PUBLIC HEARING ON EID'S DRAFT PERMIT
LOS ALAMOS NATIONAL LABORATORY ("LANL")
RESOURCE CONSERVATION AND RECOVERY ACT ("RCRA")
OPERATING PERMIT NM 08900105151
July 18, 1989

ORDER OF PROCEEDING

EID PROCEEDING

1. Introductory statement by Hearing Officer.

2. Prepared Exhibits offered by EID attorney. (Additional exhibits may be offered by anyone during hearing.)

3. Testimony by EID.

   a. Cross-examination by LANL.
   b. Cross-examination by public.

4. Submittal of comments by LANL.

5. Testimony by public.

   a. Cross-examination by LANL.
   b. Cross-examination by public (other than member of the public testifying).
   c. Cross-examination by EID.

6. Rebuttal testimony by anyone (subject to cross-examination).

7. Conclusion of EID hearing by Hearing Officer.

[hrgofsta.lnl]

LOS ALAMOS NATIONAL LABORATORY

DRAFT PERMIT HEARING

EXHIBITS

JULY 18-20, 1989

IN ALPHABETICAL ORDER

A Letter to the Folks Who are Responsible at NMEID for the Los Alamos National Laboratory's Permit for the Incinerator

Folks, please do not grant this, or any other, permit to the University of California or its master, the Department of Energy (DOE). The DOE and its puppets have shown us by its operation of its facilities in Rocky Flats, Colorado, Fernald, Ohio, Savannah River, Georgia, and Hanford, Washington that they cannot be trusted with our fragile New Mexican environment.

They (the DOE and its minions) are blatant criminals. The death toll of the DOE will be far greater than all the lives either of the Los Angeles gangs, the Bloods and the Crimps, will take in their gang wars.

If the DOE is so responsible, why has it suppressed information on cancer rates around Three Mile Island, and why has the FBI chosen to investigate them at Rocky Flats? What about its negligent handling of the Seabrook evacuation plans? It is important that you, EID, do not issue any permits until the DOE undergoes massive change.

It is, in all reality, outrageous that LANL, whose own people helped compile a very bleak report on the greenhouse effect, willfully help to bring about a disaster of that magnitude. If, as Representative Richardson says, LANL and Sandia Labs are on the front line of environmental cleanup research, why would LANL and folks consider using such a disasterous method as burning? Once again, it is imperative that no permit be issued because of the known dangers of incineration and the greenhouse effect.

I find it preposterous that you do not look for sulfides that cause acid rain, heavy metals that have been linked to various birth defects, and both dioxins and radionuclides that cause cancer and wreak ecological havoc for hundreds of thousands of years. In testimony given yesterday (7/18/89) it was shown that off-the-shelf technology exists to monitor if these emissions are present. Once again, you must not grant the DOE any permit to incinerate until a complete , non-biased technological assessment is done.

Through yesterdays repeated examples of bureaucratic babble it is clear that a major reorganization of the NMEID is needed. Until enabling legislation is passed it is imperative that no permits be granted. The EID has admitted and demonstrated that the left hand does not know what the right hand is doing because of fragmentation, budgetary constraints, and lack of communication between divisions and education of their staff members.

I find it morally reprehensible that one man will decide whether or not a known criminal agency will be granted a permit to knowingly poison us based upon the recommendations of a small group of appointed officials, two of whom are known to be affiliated with LANL. Must we also die like our sisters and brothers have so recently in China fighting tyranny. We will not be WIPPed into submission!

HANSON EXHIBIT NO. 1

7/19/ OK

Until the DOE reforms its ways (even their bosses,Secretary Watkins and Mr. Bush, admitted that reform is necessary), no permit should be granted. Just by LANL's not being available to be cross-examined verbally at these hearings should serve as a reminder of their lack of responsibility and accountability.

In keeping with the President's apparent desire to review some environmental issues, the EID should exercise restraint in the speed of their decision. A permit should not be granted until a clear national policy has been defined. Haste could well mean millions of beings suffering in needless agony for ages to come.

Please carefully and thoughtfully review our sworn testimonies. Given the many concerns that have been exposed and remain unresolved, I urge you to be brave and do the morally correct thing by just saying no to LANL and the DOE.

Thank you.

Bradley W. Hanson

Bradley W. Hanson
PO Box 657
LA MADERA NM 87539

Jean MacFarland-Altshuler
P.O. Box 3791
Pojoque Station
Santa Fe, New Mex. 87501

July 19, 1989

Richard Mitzelfelt
Dir. Environmental Improvement
Division of New Mexico
1190 St. Francis Dr.
Santa Fe, N.M. 87503

ALTSHULER
EXHIBIT
NO. 1

Dear M. Mitzelfelt,

My name is Jean MacFarland-Altshuler, from Lenox, Mass. A year ago, I bought a second home in Pojoque, about eight miles down wind from Los Alamos.

I am here at this time because of these hearings. In Massachusetts, New Mexico is seen in the local papers and the national news because of the issues surrounding the nuclear wastes issues. The state is gaining a reputation as one which does not care about its environment. The impression outside of New Mexico is that the state government is willing to wholesale its environment. If these hearings are simply protocol and are not taken seriously, more damage will be done. However, if these hearings are taken seriously there will be an opportunity for change in this direction of national attitude. New Mexico's citizens are concerned and they must be listened to. New Mexico could even become an example and set a precident for turning the tides on its own environmental self-destruction.

On the property in which I purchased, five other individuals have moved here from outside New Mexico and have moved their businesses here also. All of us are aware of many others outside the state, others who would like to become residents and bring businesses here. They are carefully scrutinizing their decisions because of the State's environmental record and the questionable activities of LANL. Los Alamos, through its aura of secrecy has succeeded in creating a most suspicious fear which I have found have personally kept many valuable potential citizens from relocating here, and who can blame them. Now that my eyes are open to the incineration that has been going on, my husband and I are also reconsidering our choice to be here.

I believe it is a grave mistake for the E.I.D. or state residents at large to consider LANL and the military industrial complex in the long run, the essential means of economic security in this state. The cost of this view is the continued growth of a population

which can help balance the overweighted military economy; an economy that in the future, I believe, will not be a viable one, with global attitudes finally shifting toward more responsible priorities.

It is a lot harder to monitor the people who have decided not to relocate to New Mexico, people who are financially sound and wish to contribute to this community. It is perhaps impossible to create statistics on lost economic opportunity because of the unseen hazzard of an endangered and poisoned environment than it will be to monitor the emissions of hazzardous wastes and nucleides from the incinerator stacks. I emplore you in your decision regarding LANL and its incineraton process not to issue this permit and to do what is necessary to realign your agency's priorities in the order of its name: Environmental Improvement.

Respectfully,

Jean Marie Faulconer Stoshus

7/19/89
GACC

CRAIG ANDERSON
ROUTE 14, BOX 216-Y
SANTA FE, NEW MEXICO 87505
505 473-9478

ON NUCLEAR ENERGY

Since its inception nearly 50 years ago, nuclear fission and its by-product radioactive waste have produced an alarming situation in which our environment and consequently the public health is at risk from the extremely toxic nature of the process of nuclear fission, the resulting by-product, and attempts to clean up and dispose of the waste.

It may rightfully be called an alarming and an outrageous situation because, if one takes the information now available to the public, combined with common sense and respect for nature and public health, one arrives at the conclusion that private industry and government continue to conduct nuclear fission on a business-as-usual basis and to handle, store and dispose of the resulting radioactive waste in a manner which has now repeatedly been proven to be lax, inadequate, dangerous, and indeed an absolute threat to public health and the well being of our natural environment (examples: Rocky Flats, Hanford). In the public domain, land, water, and air, the very elements which sustain us, are being repeatedly contaminated with radioactive waste. This is an outrageous, but well documented fact.

ANDERSON
EXHIBIT
NO. 1

Perhaps some of the most fascinating aspects of this "business as usual" scenario are only now coming to light. Within its context, a basic premise is quite axiomatic. And that is that ipso facto, a human being is a human being; and in this lifetime, as we know it, life is a game of percentages. With humans there is no absolute perfection. Human beings make mistakes. Consider a hypothetical relationship between a lawyer or scientist representing the nuclear industry or a government official representing the DOE, EPA, EID, or EIB, and a lay person, with a family, concerned with the eroding respect for public health and the well being of our natural environment demonstrated by the very agencies charged with protecting us, and those in the pursuit of science, business, and industry who would compromise public health and safety. Who can be trusted to provide accurate and truthful information? False statements have been made by government agencies which have been accepted at face value as fact by the general public. Who truly has the public interest uppermost on its agenda? What surfaces from this scenario is the stark realization that government is currently willfully and knowingly allowing the unthinkable, unconscionable act of contaminating for thousands of years to come the soil, water, and air which, and only which, sustains all life on this planet. As twisted as it seems, this apparently is happening very casually on a day-to-day "business as usual" basis across the land.

Allowing that to maintain ourselves as healthy human beings, we

have many needs, perhaps most of all, we need to feel a sense of nurturance, a sense of safety and security for our families. Thus, in the pursuit of our daily lives, how can we continue our somnambulistic acceptance of the obvious threats posed not only by the continued pursuit of nuclear fission by the nuclear industry, and scientific experimentation by the government, producing more and more toxic waste, but also the absolute danger posed by the past ineptitudes of the very government agencies charged with regulating and protecting us from this madness?

We have now reached the point at which we as citizens are being asked to accept an absolutely ridiculous balance between madness and absurdity.

We know atomic wars are unthinkable, let alone unwinnable. It is the equivalent of planetary suicide. We know atomic energy provides electricity, but at the highest cost, with the greatest danger, and the most deleterious side effects, for the longest period of time.

Hence, the question must soon willy nilly be asked:

From the viewpoint of safety, economics and politics, who supports this madness and who maintains this absurdity?

The daily news tells us with increasing frequency that safety

issues are being compromised, and facts to this effect are repeatedly presented and substantiated. Economically, investors have lost hundreds of thousands of dollars; and large corporations have been brought to their knees by nuclear projects and have sought governmental support for their predicaments; and government has continued to support these "Frankensteinian" entrepreneurships. Why? Ask Frankenstein?

Government, for all its many virtues in this great system of democracy, has perhaps been flawed from the beginning in its association with nuclear energy. It was a handmaiden at the birth of this Frankenstein monster, and it annihilated two foreign metropolises with devices which now pale as primitive in the face of today's complex megaton weapons. Perhaps government in a rapt embrace with the nuclear industry somehow feels it can right its past wrongs by proving to its constituents that it has been right all along, and that "Frankie" is really a good boy in spite of all his transgressions. Since it has been nearly 50 years already, this situation may continue to be accepted by the "duck and cover" somnambulists as they shuffle along ever closer to the waiting precipice. But those of us now "awake" feel thrust into an unacceptable situation, an untenable balance between madness and absurdity when considering the whole of the nuclear issue today.

