15 April 1986 accident at the Chernobyl' nuclear power plant.

2. The fallout has had no apparent acute or chronic health effect on Polish children, according to US and international health experts. A Polish child in the area(s) of the fallout received on the average a radiation dose to his/her thyroid the equivalent of about 10 medical X-rays. This low dose, in combination with the timely administration of prophylactic iodine, to children and pregnant women appears to have prevented any detectable radiation-induced health effects.

3. In contrast, the scientific findings presented at the mid-March European Community Conference on the Radiological Consequences of Chernobyl' attributed a thousand cases of thyroid cancer in children living in the immediate vicinity of Chernobyl' to the accident. However, no evidence of leukemia or other forms of cancer could be attributed to the accident in either these children or volunteers who contended with the accident.

4. There were innumerable reports in Poland of illnesses and symptoms such as pneumonia, skin rashes, lymph cancer, tuberculoses, diarrhea, vomiting, and blurry vision attributed to radiation from the Chernobyl' accident. However, international health experts have not been able to find any connection between these illnesses and symptoms and the radiation from the accident.

Chornobyl's Tenth Anniversary Commemoration: April 10 Event
Agenda for
April 1 Coordination Meeting
4:30 - 5:30 p.m. Rm. 100

Status of actions completed

- ~~press release~~
- ~~letter from the President (to Children of Chornobyl events?)~~
- ~~invitations (2nd tier list)~~

Press Package:

- Assistance and U.S. role - *State - Bill Taylor*
- X • G-7 Efforts/accomplishments
- MOU on Chornobyl
- Background on PVOs - *interaction*
- X • Historical account of the accident
- ~~List of Participants~~
- X • Presidential message
- *Program*

Material for the program: due by 4/3

- Background (1 page) on Vova, the child
- Background on the bandura duo
- Drawing exhibit?
- ~~Statement to describe the event~~

Other children to be invited: due by

Input to social office

Outlines for the speeches

FL -
Alex - child
VP -
Singers

- Blue Rm - Amb.
Asst Sec. manager
- MC.

[Thank America on behalf of all the
children of Chornobyl - *phone #.*
both parent

• Order of program
• Lullaby
• Message

→ acknowledgment - all working on C + intro to Alex.

A few items:

1. I spoke with Alex Kuzma and asked him to fax Melanne, Terry B. and me a draft of his prepared remarks by tomorrow (Wednesday) afternoon. I re-emphasized the importance of his remarks being broad and encompassing -- that he should speak from the perspective of all those groups who are helping the victims of Chornobyl. He seems to understand completely.
2. Melanne should call the parents of Volodymyr Malofienko, Alexander (Sasha) and Olga Malofienko. Their home number is 201-376-1502. Alex Kuzma has prepared them for the possibility of their son being asked to make a statement at the April 10 event.
3. Can we go through the priority back-up invitation list today?

Thanks.

Vova



United States Department of State

Washington, D.C. 20520

1994
April 3, 1996

UNCLASSIFIED
MEMORANDUM

TO: Office of the First Lady - Melanne Verveer
Office of Public Liaison - Marilyn DiGiacobbe

FROM: Coordinator for Nuclear Safety - John Dobrin

SUBJECT: Materials for Chornobyl Event

Attached are:

- a briefing paper for the First Lady drafted by one of America's foremost experts on the consequences of the Chornobyl disaster, Professor Marvin Goldman.
- a biography of Dr. Goldman.

This paper replaces the one we were tasked to draft; by the end of the day we hope to transmit to you the CIA's response on the issue of possible epidemiological consequences of the accident on Polish children.

BRIEF BIOGRAPHY

Marvin Goldman

Marvin Goldman is Emeritus Professor of Radiological Sciences in the Department of Surgical and Radiological Sciences of the University of California-Davis. He has an AB from Adelphi University (NY '49), a MS [physiology] from University of Maryland ('51) and his Ph.D in Radiation Biology and Biophysics from the School of Medicine of the University of Rochester (NY '57).

He has been at UC-Davis since 1958; has published over 150 scientific papers, patents and reports on radiation dosimetry and effects of exposure to radioactive materials, including the first global summary (DOE report 1957) of the environmental and medical impact of the Chernobyl accident (he has been to the former Soviet Union 23 times in the last decade and helped develop the scientific cooperative research program between US and the Newly Independent States).

In 1972 he received the EO Lawrence Award of the Atomic Energy Commission for work on the dosimetry and medical effects of radioactivity; in 1988 he received the Distinguished Scientific Achievement Award of the Health Physics Society. He has received NASA citations for his work on space nuclear (Plutonium) safety. Dr. Goldman is immediate past president of the Health Physics Society and is now Secretary of the Council of Scientific Society Presidents.

He and his wife, Joyce, live in Davis, California.



United States Department of State

Washington, D.C. 20520

April 3, 1996

UNCLASSIFIED
MEMORANDUM

TO: Office of the First Lady - Melanne Verveer
Office of Public Liaison - Marilyn DiGiacobbe

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Chornobyl: Ten Years Later

by Marvin Goldman, PhD
Department of Surgical and Radiological Sciences
University of California-Davis

The violent disassembly of the Number 4 Reactor at Ukraine's Chornobyl Station at 01:24 AM on April 26, 1986, was the worst nuclear reactor accident in history. The explosion sent a cloud of radioactive particles and gases high in the night sky and, during the burning of much of the reactor core's graphite over the next 10 days, spewed out a massive quantity of volatile radioactive materials. The release was of three parts, each with a unique character and consequence.

1. About five to ten tons of nuclear fuel particles from the ruptured 200 ton core were scattered over the nearby territory; these were largely confined to the "30 Km Exclusion Zone." The fuel particles are relatively heavy and did not travel far. Nevertheless, they delivered a massive radiation dose to the surrounding area and even killed much of an adjacent pine forest. The particles contained radioactive strontium, plutonium and other nonsoluble radionuclides.