By not attending to the details early on in the nuclear game, namely how to effectively neutralize the waste, we are faced now

with the realization that we must stop and reconsider the business as usual position that has brought us into the current predicament. We must accept this responsibility and rethink our priorities in light of the glaring facts and truths now present. Otherwise, history will record us as having presided over the "sealing" of our fate, as well as that of many future generations.

Science now accepts the premise of the mutual interconnectedness of all things. Couple this fact to the understanding that many radioactive particles have half lives of many thousands of years (plutonium 240,000 years!), and it becomes clear why people are demanding that tough, responsible accountable restrictions and guidelines be placed on the experimentation, production, storage, and disposal phases of all nuclear projects, public and private.

In order to better preserve our planet and provide for the health and well being of our human race by minimizing the hazards of producing, storing, and disposing of radioactive materials, consider the following proposals:

1. Within the nuclear system, shift human time, energy, and funding away from the current emphasis on research for and production of nuclear weapons systems and the promotion of domestic nuclear power plants. At great cost, this path has brought minimal successes in the medical field, and some innovation in military systems, but it is fast becoming

recognized as the path of the past and the road to ruin.

2. Dedicate an equivalent amount of human time, energy, and money to solving the 50-year riddle of how to neutralize and render harmless all radioactive materials. These elusive but essential steps toward achieving a neutralization process for all radioactive hazards can surely be effectively accomplished by the same collaboration between government, science, and industry that has brought us to this crisis point. We have now come full circle, back around the spiral, enabling us to see our current predicament from a higher vantage point.

We the public must remain vigilant, but we must also now be forthcoming and willing to accept conservation measures. Government regulatory agencies must "clean house," renounce this balance of madness and absurdity and recognize and rise to a place of truly being custodians of the public health and the well being of the planet; and science and industry must begin anew the search for renewable, safe, effective, and affordable energy sources. We are at a beginning place once again. We must let go of the old and embrace the search for the new, the safe, and the whole.

For the present, in light of the WIPP proposal and the Los Alamos incinerator now before the public, and in regard to the ongoing problems of storage and disposal of radioactive waste already generated by various programs around the country, consider the

following proposals:

Take immediate steps toward providing safe, accessible retrievable storage areas onsite at the various locations where nuclear projects have been undertaken. Consider super compaction in place of incinceration. Adopt a policy of absolutely minimal movement of highly toxic radioactive substances from one location to another. The risk of accident is increased exponentially each time these substances are handled, while the cost to clean up the inevitable transportation accidents would be simply staggering.

The proposed incineration of radioactive wastes must be thoroughly scrutinized by a public review process. Current environmental controls and regulations are hopelessly mired in a bog of ineffectual process for lack of funding and political expediency. Facts and claims brought forth by permit applicants, who, in the past, have virtually regulated themselves, must be substantiated by reputable sources outside the influence of those submitting permit applications; and both parties must be held accountable to the public through our legislative branches of governments, local, state, and national. Again, the paramount issues should be protecting the public health and retrieving and securing for the future, the well being of our natural environment.

In closing, if in the process of pursuing the projected program of neutralizing the nuclear nightmare it becomes clear that we have

Figure it out!

Why are there so many tourists in Santa Fe? Well, it's a very spectacular place for one. We are blessed with great people, wonderful scenery, exceptional culture, art, food and a unique sense of style. The world has found out about us and they want to come and experience—Santa Fe.

We are very lucky because we live here, and because we receive the benefits of having the tourists here. Estimates are that more than 50% of the total gross receipts tax collected in Santa Fe is directly related to tourism. Lodgers tax collections are up by 18% from last year. Every dollar a tourist spends in Santa Fe rolls over at least 2.8 times.

It isn't hard to figure out. If you live in Santa Fe, you are benefitting from that tourist dollar even if you don't work in the industry.

Figure it out... tourism is good for our economy!

Santa Fe Convention and Visitors Bureau
984-6760

Tourists in March: They're springing into Santa Fe

By BOB QUICK
The New Mexican Staff

The streets of downtown Santa Fe seem to [illegible] with tourists these days and it's [illegible] not the height of the [illegible] especially

amount a "typical" person attending a convention spends for lodging, food and incidentals, said Sabrina Pratt, administrative assistant with the Visitors and Convention Bureau.

Estimated visitor days for this March are 12,945, compared to 13,179 in March 1988 and 6,650 in March 1987.

[illegible] another solid indication of a healthy tourist [illegible] apparent in recently released [illegible]'s lodger's tax receipts. [illegible] collection for [illegible]ed 26

Santa Fe had collected more than [illegible] in lodger's tax since the budget [illegible] July 1, said Fred Lopez, the [illegible] management division director.

So far this budget year, [illegible] collections are up about 17 [illegible] figures for the comparable p[illegible] Pratt said.

"Isn't it neat?" said Diane [illegible] director of the Visitors [illegible] Bureau, of the city's boo[illegible] conventioneers business. [illegible] ever-increasing numbers [illegible] tising, specifically to the [illegible] such publication [illegible] Francisco

ANDERSON
EXHIBIT
NO. 2

reached an impasse and no "neutralization solution" is possible, we must then embrace the impasse, "let go" of the nuclear monster we have created, and look ahead to more suitable forms of energy – those that serve rather than destroy.

101st Congress
1st Session

COMMITTEE PRINT

Committee
Print 101-H

HEALTH AND SAFETY AT THE DEPARTMENT OF ENERGY'S NUCLEAR WEAPONS FACILITIES

A REPORT

BY THE

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

OF THE

COMMITTEE ON ENERGY AND COMMERCE

U.S. HOUSE OF REPRESENTATIVES

JUNE 1989

BILLUPS
EXHIBIT
NO. 1

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LETTER OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ENERGY AND COMMERCE,
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS,
Washington, DC, May 25, 1989.

TO THE MEMBERS OF THE COMMITTEE ON ENERGY AND COMMERCE:

It is my pleasure to transmit the report of the Subcommittee on Oversight and Investigations entitled, "Health and Safety at the Department of Energy's Nuclear Weapons Facilities." This report, which summarizes the subcommittee's extensive 3-year investigation, documents a myriad of problems at our Nation's most critical nuclear weapons plants and it concludes that health and safety matters are in disarray throughout the nuclear weapons complex.

Obsessive secrecy and lack of outside oversight have been hallmarks of the nuclear weapons program since its beginning as the wartime Manhattan Engineering District. On the Manhattan project, secrecy necessarily was absolute. Atomic defense workers passed down this distrust of outsiders through DOE's predecessors, the Atomic Energy Commission and the Energy Research and Development Administration, to the Department of Energy itself. In the process, almost no one seriously questioned safety practices.

Another root cause is a mindset emphasizing production above health and safety. This too is a legacy of the Manhattan project. A sense of urgency and mission born in the race to build the first atomic bomb still motivates the program. The result is dedication, but dedication to production at the expense of all other considerations. The subcommittee is not alone in reaching this conclusion. Other committees and subcommittees in the House and Senate, as well as distinguished outside reviewers, such as the National Academy of Sciences, have expressed similar views.

Intertwined with the lack of outside scrutiny and the production mindset is a sense of complacency—a sense that the DOE really has no serious health and safety problems. Relying on normal measures of industrial safety, such as lost time accident rates or worker exposure to radiation, management has reassured itself that its methods have been working. When the Chernobyl accident focused public attention on nuclear safety, it helped bring to light many problems at DOE facilities. The DOE had known of many of these deficiencies prior to the accident—in some cases for many years. The Department had simply ignored the few who had insisted there were problems—even when the critics were well-meaning DOE and contractor personnel.

I urge all members to study this report carefully. Secretary of Energy James D. Watkins and the other leaders in the new administration should view this report as a valuable tool in their efforts to correct the very fundamental and very serious problems the Department must deal with at its nuclear weapons plants.

Sincerely,

JOHN D. DINGELL, *Chairman.*

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health and safety standards have become more stringent. Although the Department is saddled with problems inherited from the past, good management still plans ahead and obtains the necessary resources to insure that production and health and safety go hand-in-hand. It is clear that this has not been done.

The General Accounting Office, in a July 1988 report, indicated that the DOE estimates that it will cost from about $100 billion to over $130 billion to upgrade the nuclear weapons complex to meet nuclear defense needs and safety and environmental requirements. This includes costs to clean up existing contamination. All of this has resulted in a crisis of the highest order.

The subcommittee hopes that the new Secretary of Energy, James D. Watkins, recognizes the enormity of the tasks that lie ahead. His testimony at his confirmation hearing suggests that he does, and the subcommittee will be watching his reform efforts with interest.

The nation is now faced with an untenable choice: Continue nuclear weapons production with its present health and safety problems, or close down production until health and safety can be assured—with possible jeopardy to the national security. Management failures at the DOE have put us in this no-win situation. If the DOE is to continue to produce nuclear weapons, it must comply with its own policy of maintaining adequate health and safety. One thing is certain: DOE's current way of doing business is simply not working.

○

Joseph [illegible]gado stated, "I personally believe that probably with a whole series of questions, not only this subcommittee but other committees that we respond to, that attention was not given to those responses and they were done in a cursory fashion and passed through the chains. . . . There is no excuse for that." While the Under Secretary acknowledges that this is a problem, a DOE Defense Programs employee told the subcommittee staff that "Dingell's questions are an imposition . . . we have more important things to do."

Conclusion

The public must know that the DOE has not successfully managed its nuclear weapons program to insure adequate health and safety. The problems cited in this report indicate a breakdown in the DOE's entire system to insure compliance with its own policy of producing nuclear weapons without undue risk to its workers and the public at large. The problems cited in this report should never exist in a nuclear weapons program.

A major cause of the DOE's problems has been a reluctance to look critically at its own management system. We have seen few examples of DOE or contractor senior officials being held accountable for poor health and safety. In fact, it appears that there is little correlation between performance and receiving accolades and cash bonuses. Conversely, the DOE and its contractors demonstrate—by the lack of recognition and overt harassment and retaliation—that workers who expose serious problems will not be looked upon favorably. Until these practices are changed, there will be no lasting improvements.

The DOE organizations responsible for the production of nuclear weapons seem to view production as their primary mission, with the expectation that others will provide for health and safety. Health and safety *must* be an integral part of production and *must* be the responsibility of those in the production arena. The situation at Rocky Flats where serious health and safety problems were ignored by the Albuquerque Operations Office and the Headquarters Defense Programs Office illustrates our concern.

While no substitute for an effective internal review system, the subcommittee does note that the DOE has recently subjected itself to necessary outside scrutiny. For example, in April 1986, following the Chernobyl accident, then Secretary Herrington asked six outside scientists and engineers to look at N Reactor at Hanford. Secretary Herrington also asked the National Academy of Sciences and the National Academy of Engineering to examine all of DOE's facilities. In addition, Secretary Herrington created a 15-member Advisory Committee on Nuclear Facility Safety. Outside oversight, however, is not the complete answer. Unless DOE changes its methods of compensation to recognize the importance of health and safety goals within its line organizations, DOE will not make significant progress in addressing its problems.