The accident killed two plant workers immediately and another 28 died over the two-three months after the accident. A total of about 200 firemen, rescue workers and shift workers received high enough doses to develop acute radiation sickness; many cases were complicated by extensive steam and radiation skin burns. Of the survivors, 14 more have died over the past decade, but only two of the deaths appear to be consequent to radiation exposure.

According to the chief biomedical officer of the Soviet Department of Health, there were some 300,000 to 600,000 "liquidators" (clean-up workers) mitigating the consequences of the accident. All the liquidators are being entered into a register; of these, perhaps some 12,000 did receive medically significant doses and are to be carefully followed. Although some of the workers, especially those involved in 1986 and early 1987, may have received significant exposures, there is now no documentation of any radiation-induced increase in cancer in these people, despite anecdotal reports to the contrary in the popular press. It should be remembered that except for leukemia, almost all radiation-induced cancers in adults require about a decade of "latency" (waiting) period before they become evident, and the decade is now complete; we will have to wait another decade before making definitive statements about leukemia risks from Chornobyl. Without a formal cancer registry and epidemiology studies, we will never really know.

2. Of special significance was the release of most of the reactor's

radioiodine and radiocesium. These volatile materials were propelled up to a height of 10 km. Most rapidly spread westward over Belarus, Ukraine; and went east into Russia. All of the northern hemisphere received detectable levels of Chornobyl's iodine-131 and cesium 134-137. Cesium is ubiquitously incorporated into all living tissues, plants and animals alike, and delivers a diluted "whole body dose" as differentiated from radioiodine, whose atoms are only concentrated in the small thyroid gland. With a 30-year half-life, radiocesium is a long term problem (it takes about seven half-lives for the level to approach zero). However, within a few years, much of the radiocesium had seeped deep into soil, was eroded from building surfaces and today poses a minimal risk where the concentrations are low and less environmentally available.

The radiocesium, with its whole body dose pattern, has been thought to be associated with a risk for leukemia as all tissues, including bone marrow, are exposed. In Ukraine and Belarus, there is no significant increase in leukemia rates in the populations of the highly dosed zones as compared to the zones which did not receive radiation (the US is funding a case-control epidemiological study on just this problem, as well as one on childhood thyroid cancer).

Based on information from study of the Japanese survivors of the atomic bombings half a century ago, an increase in leukemia would have been expected to appear within three years and might have already peaked. Perhaps the lower dose rate from Chornobyl's Cs-137 has a sparing effect on this risk. It may be too early to firmly state that there was no leukemia; there may be a slight, but not significant, upward trend.

3. Radioiodine is a special and poignant story. It has an eight day half life, so all radioiodine exposures were absorbed from the end of April to the end of June, 1986. Thereafter, there was no additional exposure. However, iodine concentrates in the small thyroid gland, thereby delivering significant doses. Newborns and infants are the most vulnerable because their gland is so small and is metabolizing and growing so rapidly.

Chornobyl's radioiodine fell on the new spring grass, was consumed by dairy cattle, transferred efficiently to milk and was responsible for most of the radioiodine doses to infants and children (direct inhalation accounted for about 5-10% of the dose).

Especially in areas where it rained while the Chornobyl cloud was passing, wet scavenging (rain washout) resulted in very high contamination levels in south-east Belarus (Gomel and Brest Regions), northern Ukraine south and west of the reactor, and Russia to a lesser extent in the Bryansk and Kaluga region. In 1990, a significant increase in infant and childhood thyroid cancers began to be evident in those who were under 15 at the time of the accident. It continues to rise and in several conferences in Belarus and Ukraine in March, I learned that the total is now over 1000 cases and is still rising (worldwide, childhood thyroid

cancer normally occurs in populations at a rate of less than 1 per million per year. There were about 600 in Belarus, some 350 in Ukraine, and 150 in Russia, as of last year. I estimate that the final toll over the next decade will add 3000+ more cases of childhood thyroid cancer. The early appearance of this many cases was unexpected, even though we knew that there was a potential for a high thyroid cancer risk.

We learned that three children had died, much fewer than the 5-10% mortality usually associated with the disease (we do not know if further mortality will be seen in these cases the years to come). Unpublished also is a possible trend toward increased rare childhood brain cancer incidence in the heavily contaminated zones.

This has to be carefully evaluated and may prove to be a false alarm, but it is a possible trend and, if confirmed, may relate to hormonal action in response to the radiation injury of juvenile thyroids.

These are all the direct radiation induced illnesses caused by exposure to radiation from Chornobyl. There is an additional and very serious result of the accident; the massive anxiety and stress incurred by worry about possible radiation consequences and by major disruption of the way of life in the impacted zones. Initially labeled "radiophobia," this stress response is exacerbated by the decline in infrastructure accompanying the dissolution of the Soviet Union. In the early hours and days following the accident, authorities were confused, misinformed and uninformed about what was happening. As a result, even though some instructions were issued regarding effective countermeasures, (e.g., interdicting contaminated milk, issuing potassium iodide pills to block the thyroid from taking up radioiodine), they were largely not carried out at the local level (if they were, I believe that many of the thyroid cancers could have been prevented).

The amount of distrust and suspicion regarding any official pronouncements still pervades the regions and lends a favorable climate for sensational claims to be given serious consideration by the public. Thus we hear about immunological diseases, gastrointestinal disorders, vegetative dystonia (a catch-all diagnosis for fatigue), eyeless pigs, five-legged cows and so on, all "caused by Chornobyl." Well meaning efforts to remove children from the area really do not reduce any radiation risk, as the children have already received almost all of their lifetime Chornobyl radiation exposure from the early plume. Today, children outside the exclusion zone are not getting dangerous exposures.

Humanitarian people and groups attempting to treat the aftermath of this disaster are finding a poor level of nutrition and public health in the impacted areas. There is much one can do to alleviate these problems, but it is not radiation risk that is being treated. This is a very sensitive issue and is subject to differing viewpoints, but the hard radiological facts are that the medically important doses have already been delivered and cannot be

"erased" by weeks in summer camp or relocation to some other country. In fact, further dislocation of children from their families may add to stress or raise unrealistic expectations. Restoring a more normal lifestyle and providing credible information which explains the difference between the facts and the fancies could be a significant contribution from the foreign "experts" (I hear too often that they would like to see less "radiation tourism" [continual fact-finding visits which provide little positive impact] and more longer-term cooperative and collaborative assistance and aid).

In summary, the facts to date about Chornobyl's true impact are the early mortality and injury to the rescue workers, the significant increase in childhood thyroid cancers and the massive stress and anxiety in the impacted population. Added is the continual sensationalism, political opportunism and skepticism about any pronouncements regarding the accident. It is a truly unique situation and one in which we can help play an ameliorating role; e.g., education via media, training of health professionals in specific areas, provision of equipment and supplies for improved public health, support of quality epidemiology and radiation dose reconstruction.

And there are still 11 more Chornobyl-like RBMK reactors in operation.

31 March 1996

BRIEF BIOGRAPHY

Marvin Goldman

Marvin Goldman is Emeritus Professor of Radiological Sciences in the Department of Surgical and Radiological Sciences of the University of California-Davis. He has an AB from Adelphi University (NY '49), a MS [physiology] from University of Maryland ('51) and his Ph.D in Radiation Biology and Biophysics from the School of Medicine of the University of Rochester (NY '57).

He has been at UC-Davis since 1958; has published over 150 scientific papers, patents and reports on radiation dosimetry and effects of exposure to radioactive materials, including the first global summary (DOE report 1957) of the environmental and medical impact of the Chernobyl accident (he has been to the former Soviet Union 23 times in the last decade and helped develop the scientific cooperative research program between US and the Newly Independent States).

In 1972 he received the EO Lawrence Award of the Atomic Energy Commission for work on the dosimetry and medical effects of radioactivity; in 1988 he received the Distinguished Scientific Achievement Award of the Health Physics Society. He has received NASA citations for his work on space nuclear (Plutonium) safety. Dr. Goldman is immediate past president of the Health Physics Society and is now Secretary of the Council of Scientific Society Presidents.

He and his wife, Joyce, live in Davis, California.

UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY

Washington, D.C. 20451

OFFICE OF
THE DIRECTOR

FAX TRANSMISSION

DATE: 4/5TO: Nicole RabnerFAX #: 456-6266Telephone #: 456-6244

FROM:

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C
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Washington, D.C. 20451Direct (202) 736-4164
Office (202) 647-9610
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Comments:

Nicole - As discussed. (Alex has continued working on this,
but there's no full 2nd draft here yet.)

Terry

This Fax transmission consists of 7 pages, including this transmission cover sheet.



Children of Chernobyl Relief Fund

MEMORANDUM

DATE: April 3, 1996

TO: MARILYN DIGIACCOBE,

COMPANY: The White House

Attn: Terry Bazyluk

FAX #: (202) 456-6218

RE: Remarks for April 10th

COMMENTS:

Dear Marilyn:

This is just my first stab at a draft statement for next Wednesday. I will be doing a lot of revisions + editing + fine tuning, but I hope this gives you an idea of the general thrust of my remarks.

Best Wishes,
Alex

Children of Chernobyl Relief Fund
272 Old Short Hills Road Short Hills New Jersey 07078
Tel: 201.376.5140 Fax: 201.376.4988 e-mail: ccrf@intac.com

International Children of Chernobyl Foundation
252001 Ukraine Kyiv vul. Sofiyivska 2/3
Tel/Fax: 380.44.228.83.65 e-mail: iccf@gu.kiev.ua

Winner of the 1995 New Jersey Governor's International Volunteer Award
CCRF is a non-profit humanitarian organization. All gifts are tax-deductible.

Presentation by Alex Kuzma [VERY ROUGH DRAFT]

Mr. Vice-President, Mrs. Clinton, honored colleagues & guests:

It is a very special honor to speak on behalf of the many distinguished organizations and individuals gathered in this room this evening. Over the past ten years, we have learned a great deal from one another and drawn inspiration from each other's efforts.

Chornobyl has made us all painfully aware of the fragility of our planet and the vulnerable state of our global community. We have learned that a disaster on this scale cannot be overcome by half-hearted or fleeting measures. It requires a long-term and passionate commitment to bring out the best in ourselves, to respect the skills and the perspectives of many talented individuals. None of our organizations could have taken on this mission without the help and the guidance of others. And the huge effort which has been launched to save the lives of Chornobyl's children, has mobilized thousands of generous souls, thousands of unsung heroes who could never fit into a room many times this size.

Collectively, we have found the faith to move mountains - mountains of cargo, planeloads of technology, trainloads of emergency supplies..... we have provided training for some of the most talented and fertile young minds in Eastern Europe who are trying to restore a shattered environment and to build a healthier future for the generations yet to come.

We are deeply grateful to this Administration for its leadership in bringing Chornobyl to the attention of the world community. The President's initiative in mobilizing financial assistance from the G-7 Nations to expedite the shutdown of Chornobyl has been absolutely crucial.

We are equally grateful to the First Lady who has visited children's hospitals in Belarus and in Ukraine to offer her support for the young mothers and physicians who are on the front lines of the battle against soaring infant mortality. Your presence and encouragement were more important than you can imagine.

[We have allowed ourselves to dream some very great dreams and launched some campaigns that at times seem hopelessly ambitious. We know that a great deal of work remains to be done, because the worst effects of radiation exposure do not emerge until ten to fifteen years after exposure....]

Although Chornobyl is an ocean and many miles away, it has brought out the very best in the American spiritToday's gathering is extremely meaningful to those of us who have been working in the field.....