The subcommittee believes it is important to recognize that many of the serious health and safety problems which plague the DOE can be attributed to management and attitude shortcomings. DOE officials have cited the fact that their facilities are old and

HEALTH AND SAFETY AT THE DEPARTMENT OF ENERGY'S NUCLEAR WEAPONS FACILITIES

Introduction

Since 1986, the Subcommittee on Oversight and Investigations has been reviewing the adequacy of protections for worker and community health and safety at the Department of Energy's nuclear weapons facilities. These 17 weapons facilities, which are operated for the DOE by contractor organizations, have the potential for causing great harm to workers, the public and even our national security if a serious accident were to occur.

The DOE weapons complex contains nuclear reactors, reprocessing plants, nuclear weapons, Special Nuclear Materials (such as plutonium and highly enriched uranium), high explosives, and other potentially dangerous operations. A mishap in handling nuclear materials or an uncontrolled fire, such as occurred at Chernobyl, could seriously injure or even kill the people who work at the sites, contaminate the environment, and pose an enduring health and safety risk to the public at large. Clearly, no one wants this to happen.

Unfortunately, the subcommittee has found substantial evidence that health and safety matters are in disarray throughout the weapons complex. There are several factors for this current state of affairs. The Department's predecessor agencies, the Energy Research and Development Administration and, before that, the Atomic Energy Commission, were cloaked in secrecy which prevented the outside scrutiny which is essential. These agencies had evolved from the wartime Manhattan Engineering District where secrecy was absolute. This penchant for secrecy and the classified nature of the process of making nuclear weapons contributed to a mindset of emphasizing production at the expense of health and safety. Ensuring adequate health and safety was not considered a priority. This way of doing business was considered acceptable at the time because no one questioned what was going on.

In response to any criticism, DOE cited normal measures of industrial safety as evidence that there was no problem. DOE cited lost time accident rates, rates for workdays lost to accidents, and worker exposure to radiation, as its argument that there existed no serious health and safety problem at its facilities. DOE remained content that its methods were working and did little to question its system. Critics, even well-meaning DOE and contractor personnel, were ignored. DOE remained largely incapable of responding unless outside pressure existed. For example, Chernobyl was like a thunderclap. The public demanded that all nuclear facilities, power plants, and production facilities be subject to aggressive inspection to prevent accidents. Suddenly, DOE facilities, which had operated

"in the wings" for many years, found themselves on "center stage". The DOE did not perform well in the spotlight. However, many of the deficiencies that were highly publicized after Chernobyl were, in fact, known to DOE prior to that accident—in some cases for many years.

We are not alone in reaching the conclusion that DOE has emphasized production over safety and health. Other committees and subcommittees in the House and Senate, as well as distinguished outside reviewers, such as the National Academy of Sciences, have expressed similar views.

In our review of health and safety issues, we have discovered a pattern that is strikingly similar to the subcommittee's experience with the Department of Energy's safeguards and security program, which has been the subject of ongoing subcommittee inquiry since 1982. The same management inadequacies and attitude problems we have identified in our review of safeguards and security are *the principal causes* for the Department's failures in protecting health and safety. The major difference between the two categories—safeguards and security on the one hand, health and safety on the other—is the nature of the threat. In the case of safeguards and security the threat is intentional, and in the case of health and safety, unintentional. But a critically important nuclear facility can be shut down and the surrounding countryside contaminated with deadly radiation just as surely by an accidental fire as by a terrorist bomb.

The Department's safeguards and security program has been in shambles. The subcommittee, for example, found evidence that the DOE and its contractor knowingly permitted assembled nuclear weapons to remain without adequate protection for a number of years at the Los Alamos National Laboratory. It took the subcommittee's intervention to force the Department to correct this potential disaster. The subcommittee's continued oversight has also provided the motivation for the Energy Department to devote management attention and resources toward improving safeguards and security. This has resulted in substantial improvements, although serious problems continue to exist.

This report describes the types of problems in health and safety that the subcommittee has uncovered. The DOE's health and safety problems have been exacerbated by the lack of effective oversight within the Department itself. This situation may be improving. Currently, the Environment, Safety and Health function appears to be bringing to the forefront serious health and safety problems that exist throughout the nuclear weapons complex. In addition, the Advisory Committee on Nuclear Facility Safety is providing a valuable independent voice to the Secretary of Energy on technical issues, including operation of the nuclear weapons production facilities. While these developments are encouraging, this report will describe what we believe to be the root cause for DOE's health and safety problems—management inadequacies.

Energy Department's Policy Not Being Followed

It has always been the official policy of the Department of Energy to operate the nuclear weapons complex in a safe and

> . . . there was also evidence of complacency at the [N Reactor] lower levels . . . [t]he sense that came through was one of doing a job in a context of safety rules whose significance had somehow been lost and which were therefore not deemed very important. . . . The plant workers must somehow reflect the values passed on from above.

- In the past, the DOE has shown that it is unwilling to help the subcommittee improve their own health and safety program. The Department did not want Messrs. Mark Hermanson and Casey Ruud, safety experts from Westinghouse Hanford Company, to accompany the subcommittee staff during their August 1987 visit to the Savannah River Plant. The subcommittee had requested these individuals because of their expertise in safety matters to be reviewed at Savannah River. At the subcommittee's October 22, 1987, hearing, Troy E. Wade, II, Acting Assistant Secretary for Defense Programs, testified that it was felt that "in this particular set of circumstances it was an adversarial relationship and I saw nothing productive for either side." Mr. Wade and the Defense Programs organization have not been doing an adequate job in insuring health and safety at the weapons complex for which they are responsible. The subcommittee believes that concern for a so-called "adversarial relationship" had a higher priority than correcting health and safety problems.
- DOE and contractor officials have not furnished correct and complete information to the subcommittee. At the subcommittee's hearing, on October 22, 1987, the Manager of the DOE's Savannah River Operations Office, did not convey the full story about the adequacy of health and safety at the Savannah River Plant. Accurate and complete information from the DOE has not always been forthcoming.

Following the subcommittee's October 22 hearing, the DOE was asked to respond to written questions concerning their safety program. The responses were in some cases misleading, in other cases unresponsive, and, in general, displayed an "I don't care" attitude. For example:

- In response to a question concerning the dangerous lack of fire protection at the Savannah River Plant, the DOE wrote: ". . . the actions of the contractor . . . have been appropriate." In a subsequent interview with the subcommittee staff, Troy E. Wade, II, Acting Assistant Secretary for Defense Program, admitted that the response was "not a very good answer."
- A senior Westinghouse Hanford Company safety official told The Seattle Times that safety audits of the Hanford site are of no interest to the public. The official was quoted as saying, "It is an imposition to us to try to run our operations in the public arena." In response to a written question by Chairman Dingell about this curious attitude on the part of Westinghouse, the only defense the DOE could offer was that the comments of the Westinghouse official were "taken out of context."

When questioned about the unacceptable manner in which the DOE responds to the subcommittee's questions, Under Secretary

appreciation from the Secretary or an Assistant Secretary or from the DOE field office manager.

The Director of Human Resources at Westinghouse told the subcommittee staff that Westinghouse policy provided for merit increases and salary adjustments for deserving employees. In addition, Westinghouse can provide rewards in the form of letters, plaques, and verbal recognition in a group setting. The DOE and Westinghouse refused to do any of these things.

Not only did these employees go unrecognized and unrewarded, but the subcommittee was required to hold a hearing on May 11, 1988, because of Westinghouse's harassment of Messrs. Ruud and Simpkin for their efforts in improving health and safety at the Hanford project and for cooperating with the subcommittee. Mr. Ruud and Mr. Simpkin had their careers adversely affected due to the actions taken by senior Westinghouse management. The DOE's failure to handle this situation properly was a matter of great concern to the subcommittee. At the hearing, Under Secretary Salgado testified:

> And I guess the other failure that we as a Department have is, we failed to acknowledge them. You're right in your letter. We failed to acknowledge them. . . . [w]e failed to acknowledge what they had done. . . . But probably more important from a DOE corporate standpoint, by not recognizing them, it's a signal that we sent into our own organization. . . . If you end up killing the messengers, nobody's going to bring you the message. So there were a series of failures on DOE's part. . . . Whether it was insensitive, lack of management, lack of training, I'm not quite sure. But there were some failures.

DOE Suffers From an Attitude Problem

The subcommittee has a number of examples where a different attitude on the part of certain DOE and contractor officials could go a long way toward improving the DOE's health and safety program. Here are some examples of what we mean:

- An "it-can't-happen-here" attitude pervades the nuclear weapons program. Operations are conducted without regard to the consequences if something were to go wrong. The subcommittee noted this in the case of the DuPont Company, which believed that fires could never occur as long as prevention was good. The subcommittee saw this at the Hanford site where possible major consequences from an earthquake went unresolved for a long period of time. The subcommittee learned this from members of the Roddis Panel—created by Secretary Herrington to review the safety of Hanford's N Reactor following the Chernobyl accident. The Panel's Chairman, Dr. Louis Roddis, told ABC News on its April 24, 1987 airing of "The Bomb Factories" that "it's simply a matter of complacency—it can't happen. Well, you know the Titanic couldn't sink either." Another member of the Panel, Dr. L. W. Lewis, said in his October 1, 1986 report to Secretary Herrington:

> secure manner. For example, former Energy Secretary John Herrington issued a formal policy statement on August 21, 1986, that all DOE activities "shall comply with the spirit as well as the letter of applicable health and safety statutes, regulations, orders, and standards." More recently, in a report issued in December 1988, Secretary Herrington said, "The Department considers complying with environmental, safety and health requirements to be an integral part of maintaining operations of its facilities."
>
> Notwithstanding the Department's official statements, we have found that the DOE has not always followed its own policy on health and safety. The nuclear weapons facilities have continued to operate although the DOE and its contractors have known about the existence of major health and safety problems. Not until after substantial Congressional and media attention focused public pressure on the problem did the DOE shut down operations at several of its most critical facilities.

DOE Fails To Acknowledge Its Problems

According to a DOE December 1988 Presidential report to the Congress entitled, "United States Department of Energy Nuclear Weapons Complex Modernization Report", the Rocky Flats Plant is, "being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public." The report, of course, was authored by the Energy Department. Former Under Secretary of Energy Joseph Salgado told a national television audience in April 1987 that he was satisfied with the Albuquerque Office's oversight of its contractors. (The Albuquerque Operations Office oversees Rocky Flats.) Former Energy Secretary Herrington told the Associated Press in October 1988 that, "there has been a good margin of safety [at the DOE facilities]. It's been adequate." The subcommittee has evidence, however, that shows that these assurances about the adequacy of health and safety at Rocky Flats (and other critical nuclear weapons sites) are simply not true.