We know that over the past year in Congress there has been an effort to weaken some of the legislation which protects our environment here in the United States.....The dangers inherent in such rollback measures need to be carefully considered before we roll back twenty years of environmental legislation. It was not so long ago that our rivers caught fire and our air and land were heavily contaminated with toxic substances....when the symbols of our natural heritage, the bald eagle and the Pergrine falcon were threatened by uncontrolled use of pesticides.

A quick look at the cities of Magnitogorsk, Zaporizhia and Dnipropetrovsk should remind us how much we have to lose should we ever let down our guard and allow short-term economic gains to ruin the health of our children and our working people. We must not repeat the mistakes or the crimes of the Soviet leadership which placed the value of industrial output above the value of human life and health.....

Thanks to pharmaceutical companies, medical manufacturers, hospitals and individual physicians who donated their valuable time and resources to improve the quality of health care in the nations of the FSU.....

[to be developed.....]

At this point, I would like to introduce a very brave young person who knows firsthand the effects of Chornobyl. Vova Malofienko was only five years old when he came to the United States in the summer of 1990 together with 7 young friends . Vova came here under the auspices of actor Paul Newman and the Hole in the Wall Gang Camp for children with cancer. Vova is with us today thanks to some wonderful treatment he received from Dr. Molly Schwenn at the Boston Floating Hospital and from Dr. Rajid Kamalaker at Beth Israel Medical Center in Newark, New Jersey. Vova is here today with his parents, Olya and Alexander who have been strong supporters of the Chornobyl relief campaign. Although their son has now recovered and seems out of danger, the Malofienkos have not forgotten the families and children who remain in the Chornobyl region, in their hometown of Chernihiv, people whose futures are still very much in doubt, and in many cases, their lives are still hanging in the balance.

We have all grown to love Vova for his courage and his wonderful sense of humor, his gentle zeal for life that turned out to be his saving grace. He has enriched our lives tremendously, and it is my pleasure to introduce to you our very dear friend - an eloquent spokesperson for all the children of Chornobyl, Vova Malofienko.

ALEXANDER B. KUZMA
Curriculum Vitae (Abridged Version)
Assistant Executive Director, Children of Chornobyl Relief Fund

B.A. Yale University 1977
J.D. Northeastern University Law School 1987

1990 - Present Children of Chornobyl Relief Fund (CCRF)

Currently serves as the Assistant Executive Director for CCRF, a nationally-recognized humanitarian relief agency which has sent over 900 tons (\$36 million dollars' worth) of medical aid to Ukraine. CCRF has established long-term partnerships with hospitals specializing in the treatment of radiation health effects and oncological illnesses in children. Coordinator for CCRF's hospital development program in Kiev, Lviv, Luhansk and Vynnytsia.

As grantwriter and fundraiser, secured and implemented a major grant from the US Agency for International Development for the distribution of oncological medicines and physicians' training in the field of thyroid cancer, leukemia and blood disorders. In 1996, with the aid of a \$262,000 grant from the Monsanto Company, CCRF has begun to develop a "Women & Children's Health Initiative" in 3 provinces in Ukraine to reduce the rate of infant mortality and to improve prenatal, maternal and children's health care in rural communities.

Testified before the U.S. Congress (Human Rights Caucus) in 1994.

Nominated by Ambassador Yuri Shcherbak to coordinate the 1996 commemorative program marking the 10th Anniversary of the Chornobyl nuclear disaster in the United States.

Former Clerk with Judge Gordon Martin, Boston Massachusetts
and the Law Firm of Daves, McCabe & Hahn in Tyler & Austin, Texas
1987-1991: Staff Attorney with the Legal Aid Society of Hartford, Connecticut.

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DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
004. bio	re: Volodymr Malofienko [partial] (1 page)	04/05/1996	b(6)

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- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
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- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
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- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

VOLODYMYR (VOVA) MALOFIENKO
Biographical Sketch

Born:

(b)(6)

[004]

Brought to the United States in July, 1990 under the auspices of the Children of Chernobyl Relief Fund and Paul Newman's "Hole In The Wall Gang Camp" to undergo treatment for leukemia.

Received treatment from Dr. Molly Schwenn at the Boston Floating Hospital (now affiliated with the University of Massachusetts Medical Center in Worcester, MA)

Also treated at Beth Israel Medical Center in Newark, New Jersey

Featured in news articles in the Boston Globe, Boston Herald, Newark Star Ledger, Bergen County Record, Inside Edition, Woman's World Magazine

Currently enrolled in the 5th Grade at the Deerfield School in Short Hills, New Jersey, where he is a very good student and popular with his classmates. He lives with his parents, Alexandr and Olga Malofienko in Millburn, NJ.

Vova is in full remission and his prognosis for a full recovery is excellent.

file

Chernobyl The Forbidden Truth

Alla Yaroshinskaya

Translated by Michèle Kahn and Julia Sallabank

Introduction by David R. Marples

Foreword by John Gofman

University of Nebraska Press
Lincoln



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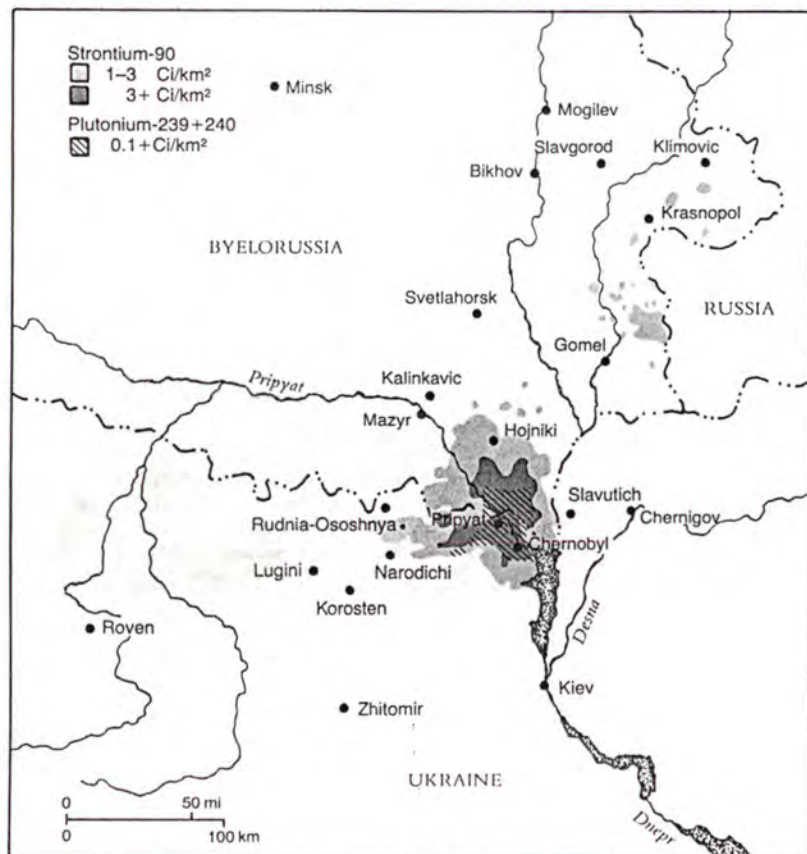
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Strontium-90 and plutonium-239+240 contamination in Byelorussia and Ukraine, in curies per square kilometre. The levels for the two are combined in the map of Byelorussia.

Data for maps from *Radiation Contamination on Ukrainian Territory*, Moscow: Committee of Geodesy and Cartography of the USSR, 1991; *Rëspublika Belarus': Review-Topographic Map with the Data on Radiation Contamination and Map of Radiational Situation on European Part of Commonwealth of Independent States and the Baltic States for January 1993*, Minsk: BelCGE Belgeodesy, Committee of Geodesy under the Council of Ministers of the Republic of Belarus, 1993.

Foreword

by Professor John Gofman

IT may surprise the reader to hear my serious recommendation to all people who care about their personal health, their future health, their children's health, and the health of future generations—and, I might add very seriously, all who care about the ecology of our planet. That recommendation: Read and take very seriously the true meaning of Alla Yaroshinskaya's *Chernobyl: The Forbidden Truth*.

My research for the past thirty years has been in the evaluation of the health risks posed by ionizing radiation from nuclear activities associated with the 'peaceful' and the 'warlike' atom. My work is in 'hard science' evaluation of the health risks. Whatever my emotional commitments may be, my task in these endeavours necessarily is to produce a scientifically rigorous evaluation. Such an evaluation abhors exaggerations either in the direction of overestimation or underestimation of the health risks of exposure to ionizing radiation—risks such as cancer and leukemia in this generation, and risks of these and numerous other diseases and impairments in many, many future generations. Indeed, the only source of self-esteem for my efforts can come from the extent to which my scientific evaluations prove to have been objective and validated by subsequent events.

Alla's path and mine crossed because of a momentous event, a crossroad for the health of humans for reasons to be elaborated below—the Chernobyl nuclear power plant accident in 1986. Within a few months of that accident, and based upon my past researches and Chernobyl-related measurements, I predicted at a major scientific meeting that the long-term consequences just for cancer and leukemia would be approximately 475,000 cancer

deaths, plus an additional 475,000 non-fatal cancers. There is no reason to change that assessment today. But there has been a great deal of work needed to assess additional consequences, particularly concerning serious thyroid diseases as well as the inheritance of gene and chromosomal defects resulting from the worldwide radiation exposure. My most recent work in these endeavours will be published shortly in *Radiation and Chernobyl: This Generation and Beyond* (C.N.R. Books, PO Box 421993, San Francisco, Ca 94142).

Nuclear-committed governments would like to believe that there may be very few, if any, long-term effects of the Chernobyl accident.

Far, far away in Zhitomir, Ukraine, a very courageous woman journalist was beginning a journalistic endeavour fraught with personal danger (more from political chicanery than from personal radiation exposure). Much of that adventure is the substance of her present book. Until last year I had only read—with much interest—a translation of Alla's article, 'The Kremlin Sages' Forty Secret Protocols'. The total story being told here by Alla goes far beyond that.

In 1992 there was a very great surprise. Alla and I became co-recipients in Stockholm of one of the Right Livelihood Awards: she for her courageous and astonishing journalism concerning the abysmal handling by the Soviet government of the Chernobyl disaster (here described in detail), and I for my scientific work on health effects of radiation, including that done in evaluation of the health consequences of the Chernobyl accident.

I wish to say to the reader that Alla Yaroshinskaya has not only proven her outstanding capability as an investigative journalist and writer, but she impresses me indelibly as a charming human with exceptional qualities of compassion, of dedication to honesty, fairness and truth, and a person of great appreciation for the beauty of our natural world and loving concern for the children of the world.

Since our meeting in Stockholm we have been communicating extensively about our mutual concern that the full truth of the

current and future health consequences from Chernobyl should be evaluated *and* communicated to the world public. And we are both concerned, for excellent reasons, at the fact that there has existed, and continues to exist, a massive and worldwide campaign to prevent that truth from becoming known.

Your health and your life may be at stake. The grounds for this concern are described below.

Biomedical un-knowledge and nuclear pollution

'Biomedical un-knowledge' is shorthand for all the findings which are the opposite of what is true about health and disease. The rational person would of course assume that no one wants biomedical un-knowledge. *Not so!* There is a market *eager* for medical un-knowledge in the field of health consequences from nuclear (and other) pollutants. There are financially and politically powerful interests who assume that they have a lot to lose if research finds that their pollutants are deadly. And in their short-sighted view, that assumption can be correct.

The market? Yaroshinskaya amply describes the Soviet market which operated in the post-Chernobyl era in grossly anti-human ways (while talking about the humanity of their socialist enterprises).