Health and Safety Problems Are Real

Not only has the subcommittee found evidence of health and safety problems at Rocky Flats which belie these assurances, but the nature and pervasiveness of these problems clearly indicate a systemic breakdown in DOE's programs to insure adequate health and safety at the other sites as well. This is what the subcommittee has found:

- DOE Headquarters identified pervasive health and safety problems at the Rocky Flats Plant involving inadequate fire protection, inadequate protection of workers from plutonium contamination, and an ineffective quality assurance program. Recently, the DOE closed down operations at one of the key weapons buildings at Rocky Flats due to radiological control problems, including the exposure of three people to potentially high levels of plutonium contamination. Fire doors had ventilation holes drilled in them in obvious disregard for fire safety. This would be inexcusable at any DOE nuclear facility, but a

disastrous plutonium fire occurred at Rocky Flats in 1969. A major fire at any one of the DOE's weapons plants would result in deaths and injuries, along with the contamination of the surrounding environment and the disruption of vital defense activities.

- The DuPont Company at the Savannah River Plant followed its corporate philosophy that fire protection is really unnecessary because fires can be prevented. The DuPont Company justified its position on the basis of its historically low fire loss record at Savannah River, coupled with its ongoing fire prevention program. This unrealistic view caused fire protection to be practically nonexistent. DOE itself did not encourage DuPont to install fire protection systems for many years, compounding the problem. Belatedly, the DOE in 1986 warned that a major fire could occur because basic fire protection program elements were not in place. For example, fire protection was so deficient that the only thing available to fight a fire at one reactor building was an ordinary garden hose. The subcommittee investigators were told that the reactors at the Savannah River Plant were the only reactors in the United States without automatic sprinkler systems. Automatic sprinkler systems were deliberately not turned on at the Tritium Facility (one of a kind) because a DuPont manager was more concerned about computers, electrical components and paper records getting wet than about the Tritium Facility burning down. Other fire protection problems included lack of fire protection water supply, absence of automatic fire extinguishing systems, and lack of prompt fire department response capability. The DOE and DuPont (which left Savannah River on April 1, 1989), had been proceeding very slowly to correct this major problem. For instance, phase one of DOE's efforts to correct this situation will not even be completed until 1996, according to DOE budget documents.
- Workers at nuclear sites must be qualified for the work they are entrusted to perform. Incredibly, the DOE has allowed poorly trained personnel to work on critical nuclear operations. Contractors for nuclear facilities under the oversight of the Albuquerque Operations Office were not properly training and certifying their nuclear operators. Several safety inspectors at the N Reactor at Hanford, Washington, had not been properly certified for their jobs because of improperly graded tests or lack of experience or both. It took the Energy Department 5 years to discover this mistake. Ten inspectors were certified based on improperly graded tests. Four inspectors, who actually flunked their tests, were allowed to conduct critical safety inspections at the N Reactor. At the Savannah River Plant, noncertified personnel performed official inspections of critical reactor systems at the weapons production reactors.
- An audit of the Hanford Plutonium Finishing Plant, where large quantities of weapons-grade plutonium are processed, concluded that "Operations conducted activities in a manner to facilitate productivity with inadequate regard for control meas-

- Former Secretary Herrington awarded the "Gold Medal"—the Department's highest award—to a DOE official who was found by the subcommittee to have allowed health and safety to deteriorate at some of this nation's most critical defense facilities. In giving this award, Secretary Herrington wrote, "unceasing efforts toward achieving excellence and fostering dynamic innovation and creativity." Then-Under Secretary of Energy Joseph Salgado wrote about this official, "first among equals as outstanding manager and leader—we have no better." This official received a substantial cash bonus.
- Another top DOE manager was rated "exceptional". In giving this official his "exceptional" rating, Under Secretary Salgado wrote, "continued exceptional service—valued counselor—exceptional leader." This official also received a substantial cash bonus. While he was in charge of operations, inadequate fire protection and other serious health and safety problems existed at his site, including inadequate training for reactor operators.
- Still another senior official was rated "exceptional". On his performance appraisal of the official, Under Secretary Salgado wrote, "exceptional performance on most difficult area. . . ." This official received a generous cash bonus as well. This individual was not successful in insuring that the site he was responsible for had adequate health and safety.

DOE Fails To Reward the Right People

During the course of the subcommittee's investigation into the adequacy of health and safety, we have observed that the DOE simply will not recognize the people in the system—and there are many—who contribute in an outstanding manner to better health and safety. Good examples are the witnesses from Westinghouse Hanford Company—Mark Hermanson, Casey Ruud, and James Simpkin—who testified at the subcommittee's October 22, 1987 hearing. At that hearing, the DOE's former Assistant Secretary for Environment, Safety and Health, Mary Walker, testified that, with respect to Messrs. Hermanson, Ruud and Simpkin, "I think that people who are willing to stand up and question safety practices under circumstances where it might be difficult for them should be rewarded."

On November 13, 1987, Chairman Dingell wrote former Secretary Herrington, "I believe Messrs. Hermanson, Ruud, and Simpkin deserve to be recognized for their contribution to the public good. Such recognition would serve notice that the Department is serious about improving its health and safety program. . . ."

In a February 2, 1988, response signed by Joseph Salgado, Under Secretary of Energy, no mention was made of any recognition for Messrs. Hermanson, Ruud, and Simpkin. The Department informed the subcommittee staff that Under Secretary Salgado had determined it would "not be appropriate" for the DOE to reward these individuals because they were contractor employees. Later, the subcommittee staff was told by the Director of Administration at the DOE, that the Department could have provided a letter of

ur al conditions, inadequate supervisor awareness, inadequate configuration control, inadequate procedures, and failure to follow procedures."

Why Is Health and Safety So Bad?

The subcommittee's investigations have shown that the Department of Energy has placed a much higher value on meeting production goals than on adhering to procedures designed to ensure health and safety. DOE field offices have not been successful in insuring that their contractors have been conducting their operations in a safe manner. Likewise, the DOE Headquarters Defense Programs Office, which is responsible for health and safety at the weapons complex, has fallen down on the job. Until recently, the DOE's Environment, Safety and Health Office had not been doing an adequate job in overseeing environmental, safety and health issues at the weapons complex.

This situation has been exacerbated by the isolation of the DOE weapons program from the "mainstream" of commercial reactor design and operation. In 1974, Congress abolished the Atomic Energy Commission and created the Energy Research and Development Administration and the Nuclear Regulatory Commission. The DOE, and its contractors, failed to take an interest in the evolution of commercial nuclear power reactors, especially the operating and management techniques required to run them safely. Even the partial meltdown of the fuel core at Three Mile Island did not lead to greater curiosity on the part of the DOE and its contractors. Under such circumstances, and in spite of the fact that the DOE has maintained that its facilities would be comparable to commercial facilities, the DOE found itself in a "culture shock" when standards derived from the commercial nuclear power world were finally applied to its facilities.

The DOE rewards its top officials for meeting or exceeding production goals regardless of whether the official was successful in insuring adequate health and safety. Contractors also have traditionally been rewarded primarily for production, with little or no consideration for health and safety. The subcommittee has also found instances where the DOE and its contractors not only fail to reward employees who are diligent in promoting safety, but occasionally, attempt to fire or demote such people.

DOE Rewards the Wrong People

One of the most disturbing things the subcommittee found in its review of the DOE's safeguards and security program was the "buddy bonus system." DOE officials who failed to remedy the serious safeguards and security problems were nonetheless richly rewarded by the Department. We have seen the same practice with respect to health and safety. In some cases, the very same people who were recognized for their "good work" in safeguards and security continued to be looked upon favorably despite their failures in the health and safety arena. For example, facility managers at key DOE sites have received awards, bonuses, and effusive praise from senior DOE officials at the same time as the facilities had substantial unresolved health and safety problems:

ures." Further, the audit found that becaus . serious problem with the degree to which Nuclear Material Custodians either understand their duties and responsibilities, or choose to comply with them . . . the overall program is assessed as less than adequate in assuring control of nuclear materials as described by DOE and Rockwell requirements." Such failures could result in the loss of nuclear materials, causing health and safety, and security problems.

- In April 1986, at the Hanford Plutonium Finishing Plant, two workers sustained puncture wounds while replacing filters in a glove box. The puncture wounds caused the workers to be contaminated with plutonium. Although contractor management was fully aware of a design flaw which resulted in the puncture wounds, it blamed the workers for not following proper procedures. Management was aware of this problem long before the incident occurred but did nothing to correct the problem.
- On March 7, 1985, the Governor of the State of Washington toured the Hanford reservation at Richland, Washington. Just prior to the arrival of the Governor's party near a site contaminated with radiation, and on direct orders from Rockwell Hanford Operations management, signs which warned of the radiation hazard were removed. A part of the Governor's entourage passed right through the contaminated area, oblivious of the hazard around them. Rockwell covered up this incident for almost 1 year until the matter came to the attention of the media and the subcommittee. To make matters worse, the Manager of the DOE's Richland Operations Office told the subcommittee that the sign removal during the Governor's visit was nothing more than an "aberration". The subcommittee, however, obtained a letter from Rockwell's former head of safety, dated August 14, 1986—over 1 year after the Governor's incident—which shows that this was no "aberration". According to the letter, ". . . members of the Waste Management Program Office have repeatedly put pressure on members of the Radiological Protection Department to remove posting signs in areas of contamination."
- At the Feed Materials Production Center near Fernald, Ohio, radon gas was released in April 1986, from the K-65 silos when venting occurred without the approval of management. Westinghouse, the contractor, attempted to conceal this serious incident and was later cited by a DOE incident investigation board for attempting "to prevent disclosure of factual information concerning this incident." Also, several hundred pounds of uranium oxide were released from the stacks at the Feed Materials Plant due to improper operation and maintenance of the bag house, which was designed to minimize such releases.
- At the Hanford Tank Farm complex, where vast quantities and varieties of radioactive substances are stored, including plutonium, the health of workers was frequently put in serious peril. Control room operators were directed by Rockwell Hanford Company management, the operating contractor at the

time, to turn off the alarms—which are supposed to warn against high radiation levels—because of the annoyance when alarms are unnecessarily set off by high winds. Under these conditions, if a release of radiation had occurred, the workers would have been exposed to dangerous and possibly lethal doses of radiation.

- At the Plutonium Finishing and PUREX Plants at the Hanford site, over fifty criticality specification violations have occurred in the past several years. Even though these violations greatly increased the potential for a major criticality accident, in which the release of intense radiation could cause death, the DOE did not stop operations until October 1986, *after* intense interest in safety at Hanford was aroused by the subcommittee and by the media. Still, the DOE failed to take steps to insure that such problems would not be repeated. On March 18, 1988, operators left a valve open at the PUREX facility and a wrong chemical solution was transferred to a tank. While there was no danger of a criticality accident occurring in *this* particular incident because the chemical transferred was nonradioactive, this incident showed that nothing had been learned from previous near accidents that could have led to a criticality. Westinghouse, the contractor, was forced to suspend operations. As a result of this incident, procedures and operator training were finally changed.
- Apparent pressures to meet production quotas at the N Reactor, in March 1986, led operations personnel to begin a high pressure test of primary coolant piping when they knew full well that inspection personnel were in a location that could cause bodily harm or death if something went wrong. When confronted with this outrageous disregard for worker safety, the DOE Manager at Hanford agreed that the lives of the inspection personnel had been jeopardized and attributed the irresponsible action to the fact that, "the operations people had been working long hours and were strung out." This statement is ludicrous. It is the cardinal rule of safety not to conduct dangerous operations with workers who are "strung out". This is only inviting a mishap to occur.
- A former Hanford contractor employee testified at an October 1987 subcommittee hearing that the pressure tube inspection program at the N Reactor was "out of control". This could have caused problems of a life-threatening nature because pressure tubes in reactors can cause a loss of coolant if they should leak or burst. This would result in a release of high levels of radiation. As a result of inquiries by the subcommittee, the Department of Energy belatedly found that the contractor employee was justified in his concerns.
- Workers who use illegal drugs at nuclear facilities pose a serious risk from a health and safety standpoint. Drugs have been a major problem at a number of the DOE's most sensitive weapons facilities—at the Oak Ridge Y-12 Plant, at the Lawrence Livermore National Laboratory, at the Los Alamos National Laboratory, and at the Hanford site. The DOE's approach in addressing this problem has been haphazard and inconsistent. For instance, in 1986, the DOE pressured Livermore Laboratory to prematurely shutdown an undercover drug probe.

- Quality assurance is essential to an effective safety program. Without an effective quality assurance program, it is impossible to know whether safety is what it should be. Top DOE management at the Richland Operations Office scuttled its quality assurance oversight program for 16 months, leaving no independent oversight to insure that quality assurance would be adequate at that critical nuclear operation. At Albuquerque, a June 1985 DOE Headquarters appraisal found a number of shortcomings in the Albuquerque quality assurance program to assure compliance with *minimum* DOE safety standards. At the Savannah River Plant, DOE Headquarters found in 1986 that DuPont's quality assurance program "has progressed slowly with little acceptance until the last 2 years."
- The Albuquerque Operations Office is responsible for managing almost all of the DOE's sensitive weapons facilities. DOE Headquarters in June 1985 found numerous safety problems throughout the Albuquerque complex. In the area of quality assurance, the appraisal found ". . . shortcomings in the level of implementation and the degree of surveillance to assure compliance." The report concluded:

  (1) that Albuquerque's performance of appraisals of its contractors has deteriorated, particularly in the areas of health physics and nuclear facility safety;
  (2) that there has been a reduction in the number and quality of the contractors' internal appraisals; and
  (3) that Albuquerque and its contractors are not properly following the departmental procedures for training and certifying nuclear operators, and for keeping them current by retraining and recertifying them.

- An audit at Hanford in January 1987 of the PUREX facility, where highly hazardous operations involving nuclear materials are performed, found major problems with the calibration of vital instruments. The auditor wrote, "PUREX QA [quality assurance] has failed to . . . require corrective action in response to deficient calibration practices. . . . [T]here is not evidence of any surveillance activity that verifies instrument calibration procedure compliance at PUREX after October 1984." Without proper calibration of critical instruments, it is impossible to know how the plant is operating. Such lapses could result in a major accident.
- The DOE has permitted the DuPont Company contractor to ignore many of its important safety regulations. This has resulted in serious incidents. In January 1989, for example, a water pressure test at the Savannah River's K Reactor damaged several valves and piping and possibly other equipment. In a letter to a senior DuPont director, the DOE Savannah River Manager concluded, "An initial assessment of the event indicates at least the following concerns: improper response to

LEGAL NOTICE

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE BUREAU
Santa Fe, New Mexico 87503

PUBLIC NOTICE NO. 28 May 10, 1989

NOTICE OF INTENT TO GRANT A PERMIT FOR THE OPERATION OF A HAZARDOUS WASTE TREATMENT AND STORAGE FACILITY

The State of New Mexico is authorized to operate a hazardous waste management program in lieu of the Federal program for those portions of the Resource Conservation and Recovery Act (RCRA) in effect prior to the enactment of the Hazardous and Solid Waste Amendments of 1984 (HSWA). The HSWA impose additional requirements on hazardous waste management facilities which will be administered and enforced by the U.S. Environmental Protection Agency until the State of New Mexico receives additional authorization for these requirements.

Under authority of RCRA, the Environmental Improvement Division (EID) of the New Mexico Health and Environment Department and the U.S. Environmental Protection Agency (EPA) Region VI, propose to issue a final permit to Los Alamos National Laboratory, Los Alamos, New Mexico 87545, for the storage, incineration, and chemical treatment of hazardous waste. The EID permit is to be issued under authority of the New Mexico Hazardous Waste Act (§ 74-4-1 *et. seq.*, NMSA 1978, as amended 1989) and the EPA permit under the authority of the Hazardous and Solid Waste Amendments of 1984. The facility has been assigned EPA identification number NM0890010515.

The proposed EID permit contains conditions for the storage in tanks and containers, chemical treatment to reduce the hazardous nature and incineration to destroy hazardous wastes. The EPA permit will address the investigation and, if necessary, the cleanup of past spills and disposal sites as well as other HSWA regulations.

The draft proposed permits and the administrative records may be reviewed at either the E.I.D. Central Office library at the Harold Runnels Building, 1190 St. Francis Drive, Santa Fe, New Mexico; the Espanola public library, 314A Onate N.W., Espanola, New Mexico; or the EPA library, 1445 Ross Avenue, Dallas, Texas. To obtain a copy of the administrative record or any part thereof, at 35 cents per page, please contact Mr. Crossman at the address below, or call (505) 827-2923.

The addresses of the E.I.D. and EPA representatives for either reviewing or obtaining a copy of the administrative record or any part thereof, or for commenting or public participation, are:

Mr. C. Kelley Crossman
Supervisor
Hazardous Waste Bureau (EID)
1190 St. Francis Drive
Santa Fe, New Mexico 87503

Mr. Bill Honker, Chief,
RCRA Permits Branch
U.S. EPA Region VI
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

L-1D
EXHIBIT
NO. 1

Any person, including the applicant, who wishes to comment on the decision to issue a permit may do so by submitting comments, along with the commentor's name and address, to both addressees above. All written comments submitted on the decision to issue the permit must be received by the EID not later than July 7, 1989, to be considered in formulating a final decision.

Any person, including the applicant, who wishes to request a public hearing concerning the proposed action(s), may do so by submitting a written request to both addressees above. Any request for a hearing shall state the nature of the issues proposed to be raised in the hearing. All requests must include the requestor's name and address. Requests for a hearing must be received by June 9, 1989, to be considered. A public hearing is scheduled for 9:00AM on June 13, 1989 in Apodaca Hall of the PERA Building, Old Santa Fe Trail at Paseo de Peralta, Santa Fe, NM. If insufficient requests for a public hearing are received by June 9, 1989, the EID reserves the right to cancel the scheduled hearing.

All written comments submitted on the proposed plan or permit will be considered in formulating a final decision. EID and/or EPA may modify the draft permit(s) based on the comments received. The EID will notify LANL, and each person who submitted a written comment during the public comment period, of the final decision or of any other public hearing which may be scheduled.

If, after consideration of all written comments, this proposed action becomes the final decision, the EID and the EPA will each issue the laboratory an operating permit. These permits will govern the handling and treatment of regulated hazardous wastes at the laboratory.

This notice satisfies the requirements of the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901, *et. seq.* and 40 CFR 124.10. The final permit, if issued by the EPA, will implement the requirements of the HSWA, amending the Federal Solid Waste Disposal Act, as amended. The State of New Mexico and the EPA have entered into a joint permitting agreement whereby RCRA permits may be issued in the State, in accordance with the Hazardous Waste Management Regulations of the State of New Mexico and the HSWA, until the State receives interim or final authorization under RCRA to administer the requirements of HSWA. In order for the applicant to have a fully effective RCRA permit, both the New Mexico EID and the EPA must issue a permit. EPA may participate in any public hearing if one is held.

LEGAL NOTICE

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE BUREAU
Santa Fe, New Mexico 87503

PUBLIC NOTICE NO. 29 June 11, 1989

NOTICE OF INTENT TO GRANT A PERMIT FOR THE OPERATION OF A HAZARDOUS WASTE TREATMENT AND STORAGE FACILITY
SECOND NOTICE

The State of New Mexico is authorized to operate a hazardous waste management program in lieu of the Federal program for those portions of the Resource Conservation and Recovery Act (RCRA) in effect prior to the enactment of the Hazardous and Solid Waste Amendments of 1984 (HSWA). The HSWA impose additional requirements on hazardous waste management facilities which will be administered and enforced by the U.S. Environmental Protection Agency until the State of New Mexico receives additional authorization for these requirements.

Under authority of RCRA, the Environmental Improvement Division (EID) of the New Mexico Health and Environment Department and the U.S. Environmental Protection Agency (EPA) Region VI, propose to issue a final permit to Los Alamos National Laboratory, Los Alamos, New Mexico 87545, for the storage, incineration, and chemical treatment of hazardous waste. The EID permit is to be issued under authority of the New Mexico Hazardous Waste Act (§ 74-4-1 *et. seq.*, NMSA 1978, as amended 1989) and the EPA permit under the authority of the Hazardous and Solid Waste Amendments of 1984. The facility has been assigned EPA identification number NM0890010515.

The proposed EID permit contains conditions for the nonradioactive hazardous waste storage in tanks and containers, chemical treatment to reduce the hazardous nature and incineration to destroy hazardous wastes. The EPA permit will address the investigation and, if necessary, the cleanup of past spills and disposal sites as well as other HSWA regulations. Radioactive mixed wastes subject to regulation under the Resource Conservation and Recovery Act will be addressed at a later date.

The draft proposed permits and the administrative records may be reviewed at either the E.I.D. Central Office library at the Harold Runnels Building, 1190 St. Francis Drive, Santa Fe, New Mexico; the Espanola public library, 314A Onate N.W., Espanola, New Mexico; or the EPA library, 1445 Ross Avenue, Dallas, Texas. To obtain a copy of the administrative record or any part thereof, at 35 cents per page, please contact Mr. Crossman at the address below, or call (505) 827-2923.

The addresses of the E.I.D. and EPA representatives for either reviewing or obtaining a copy of the administrative record or any part thereof, or for commenting or public participation, are:

Mr. C. Kelley Crossman
Supervisor

Mr. Bill Honker, Chief,
RCRA Permits Branch

EID
EXHIBIT
NO. 2

Hazardous Waste Bureau (EID)
1190 St. Francis Drive
Santa Fe, New Mexico 87503

U.S. EPA Region VI
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Any person, including the applicant, who wishes to comment on the decision to issue a permit may do so by submitting comments, along with the commentor's name and address, to both addressees above. All written comments submitted on the decision to issue the permit must be received by the EID not later than July 18, 1989, to be considered in formulating a final decision.