And the ex-USSR is not alone. Nuclear energy, whether the 'peaceful' or the 'military' atom, represents a dearly beloved project of governments in the United States, Britain, Russia, France, Germany and Japan—as well as India, China, Pakistan, Iran and a host of 'wannabees'. Nuclear energy is fiercely defended by governments, whatever party is currently in power. They all realise that their fiercest defence will fail if the public comes to realize that radiation is harmful, even at the lowest doses. In lavish sponsorship of scientists, engineers and physicians in innumerable institutions worldwide (including many halls of academe), the governments have a wish-list for the outcome of radiation research (into Chernobyl, for instance). The wish-list includes the following 'findings'. Note that I did not say that a 'finding' has any need to be true: it needs only to be saleable.

One Best of all would be a finding that a little extra radiation improves human health. This is called 'hormesis', and its more avid proponents are now ready to treat society for Radiation Deficiency Disease.

Two In case hormesis does not sell well to the public, the next best finding is that there exists a so-called threshold dose of radiation. For exposures below that mythical safe dose, repair mechanisms will take care of everything. Safe. Safe. Safe. Never mind mentioning the powerful evidence and logic which prove that no such safe dose exists for cancer or inheritable disorders.

Three If hormesis and thresholds are not saleable to the public, there is always the retreat to the unproven position that slow delivery of radiation (as will be given to the public in accidents such as Chernobyl) is far less harmful than radiation delivered rapidly, as in nuclear war. (Even ten times less harmful.)

A warning

I, too, would prefer radiation to be harmless. Who would not?

But unfortunately evidence and logic do *not* support the wish-list. Low-dose ionizing radiation may well be the most important single cause of cancer, birth defects and genetic disorders. Adding to the unavoidable dose received from natural radiation sources will possibly be one of mankind's greatest follies. This is my view, which is a view independent of government sponsorship.

Surely it was no accident that governments sponsoring nuclear energy programmes also became the major—or virtually only—sponsors of research ostensibly dedicated to discovering the truth about health hazards from radiation exposure. In similar fashion it is reasonable to surmise that the tobacco industry would have liked to capture control of all the research on health hazards from smoking.

Alla Yaroshinskaya's description of the repression of scientists and physicians and the suppression of scientific information in the

former USSR provides blatant examples of what it means to have governments sponsoring nuclear research and health evaluation. Personal experience and observation show that the situation is not fundamentally different in other countries. Dissident scientists may experience loss of jobs and livelihood, without immediate loss of life itself.

The public is not without power to protect itself

In recent times, most governments have found that it is not wise to suggest, 'Let them eat cake.' Not all the current crop of politicians are enamoured of Marie Antoinette's fate. Deceit is far more successful—and the cost is relatively low. Government agencies have found that supporters can be hired to defend virtually any pollutant.

Not all medical science is corrupt. There is *not* always a special interest that would like to falsify the outcome of medical studies. Nonetheless, medical science long ago realized that false findings can either be planned, or can be the result of innocent self-deception. And to avoid endless hassling over the validity of results, some basic Rules of Research have evolved for studies of health effects of pollutants, of dietary manipulations, of efficacy of pharmaceuticals. If it is not absolutely clear that the fundamental Rules of Research have been followed meticulously, there is no need to accept either the database on which findings rest, or the findings themselves.

We shall list nine of the prominent Rules of Research. In one way or another, they are repeatedly listed in the medical science literature. No real scientist can claim not to have known the Rules of Research. Yet in many fields the Rules are violated. The health effects of radiation represent an area with some massive violations of the Rules, both in preparing the database for examination and in analyzing the findings themselves for biological meaning.

The key to believable biomedical research is obedience to the Rules of Research. It follows that the public can solve the problem of getting honest health information concerning radiation if it can figure out and ESTABLISH

a mechanism to ensure that the Rules of Research receive meticulous implementation, and not merely lip service. This is true for nuclear pollution, such as from Chernobyl, and it is true for legions of other pollutants such as dioxin, lead or mercury. The public has a crucial function in establishing the mechanism, which will NOT be provided to it from on high. Neither academe nor government can be relied upon to establish it, and there will be powerful opposition to effective implementation of this mechanism, for obvious reasons. I have proposed such a mechanism, and it follows the Rules of Research below.

Nine essential rules of inquiry

Adherence to the following rules is essential for conducting scientifically credible studies of Chernobyl's radiation consequences, short or long term. Specifically for the evaluation of a 'Chernobyl', we are talking about comparing the fates of exposed and non-exposed groups of persons.

- FIRST RULE: *Comparable groups*. An essential condition for determination of radiation effects is the assurance that exposed and non-exposed groups of persons would have the *same* rate of disease and disorders in the absence of radiation.
- SECOND RULE: *A real difference in dose*. If the rate of disease is being compared in two groups, it is essential to achieve a reasonable certainty that the compared groups have appreciably *different* accumulated doses. If the compared groups in fact received *nearly the same* total amount of radiation, it is predestined before the study even begins that analysis will find 'no provable difference in disease rates between the two groups'.
- THIRD RULE: *A sufficiently big difference in dose*. The dose-differences between compared groups must be large enough to allow for statistically conclusive findings, despite the random variations in numbers and in population samples. Analysts can cope with the random fluctuations of small numbers both by assuring

sufficiently large dose-differences between compared groups, and by assuring large numbers of people in each group.