A public hearing is scheduled for 9:00AM on July 18, 1989 in the auditorium of the Harold Runnels Building, 1190 St Francis Drive, Santa Fe, NM. These are a new date and location which supersede those given in EID legal notice 28 dated May 10, 1989. Any person, including the applicant, who wishes to present information for the record at the public hearing or to speak on the proposed action(s), may do so by submitting a written request to both addressees above. Any request to speak at the hearing shall state the nature of the issues proposed to be raised. All comments should include the requestor's name and address.

All written comments submitted on the proposed plan or permit will be considered in formulating a final decision. EID and/or EPA may modify the draft permit(s) based on the comments received. The EID will notify LANL, and each person who submitted a written comment during the public comment period, of the final decision or of any other public hearing which may be scheduled.

If, after consideration of all written comments, this proposed action becomes the final decision, the EID and the EPA will each issue the laboratory an operating permit. These permits will govern the handling and treatment of regulated hazardous wastes at the laboratory.

This notice satisfies the requirements of the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901, *et. seq.* and 40 CFR 124.10. The final permit, if issued by the EPA, will implement the requirements of the HSWA, amending the Federal Solid Waste Disposal Act, as amended. The State of New Mexico and the EPA have entered into a joint permitting agreement whereby RCRA permits may be issued in the State, in accordance with the Hazardous Waste Management Regulations of the State of New Mexico and the HSWA, until the State receives interim or final authorization under RCRA to administer the requirements of HSWA. In order for the applicant to have a fully effective RCRA permit, both the New Mexico EID and the EPA must issue a permit. EPA may participate in any public hearing if one is held.

EID Exhibit #3
is the draft permit
and is in a separate
binder.

RCRA TRIAL BURN PLAN
FOR A MODULAR INCINERATOR
AT THE LOS ALAMOS NATIONAL LABORATORY
IN LOS ALAMOS, NEW MEXICO

Revision 1.0

OCTOBER 1985

89-038

NEW MEXICO HEALTH AND ENVIRONMENT DEPARTMENT

HED NEWS

OFFICE OF PUBLIC INFORMATION
1190 St. Francis Drive
Santa Fe, New Mexico 87503
(505)827-2618

EID EXHIBIT NO. 4

FOR IMMEDIATE RELEASE
MAY 19, 1989

CONTACT: C. Kelley Crossman
827-2923

SANTA FE, NM-- The Environmental Improvement Division of the New Mexico Health and Environment Department is seeking public comment on a draft hazardous waste permit for Los Alamos National Laboratory (LANL).

The draft permit details the requirements for storage and treatment of hazardous wastes generated through LANL operations. The public may review the draft plan at the Harold Runnels Building library, 1190 St. Francis Drive in Santa Fe, or the Espanola Public Library, 314A Onate, NW.

According to C. Kelley Crossman of EID's Hazardous Waste Bureau, LANL generates large quantities of waste solvents and chemicals which must be handled in accordance with strict guidelines. The draft permit specifies which chemicals may be stored while awaiting treatment, the treatment processes LANL may employ, and the conditions under which certain materials may be incinerated. Additionally, the permit will require LANL to investigate all past disposal sites and prepare clean-up plans where necessary.

Crossman said this permit does not authorize or address radioactive wastes contaminated with regulated chemicals, which are subject to a separate permit to be processed at a later date.

The public is also invited to attend a public hearing on the draft permit scheduled for June 13, 1989. The hearing will begin at 9:00 AM in the P.E.R.A. Building's Apodaca Hall, located in Santa Fe at the intersection of Paseo de Peralta and Old Santa Fe Trail.

(more)

Questions and comments regarding the draft permit may be directed to the Hazardous Waste Bureau, 1190 St. Francis Drive, Santa Fe, NM 87503. Comments must be received by July 7, 1989.

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89-043

NEW MEXICO HEALTH AND ENVIRONMENT DEPARTMENT

HED NEWS

OFFICE OF PUBLIC INFORMATION
1190 St. Francis Drive
Santa Fe, New Mexico 87503
(505)827-2618

FOR IMMEDIATE RELEASE **CONTACT: C. Kelley Crossman**
JUNE 2, 1989 **827-2923**

SANTA FE, NM-- The Environmental Improvement Division of the New Mexico Health and Environment Department has rescheduled a public hearing on a draft hazardous waste permit for Los Alamos National Laboratory (LANL) for July 18, 1989. The public hearing had originally been set for June 13, 1989.

According to EID Director Richard Mitzelfelt, the decision to reschedule the hearing was prompted by requests from citizens wishing to take part in U.S. Department of Energy hearings on WIPP scheduled for the week of June 12, 1989.

"Although the WIPP hearings and the LANL hearing are unrelated, many citizens would attend both events if given the opportunity," said Mitzelfelt.

The July 18 public hearing on the draft permit will begin at 9:00 AM in the Harold Runnels Building Auditorium located in Santa Fe at 1190 St. Francis Drive.

The draft permit details the requirements for storage and treatment of hazardous wastes generated through LANL operations. The public may review the draft plan at the Harold Runnels Building library, 1190 St. Francis Drive in Santa Fe, or the Espanola Public Library, 314A Onate, NW. A third copy of the draft plan will be available in EID's Taos Field Office through most of June and will then be moved to the Los Alamos Public Library for July.

(more)

EID
EXHIBIT
NO. 5

According to C. Kelley Crossman of EID's Hazardous Waste Bureau, LANL generates large quantities of waste solvents and chemicals which must be handled in accordance with strict guidelines. The draft permit specifies which chemicals may be stored while awaiting treatment, the treatment processes LANL may employ, and the conditions under which certain materials may be incinerated. Additionally, the permit will require LANL to investigate all past disposal sites and prepare clean-up plans where necessary.

Crossman said this permit does not authorize or address radioactive wastes contaminated with regulated chemicals, which are subject to a separate permit to be processed at a later date.

Questions and comments regarding the draft permit may be directed to the Hazardous Waste Bureau, 1190 St. Francis Drive, Santa Fe, NM 87503. Comments must be received by the close of the public hearing on July 18, 1989.

--30--

BRIEFING ON
LOS ALAMOS
NATIONAL LABORATORY
HAZARDOUS WASTE
DRAFT PERMIT

JULY 18, 1989

C. KELLEY CROSSMAN

RCRA PERMIT WRITER (EID)

RCRA

RESOURCE CONSERVATION AND RECOVERY ACT

PL 94 -- 580

OCTOBER 21, 1976

HSWA

HAZARDOUS

AND

SOLID

WASTE

AMENDMENTS

NOVEMBER 8, 1984

NEW MEXICO
HAZARDOUS WASTE ACT

CHAPTER 74
NEW MEXICO STATUTES, ANNOTATED
AS AMENDED, 1989

LANL 7/89-4

40 CFR

CODE OF

FEDERAL

REGULATIONS

TITLE 40

PARTS

260 -- 271

EFFECTIVE DATE

NOVEMBER 19, 1980

LANL 7/89-5

HWMR -- 5

NEW MEXICO

HAZARDOUS WASTE

MANAGEMENT REGULATIONS

FIFTH EDITION

LANL 7/89-6

RESOURCE CONSERVATION AND RECOVERY ACT

PERMITTING ACTIONS

TREATMENT

STORAGE

DISPOSAL

LANL 7/89-7

SUBMIT APPLICATION INFORMATION

PART A -- FORMS

PART B -- DETAILS

DRAFT PERMIT PREPARED

DISTRIBUTION

EPA REGION 6

LOS ALAMOS NATIONAL LABORATORY

EID HEADQUARTERS

ESPANOLA LIBRARY

EID TAOS OFFICE

LOS ALAMOS LIBRARY

PUBLIC NOTICE

NEWSPAPER

RADIO

MAILING LIST

PUBLIC COMMENT PERIOD

45 DAYS MINIMUM

PUBLIC

APPLICANT

EPA

PUBLIC HEARING

DIRECTED BY EID

ADDRESS PERMIT CONDITIONS

SUBMIT DATA, VIEWS OR ARGUMENTS

ALL PUBLIC INPUTS ADDRESSED

EVALUATE AND CONSIDER COMMENTS

MAKE CHANGES AS APPROPRIATE

WRITTEN RESPONSE TO COMMENTS

REDRAFT PERMIT AS APPROPRIATE

ISSUE OR DENY PERMIT

THE PERMIT BECOMES THE
FACILITY OPERATING RULES

DIRECTOR'S DECISION MAY BE APPEALED TO
THE ENVIRONMENTAL IMPROVEMENT BOARD

LANL PRESENT STATUS

LONG TERM STORAGE

CHEMICAL TREATMENT

INCINERATE CHEMICAL WASTES

INCINERATE EXPLOSIVE WASTES

INCINERATE MIXED WASTES

BURN WASTE EXPLOSIVES

L A N L

PROPOSED

HAZARDOUS WASTE

PERMIT

APPLICATION DATE

MAY 1, 1985

LAST REVISED

NOVEMBER 1987

MODULE I

STANDARD CONDITIONS

LEGAL STATUS

REVIEW

SEVERABILITY

DUTIES

DEFINITIONS

MODULE II

GENERAL FACILITY CONDITIONS

FACILITY DESIGN

WASTE ANALYSIS

SECURITY

INSPECTION

TRAINING

PREPAREDNESS

RECORDS

REPORTS

CLOSURE

MODULE III

CONTAINER STORAGE

SPECIFY SITE

SPECIFY WASTES

SPECIFY CAPACITY

SPECIFY CONTAINERS

SPECIFY CLOSURE PLAN

MODULE IV

TREATMENT TANKS

SPECIFY UNITS

SPECIFY WASTES

SPECIFY CAPACITY

SPECIFY TREATMENT

SPECIFY CLOSURE PLAN

MODULE V

CONTROLLED AIR INCINERATOR

SPECIFY UNIT

SPECIFY WASTES

SPECIFY OPERATION

- WASTE FEED RATES
- AIR FLOW RATES
- TEMPERATURES
- OXYGEN LEVELS

SPECIFY CLOSURE PLAN

MODULE V

CONTROLLED AIR INCINERATOR (CONTINUED)

DUAL FIRE BOX
- TEMPERATURE CONTROL
- AIRFLOW CONTROL
- WASTE FEED RATE CONTROL

EXHAUST SCRUBBER SYSTEM
- QUENCH COLUMN
- VENTURI PARTICULATE FILTER
- WET SCRUBBER
- HIGH EFFICIENCY FILTERS
- CARBON ABSORBER COLUMN
- HIGH EFFICIENCY FILTERS