- FOURTH RULE: *Careful reconstruction of dose*. Obviously, false conclusions will be drawn if supposedly *non-exposed* people in a database really received appreciable doses, and supposedly high-dose people received lower doses than the database indicates. The non-uniform nature of the Chernobyl releases of radioactivity makes this scientific pitfall into a real possibility, unless careful and objective dose reconstruction is substituted for assumptions. It is virtually imperative to use biological dosimetry here, since the physical dosimetry will not be truly a reliable indicator of dose received. (Biological dosimetry measures something in the person, such as chromosome injuries, which are produced in proportion to total dose received. It avoids all the arguments as to whether the measurements in the field tell the true exposure.)
- FIFTH RULE: *'Blinding' of dose analysts*. In a valid study of health response to a particular radiation dose, the analysts who estimate doses must have no idea of the medical status of the individual or group on which they are working. The health status and dose-related data must never be present in the same file. In other words, dose analysts must do their work blind, in order to protect the database from a wish-list answer about the relationship between dose and health.
- SIXTH RULE: *'Blinding' of diagnostic analysts*. In order to achieve scientific credibility, studies must show proof of precautions against bias not only in the dose-input, but also in the health-response output. In a valid Chernobyl study, the principle of blinding must extend to all analysts, physicians and technicians who diagnose the health status of persons in the study. They must *not* know whether a person's radiation dose was high or low, and they must be denied information (such as place of residence) which would allow them to form a personal opinion about the

likely dose. Crucial is the requirement that teams of 'special experts' have no ability to alter diagnoses later—unblinded.

- SEVENTH RULE: *No changes of input after any results are known.* One of the fundamental rules in an ongoing study is that no one is allowed to make retroactive alterations, deletions or additions to input-data after any of the health-response results are known. If there is an opportunity for health results to influence a study's revised input, there is clearly an opportunity to falsify the real cause-effect relationships (if any) between dose and response. A study becomes properly suspect if retroactive changes have been made in diagnosis or dose; if cases have been shuffled into new groupings (cohorts); if any data or cases have been suddenly dropped from the study; or if new cases have suddenly been added 'as needed' from some reserve.

- EIGHTH RULE: *No excessive subdivision of data.* It is in the nature of numbers that even the largest databases can be rendered inconclusive and misleading if analysts keep the data subdivided into too many categories or subsets. Therefore, subdivision must be watched with a degree of suspicion.

Inconclusive results: if analysts hope a study will find no provable effects, this result can be arranged by creating a 'small numbers problem', which will prevent almost all results from passing the test of statistical significance.

Misleading results: preservation of excessive subdivision also increases the frequency of finding a few effects at random which do pass the test of statistical significance, but which are nonetheless unreal (false).

- NINTH RULE: *No prejudgements.* Prejudgements are seldom compatible with objective inquiry.

Violations of the Rules of Research

The Rules of Research have been massively violated in essentially all epidemiological studies of health effects of radiation. Many, many studies in the literature fail to meet most of the Rules. The Hiroshima-Nagasaki studies have been justifiably criticized on these grounds, and, with possible rare exceptions, studies thus far into the effects of the Chernobyl accident have failed to meet the Rules.

The Rules are well known to the nuclear-committed governments, so they know fully how one can violate them. The Rules can certainly be violated repeatedly in the future. The result could be the creation of Biomedical Un-knowledge that will fill the textbooks of medicine for the next hundred years. What is true about radiation and health would be labelled untrue: what is untrue would become prevailing wisdom.

What would it take to be able to commit such a human injustice? THE ESSENTIAL REQUIREMENT IS TOTAL CONTROL OVER THE INPUT TO THE DATA-BASE, THE PROCESSING OF THE DATA, AND THEIR ANALYSES. In fact, control over input and output data themselves (dose and clinical findings) can suffice to predetermine the 'findings' of all users of the database. Once a database is 'managed', even the most innocent analyst will contribute to a flood of Biomedical Un-knowledge.

The effort by nuclear-committed governments to keep control over every significant radiation database continues in full force.

The central Chernobyl database is already under construction by the International Program on Health Effects of the Chernobyl Accident (IPHECA/WHO). Arrangements have been made with the governments of Russia, Byelorussia and the Ukraine to permit this. The main sponsors of the IPHECA study are the governments of the United States, Britain, France, Germany, Japan and Russia.

Is it possible that these studies will be honestly done? The answer to this question is, 'Yes, it is possible.' But that is exactly the

wrong question. Ask yourself if you would permit the tobacco industry to control all the studies of the health effects of cigarette smoking?

It is *totally unacceptable*—and unnecessary—that key radiation studies be conducted under circumstances that can either totally compromise the studies, or permit their use to produce un-knowledge. This warning in no way impugns the motives or work of some of the scientists who analyze such data. We *must* reiterate: if the Rules of Research are violated in handling a database, no analysis of such data can escape the poison. The first obligation of every objective scientist is to question the believability of raw data *before* he or she uses them, and at the very least to discuss the issue whenever questionable databases are used.

The need for a scientific watchdog

Since the key to believable biomedical research is obedience to the Rules of Research, it follows that citizens must propose and establish a specific mechanism to ensure scrupulous compliance with those Rules. It is proposed here to begin with the Chernobyl database.

I propose that a team of *independent* 'watchdog' scientists be established to work inside IPHECA's Chernobyl study with the authority (a) to check that every Rule of Research is obeyed, (b) to blow the whistle publicly if there are questionable practices, and (c) to publish its own views as an integral part of every IPHECA document. Such a watchdog authority cannot be temporary. Although preparation of the database is most intense at the beginning of a project, input is necessarily added to the database for many, many decades, as the health of the participants is followed up. Moreover, experience with the 1986 handling of the Hiroshima-Nagasaki database demonstrates that the most massive rule violations may occur in a long term study even decades after its inception.

The watchdog authority is a common sense proposal because it amounts to establishing a system which rewards and honours

truth-telling, instead of punishing it by loss of employment or worse—which is what happens so often nowadays in every field from science to manufacturing or journalism. Alla Yaroshinskaya is an example of the wrong way one society (the former USSR) 'honoured' a truth-teller.

It is common sense for society to figure out how to reward the kind of behaviour it wants, instead of rewarding bad behaviour. The Right Livelihood Award deserves praise for recognizing this principle in what it honours. Jacob von Uexkull summarized the situation elegantly when he wrote: 'If our most important needs today are not new technological fixes but new social values and institutions [...] then these priorities need to be reflected in what our society honours and supports.'