PURPOSE
- DESTROY WASTES
- REDUCE VOLUME

INCINERATOR STANDARDS (HWMR-5)

DESTRUCTION EFFICIENCY

99.99%

99.9999%

HYDROCHLORIC ACID REMOVAL

99%

PARTICULATE EMISSIONS

180 miligrams per cubic meter

MODULE VI

STORAGE TANKS

SPECIFY UNITS

SPECIFY WASTES

SPECIFY CAPACITY

SPECIFY CLOSURE PLAN

MODULE VII

INDUSTRIAL INCINERATOR

SPECIFY UNIT

SPECIFY WASTES

SPECIFY ANALYSIS

SPECIFY RECORDS

SPECIFY CLOSURE PLAN

PERMIT ATTACHMENTS

WASTE ANALYSIS PLAN

INSPECTION PLAN

TRAINING PLAN

CONTINGENCY PLANS

CLOSURE PLANS

AUTHORIZED WASTE LIST

OPERATING PROCEDURES

COMPLIANCE SCHEDULE

REGULATIONS

EXHIBIT
NO. 7

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EID EXHIBIT NO! 8

EID JULY 19, 1999 STATEMENT RESPONDING TO PARTICULAR CONCERNS EXPRESSED BY MEMBERS OF THE PUBLIC REGARDING THE LANL MIXED WASTE INCINERATOR

EID has received many comments from the public concerning this draft permit. Regrettably, the laws and regulations that govern a facility as large as LANL are very complex. Several of the comments received by EID reflect that complexity. As important, the comments reflect concerns some members of the public have regarding operation of the mixed waste incinerator. In order to better inform the public of the applicable laws and regulations and to better address the public's concerns, EID has developed a statement to explain what this draft permit can and cannot do regarding the mixed waste incinerator.

THIS DRAFT PERMIT CAN ONLY REGULATE CHEMICAL WASTE IT CANNOT REGULATE RADIOACTIVE WASTE

The federal Atomic Energy Act of 1954 (AEA), authorized the United States Department of Energy ("DOE") to develop and effectuate its own regulations controlling DOE's management of its own radioactive wastes. Other statutes may impose additional requirements on radioactive material handling. This permit action is under the State Hazardous Waste Act. The State Hazardous Waste Act does not regulate radioactive waste in any way. The Hazardous Waste Act only applies to wastes that meet the legal definition of "hazardous waste," and these are basically chemical wastes. The Hazardous Waste Act cannot be applied to source, special nuclear or byproduct radioactive wastes. Thus, EID does not have the authority through its Hazardous Waste Program, and through this or any other hazardous waste management permit, to regulate radioactive waste. This draft permit is a permit that only regulates chemical hazardous waste. It does not and can not regulate radioactive waste.

"MIXED WASTE" REGULATION

When a waste has both chemical and radioactive components, it is called a "mixed waste." Because of the chemical component of mixed waste, the Hazardous Waste Act does apply to mixed waste. It only applies to the chemical part of mixed waste, however. The Hazardous Waste Act does not apply to the radioactive part. DOE regulates the radioactive part, pursuant to the Atomic Energy Act.

STATE AUTHORITY TO ENFORCE THE FEDERAL STATUTE, RCRA

This draft permit is a hazardous waste management permit administered by EID's Hazardous Waste Bureau. EID's legal authority to issue this permit under State law is the Hazardous Waste Act. Ultimately, however, EID's legal authority to issue this permit comes from the federal hazardous waste management statute, named the Resource Conservation and Recovery Act ("RCRA"). Under RCRA, the federal government, through the United States Environmental Protection Agency ("EPA"), gives specific authorizations to a state to enforce certain parts of RCRA. The state then enforces those parts of RCRA in the state instead of EPA.

New Mexico is an "authorized state," that is, New Mexico is authorized by EPA to enforce certain parts of RCRA in New Mexico instead of EPA. This draft permit is a RCRA permit, prepared by EID's Hazardous Waste Program staff to address only those specific parts of RCRA that EPA has authorized New Mexico to enforce. Because Congress has added requirements to RCRA in stages through amendments, EPA is requiring states to submit their requests for authorization in stages. Thus, New Mexico is authorized by EPA to enforce some RCRA provisions, but not other RCRA provisions.

NEW MEXICO DOES NOT HAVE RCRA AUTHORIZATION TO REGULATE THE CHEMICAL PART OF MIXED WASTE

New Mexico is not yet authorized by EPA to regulated the chemical part of mixed waste through its RCRA hazardous waste management program. New Mexico is in the process of applying to EPA for authorization, however.

THIS DRAFT PERMIT IS A RCRA PERMIT

Because New Mexico is not authorized by EPA to regulated the chemical part of mixed waste through its RCRA program, this draft RCRA permit does not authorize LANL to incinerate the chemical part of mixed waste. This draft permit only authorizes the incineration of purely chemical waste in the incinerator.

In order to get a RCRA permit to incinerate mixed waste, LANL will need to develop a mixed waste permit application, and submit it to EID. EID expects LANL to submit this application in the late fall of 1989. The EID Hazardous Waste Program staff will review the

application. After EID has been authorized by EPA to regulate the chemical part of mixed waste under the RCRA hazardous waste program, EID will draft a proposed RCRA permit based on the LANL application, and submit it to the public for public comment, just as this draft permit has been submitted to the public for public comment.

RCRA "INTERIM STATUS"

"Interim status" gives temporary authorization to certain facilities to continue their hazardous waste management activities until their applications for final permits can be acted on. RCRA gave this interim status to facilities that were in existence on a certain date and which complied with certain notification requirements. Operations under interim status are regulated by regulations designed for this interim status.

THE LANL INCINERATOR HAS RCRA "INTERIM STATUS"

The LANL incinerator has RCRA "interim status" and is thus authorized to burn chemical waste without a final hazardous waste RCRA permit. This is true for both purely chemical waste and for mixed waste. The temporary permission to burn purely chemical waste will end when EID takes final action on this draft RCRA permit. Then, burning of purely chemical waste will be allowed only pursuant to the permit. The temporary permission to burn the chemical part of mixed waste will end when EID takes final action on a RCRA permit addressing that waste, which EID will not do until after EPA authorizes EID to do so. Then, burning of the chemical part of mixed waste will be allowed only pursuant to that permit.

SUMMARY

Thus, this draft permit does not authorize LANL to incinerate mixed waste, that is, chemically hazardous waste that is mixed with radioactive waste. The draft permit only proposes to authorize the incineration of strictly chemical hazardous waste, and then only under the permit's specified conditions. EID will at a later date propose a draft hazardous waste permit to regulate the incineration of the chemical part of mixed waste. No RCRA hazardous waste permit can regulate radioactive waste.

INDEPENDENT STATE HAZARDOUS WASTE ACT AUTHORITY TO REGULATE RCRA

INTERIM STATUS FACILITIES

EID has two sources of authority under the Hazardous Waste Act. First, EID is authorized to enforce whatever portions of RCRA that EPA has expressly authorized the State to enforce. Second, EID is authorized to enforce all provisions of the Hazardous Waste Act, even if some particular provision has not yet been approved by EPA as part of RCRA authorization. In this second case, EID is acting on solely state authority; it is not acting pursuant to its federal RCRA authority. EID has used this state authority in the past, to deny LANL's request to begin construction of a new mixed waste incinerator until after review and approval of the construction phase.

Interim Status Regulations

Under the Hazardous Waste Act, the incinerator, in so far as it burns mixed waste, has "interim status." It has interim status under both the State's federal RCRA program, and the independent state authority. That means that it has a temporary permit to operate until a final permit, such as this one presently under consideration for purely chemical waste, is considered. In the interim, it is regulated under the regulations designed for the interim period, and not under the regulations designed for final permits.

There are no specific regulations applicable to interim status under either state or federal law addressing the chemical part of mixed waste. EPA intends at this time to regulate all chemical wastes under the same set of regulations.

EID's Hazardous Waste Bureau did not develop any interim regulations independent of those required for the federal RCRA program. EID did not develop interim regulations specifically governing the chemical part of mixed waste under its state authority for several reasons. First, the Hazardous Waste Act prohibits the State from regulating hazardous waste more strictly than RCRA does. EID could not develop regulations covering the chemical part of mixed waste until RCRA covered the chemical part of mixed waste. EPA did not clearly add the chemical part of mixed waste to its RCRA program until July 3, 1986. EID could not have begun the process of promulgating such regulations until after that date.

Second, the process of promulgating regulations is very resource intensive, and EID's Hazardous Waste Program has extremely limited resources. EPA funds 75% of the program and requires that those

monies go only into RCRA-related activities. The remaining 25% is paid out of state monies that are the State's required "match" for getting the EPA grant monies. Thus, the Hazardous Waste Program's budget is restricted to federally-authorized RCRA activities. The program has developed other, extensive regulatory, and statutory, changes in the interim in order to maintain current, and seek new, RCRA authorization. In addition to regulation development, the program must meet inspection, enforcement, and permit commitments to EPA for purposes of maintaining RCRA authorization. There simply have not been enough resources to do everything that EID would like to do, and it chose not to develop interim regulations applying to the chemical part of mixed waste. An important goal of RCRA and the Hazardous Waste Act is to get facilities operating pursuant to permits instead of under interim status. Therefore, developing regulations governing interim status facilities uses the Hazardous Waste Bureau's limited resources less well than developing regulations applying to final permits.

Final Permit Regulations

EPA has indicated that it does not intend to promulgate any final permit regulations specific to the chemical part of mixed waste. EPA has apparently determined that the present regulations governing permits are sufficient to protect the public health and the environment from the chemical part of mixed waste. The State has adopted these regulations.

Thus, EPA will not require EID to develop any additional regulations governing permits specific to the chemical part of mixed waste in order for EID to get and maintain RCRA authorization for the chemical part of mixed waste.

EID is authorized by the Hazardous Waste Act to develop additional regulations applicable to permits dealing with the chemical part of mixed waste. However, under the Hazardous Waste Act prohibition, such regulations could not be stricter than whatever RCRA requires through permits dealing with the chemical part of mixed waste. EID is not presently considering developing any such regulations, but welcomes the public's input on whether EID should.

AIR QUALITY REGULATIONS

Some members of the public have expressed their concern that State or federal air quality requirements may not adequately regulate the incineration of the radioactive part of mixed waste. As previously stated, this draft RCRA permit does not cover any mixed waste

incineration; it is limited to purely chemical waste incineration. Further, no RCRA permit could regulate the radioactive part of mixed waste. The incinerator has interim status that allows it to operate without a final RCRA permit. Operation of the incinerator must also comply with any other applicable laws and regulations, however. Thus, the incinerator will not be allowed to operate if it has failed to satisfy the legal requirements of other relevant state and/or federal programs.