Setting up the watchdogs

Step One: All of us urgently need to encourage people in Byelorussia, Ukraine, Russia and elsewhere to learn what the Rules of Research are all about, why they are not just an academic issue, and how they connect directly with a top concern of non-academic people everywhere: health. Health for themselves, their children and their grandchildren. The public, the press and other professions will not demand compliance with these Rules unless they are aware of them and aware of the potential mega-misery consequences of not insisting on scrupulous compliance.

Step Two: We need to establish the principle that any database under accumulation—for example, the IPHECA database concerning Chernobyl—is automatically provided with an independent and enduring watchdog authority.

But the task is certainly *not* to dictate a uniform analysis of data. That would be the opposite of good science. *The purpose of a watchdog is to ensure that the database itself can be trusted, and that dissent is not punished and not silenced.* Thus the sponsor of a database—IPHECA for example—would be required to include commentary and analysis from the watchdog authority in each of its publications.

Step Three: After the watchdogs are in place, people at the grassroots must stay vigilant, decade after decade, to ensure that the independent experts do not become just sheep who wear a watchdog costume. One must remain realistic about human corruptibility.

Step Four: At the grassroots level, we must insist on two things.

(a) The watchdog must be adequately funded. The cost per database will not be trivial. But there is a simple criterion to use. If a database is worth having, then it is essential that it produce knowledge, not un-knowledge. Thus, if there is to be funding for an IPHECA, surely it would be reasonable that the independent watchdog have 5% of the budget that is provided by the sponsors of IPHECA itself. Indeed, sincerity on the part of those sponsoring IPHECA would itself seem to demand that funding be offered forthwith.

(b) The watchdog must have full, immediate and ongoing (for decades) access to protocols, tapes, documents, laboratory results, vital statistics—all the information about how the input to the database is generated. Input includes the medical and health observations, the ecological observations, the laboratory procedures and tests, the dose-estimates, and the methods of dose-reconstruction. All such items are part of the database.

Channelling the anger

As you read this book, you will experience anger—anger that humans should have been subjected to the treatment described by Alla Yaroshinskaya. She has performed a great service to humanity by containing her anger and patiently telling all of us just what has happened, and what can happen. One of her memorable statements will have a long life. For those not familiar with the periodic table of chemistry, let me say that Cs-137 is a description of the isotope of the element caesium with mass number 137. Pu-239 is a description of the isotope of the element plutonium with mass

number 239. The accident occurred in 1986. Alla Yaroshinskaya writes in this book:

‘Reading through these unique documents, it occurred to me that the most dangerous isotope to escape from the mouth of the reactor did not appear on the periodic table. It was Lie-86. A lie as global as the disaster itself.’

It is my fervent hope that the grassroots public will channel its anger too, and join the effort to set up the necessary safeguards (such as the watchdog authority described above). We can thereby help to prevent future human injustices, like those Alla so poignantly describes. We all owe that much to forthcoming generations of children.

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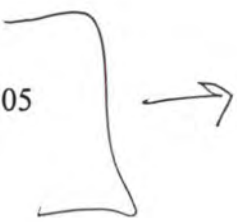
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April 8, 1996

Media Advisory: A memorial service will be held April 10 at the National Cathedral for Secretary of Commerce Ron Brown. The Chernobyl Commemoration has been rescheduled for May 1, 1996 at 1pm.

April 2, 1996

FOR IMMEDIATE RELEASE
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**MILLBURN BOY INVITED TO MEET FIRST LADY AND VICE PRESIDENT
AT WHITE HOUSE CEREMONY TO COMMEMORATE TEN YEAR
ANNIVERSARY OF CHORNOBYL EXPLOSION**

Event to honor organizers of US relief efforts
Young survivor will address guests

(Millburn, NJ) -- On Wednesday, April 10, Volodymyr (Vova) Malofienko, an elementary school student at the Deerfield School in Millburn/Short Hills township will travel to Washington, DC to meet with First Lady Hillary Rodham Clinton and Vice President Al Gore in a special ceremony to commemorate the tenth anniversary of one of the worst environmental disasters in history - the explosion at the Chornobyl nuclear power plant. Traveling with Vova will be a delegation from the Children of Chornobyl Relief Fund (CCRF), a humanitarian relief organization based in Short Hills, New Jersey.

The ceremony will be held in the East Room of the White House and will honor many of the relief organizations from across the United States that provide medical and technical assistance to those regions most affected by the 1986 radiation disaster. Among the groups to be recognized is the Children of Chornobyl Relief Fund. Founded in the autumn of 1989, CCRF has organized 14 airlifts, 5 sea shipments and delivered medical and technical assistance valued at over 36 million dollars during the past 5 years to the victims of the Chornobyl disaster in Ukraine.

- more -

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Vova Malofienko

Vova came to the United States in July 1990 at the invitation of Paul Newman's "Hole in the Wall Gang Camp" for terminally ill children. When he arrived Vova, age 5 at the time, was suffering from acute myelogenous leukemia. The ten visiting children were hosted in New Jersey by CCRF, and were given complete medical exams. With the level of medical treatment available in the US, Vova's prognosis was revised and he was given a slim chance of survival, the only one out of the group of ten visiting children.

On April 26, 1986, Vova was only 2 years old when the cloud of radioactive fallout contaminated his hometown of Chernihiv, 60 miles downwind from the Chornobyl plant. His parents, Olya and Alexander remember that he played outside for many hours throughout the early part of May, the period when radiation levels were at a peak. Since the Soviet government had not warned its citizens about the possible consequences of exposure to radiation, Vova's parents were unaware of the dangers involved.

Shortly after his arrival in the United States, Vova began several years of treatment at the Boston Floating Hospital and the Beth Israel Hospital in Newark before his leukemia was brought under control. He has been in full remission since 1993.

Vova is expected to make a short statement thanking the First Lady for her support of children's health programs in the United States, and for her personal visits to Chornobyl hospitals in Ukraine and Belarus where children are undergoing treatment for radiation-related diseases.

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