Regarding Air Quality Regulation

EID's Air Quality Bureau reviewed the operation of this incinerator in 1988 and determined that a state air quality permit is not required, because the predicted emissions were below thresholds that require a permit. Under new State toxic air pollutant requirements, effective December, 31, 1988, this incinerator is an "existing source" and therefore is not subject to the new air regulations. Data concerning the incinerator are being collected, however.

EID has the authority under the State Air Quality Control Act to regulate the radioactive emissions from this incinerator, but does not have any implementing regulations to do so at this time. EPA enforces other air quality programs in the State. The radionuclide emissions from this incinerator have been reviewed by EPA Region VI for compliance with the regulations that govern (40 CFR Part 61, Subpart H) radionuclide emissions from DOE facilities, under the federal Clean Air Act. EPA reviewed the emissions from the existing incinerator in November 1988, as part of reviewing LANL's application for a new proposed mixed waste incinerator.

EID expects to develop new air quality regulations for incineration, that will include radionuclide emission limits at the stack as opposed to the fence line. Under EID's current schedule for the development of such regulations, a public hearing on the proposed regulations is expected next spring. In the interim, the Air Quality Bureau will be developing and taking to hearing regulations governing municipal and medical waste incineration.

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
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NO. 9

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Teresa Sheehan	2604 Via Bellanda Santa Fe, N.M. 87505
ARTHUR CLARK	709B Vieneta Dr, S.F. 87501
DAVID CUNNINGHAM	BOX 8307 SANTA FE NM 87504
VANCE HOLMES	1710 LENA ST SANTA FE N.M. 87501
Howard Shulman	PO Box 8302 SF NM 87504
John DeVito	RT-10, Box 144, Santa Fe, N.M. 8754
Spence Leighton	3024 Plaza Blanca S.F. 87505
K Pilnock	FIVE OAKS, LAMY, NM 87540

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

MAILING LIST SIGNUP SHEET

Please add my name to the mailing list: **PLEASE PRINT CLEARLY**

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STEVEN SIEGMAN	605 GALISTEO-FRONT SF 875
Peder [illegible]	787 CAMINO SANTA MARIA S.F. 8750
Joan Cavanagh	POB 15967 Santa Fe, N. M. 87506
Mary Wickstrom	1225 Declovina SF NM 8750
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Nancy Kleinbord	1526 Cochiti St., Santa Fe 875
Margaret F. McDowell	226 So. 7th St FERNANDINA, 32034
Audrey Goddard	POBox 1 LLANO NEW MEXICO 87545

A

8 of 8

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

MAILING LIST SIGNUP SHEET

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Richard O Yumbe	PO # 30 Chamisal NM 87522
Diego S. Bernal	P.O. Box 175, El Rancho, NM 875
CASEY & KRISTIN RYAN	38 APACHE RIDGE ROAD SANTA FE NM 8750

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NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

MAILING LIST SIGNUP SHEET

Please add my name to the mailing list: **PLEASE PRINT CLEARLY**

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Pam Lytle	P.O. Box 29 LLANO, N.M. 87
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R. KENNEDY	PO BOX 216 VELARDE NM 87532
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Jo Giddens	PO Box 9545, Santa Fe, NM 8750
Dana Patrie	Rt 7 Box 124 R SF NM 87505
Sandi Evans Los Alamos Monitor	Box 1268, Los Alam 8754
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Dr Robert C. March	PO Box 932 SFe, NM 87504
CRAIG FREDRICKSON	2742 VERANDA RD NW ABQ, NM 87107

B

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

MAILING LIST SIGNUP SHEET

Please add my name to the mailing list: **PLEASE PRINT CLEARLY**

NAME	ADDRESS
Katherine M. Lage	GEN. DEL. LLANO NM 87543

3 of 8

B

EID

11

PR. Presented
AB - Absent

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

WITNESS SIGNUP SHEET

I wish to speak at this public hearing:

	NAME		NAME
PR.	1) Dr Robert Morey	13)	~~Silvia Solomon~~
PR	2) Richard Dayo DeYO HANSON	14)	Katherine Pettus ~~Dorothy Hansen~~
PR	3) Bradley Hansen	15)	~~Diane S. Bernal~~
Absent	4) Sharon Rawlins Bauch	16)	Martina Hollinger
	5) Edward Zuhlman	17)	Joan Cavanagh
P.R.	6) PAUL ROBINSON	18)	ARTHUR SILVERS
	7) Jacquelyn Buchanan	19)	TAJ AMEERA
	8) Sondra Spies	PR 20)	Bonnie Bonneau
	9) Cinda Flak	21)	Wayne Wisor
P.R.	10) Nancy Tibbetts	PR 22)	James Holmes
	11) Barbara Bischoff	23)	Robert W. Higginson
	12) DAVID BATES	24)	GROVE BURNETT GROVE BURNETT

A

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

WITNESS SIGNUP SHEET

I wish to speak at this public hearing:

	NAME		NAME
20	Joni Arends	P.R.	Sheena Cameron
PR 21	CRAIG ANDERSON	32	SUSAN GRAB
22	MICHAEL HORAN PO BOX 2062, TAOS 87571	33	KATHERINE PETTUS.
23	Mary Lou COOK	34	JONAS RANA
24	~~Dr Charles Glendening~~	35	DANIEL CWSIANY
25	~~Dan Balduini~~	36	Elizabeth Bellups
26	Ruth Rosen (wef league of women 12	37	Brian McCarthy
27	myrth RESON	38	AVRIL FOGDEN
28	Lonelda Lyons	39	
29	Ryan Ross	40	Norah Pierce
PR. 30	Dr Robert C. March	41	Stan Walters
PR. 31	Paula Gratton	42	James Tijan (TIRJAN)

A

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

WITNESS SIGNUP SHEET

I wish to speak at this public hearing:

NAME	NAME
P.R. 1) Hugh Jennings	P.R. 13) [illegible]
P.R. 2) Mary G. P. Hall	14)
3) Herman Barickman	15)
4) [illegible]	16)
5) Katherine Lage	17)
6) [illegible]	18)
7) Michael Horan	19)
8) Carolyn Bleakley	20)
P.R. Jean Nichols	21)
P.R. Frank Walker	22)
P.R. [illegible]	23)
P.R. [illegible]	24)

B

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

WITNESS SIGNUP SHEET

I wish to speak at this public hearing:

NAME	NAME
David Trujillo	
~~Olivia Tsosie~~	
VANCE HOLMES	
Liz Rondol.	
Noah Person	
~~Paula Sisto~~	
~~Sheena Cameron~~	
Maureen Havey	
Katherine Lage	
P.R. SUSAN Wilson	

Start of Day 2

A

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEARING ON LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE DRAFT PERMIT
JULY 18, 1989

WITNESS SIGNUP SHEET

I wish to speak at this public hearing:

NAME	NAME
1) Richard P. Moore (Alb.)	61)
2) Sen. TOM RUTHERFORD	62)
31)	63)
32)	64)
33)	65)
34)	66)
35)	67)
36)	68)
37)	69)
38)	70)
39)	71)
40)	72)

A

TESTIMONY

EID
EXHIBIT
NO. 12

KATHERINE PETTUS
JULY 18, 1989

I oppose the application for a permit to burn hazardous or radioactive waste at Los Alamos, not simply until there are regulations in place to oversee the process, but in perpetuity. Granting a permit to burn waste implies granting permission to produce waste; condoning the operation of the deadly military industrial complex whose teeth are at the vulnerable throat of our Mother the Earth.

The very fact that we, as a democratic society have allowed radioactive or hazardous waste to be generated is testimony to how much we have forgotten about our integral connection to all life on earth. In the words of Chief Seattle, written over a century ago to President Taft, "continue to soil your bed, and one day you will suffocate in your own waste."

It is our challenge, as human beings living in modern industrial society, to re-member ourselves, to re-pair the strands of the web we have so thoughtlessly mangled, and to acknowledge our dependence upon all life forms, humble and inert though they may be when compared with the arrogance of human rationality and scientific achievement. Industrial civilization is self-destructive: outwardly murderous and inwardly suicidal. Opposing the licensing of a hazardous waste incinerator is a declaration of faith in the life force and in the power of ordinary citizens to guide our society toward a more sustainable and healthful path.

Forty thousand children die every day of hunger and preventable disease in the world; the translation of hunger and preventable disease is wasted resources. Resources such as those in Los Alamos, appropriated for the benefit of a handful of the privileged, converted into murder weapons and the byproducts discharged into the atmosphere to slowly poison our miraculous planet.

It is time to radically change our priorities. What is now spoken of in the highest circles as "the environmental problem" is indeed a global catastrophe, and one that demands urgent action at the international level. But the sources of the problem are local, and often individual, and stem from our attitudes to production, consumption and waste. We can begin to solve the global environmental problem right here at home, in Northern New Mexico, by immediately halting the production of hazardous substances, and converting the Los Alamos Laboratories into a research and development center for clean, cheap sources of energy. I want to thank all of you who came to speak on behalf of my three children, and the seven future generations of whom we must think before taking any action such as the one under consideration today.

Table 3-2.—Some Commercial Sources of Solvent Recovery Equipment[a]

Carbon adsorption:

AMCEC Corp. (Oak Brook, IL): Custom designed and packaged systems. A new process reduces desorption stream requirements from the conventional 3 or 4 lb steam/lb of solvent to 2 lb steam/lb of solvent recovered, or less.

Dedert Corp. (Olympia Fields, IL): Equipment and systems feature new technology to reduce energy consumption to less than 1 lb of steam/lb of solvent recovered for large-scale operations. Investment recovered quickly, often in less than 24 months.

Hoyt Manufacturing Corp. (Westport, MA): Can recover 85 to 95 percent of solvent with payback in less than 1 year.

Met-Pro Corp. (Systems Division, Harleysville, PA): Either granular or fiber carbon used.

Ray Solv, Inc. (Piscataway, NJ): Regeneration of carbon achieved by purging the adsorber with an inert gas in new system. This can reduce cost by 50 percent and energy requirements by 35 percent over conventional systems. Steam desorption system offers recovery efficiencies of 99 percent.

Vara International, Inc. (Vero Beach, FL): Uses pelletized carbon bed and automatically controlled systems.

Distillation/condensation:

Edwards Engineering Corp. (Pompton Plains, NJ): System based on direct condensation by refrigeration. Vapors are passed over cold condensing surfaces where solvent vapors condense and are collected as a liquid and returned to product storage.

Finish Engineering Co. (Erie, PA): Features one button operation and no operator requirement.

Hoyt Manufacturing Corp. (Westport, MA): Distillation system recovery efficiency of 98 percent; completely automatic, continuous process.

Recyclene Products, Inc. (South San Francisco, CA): Small volume (5 gal) distillation recovery system available.

Distillation/condensation (continued):

Pope Scientific, Inc. (Menomonee, WI): Uses a vacuum distillation process. Capacity of up to 200 gal/day.

Sauk Valley Equipment Co. (Rock Falls, IL): Can distill 15 gal/shift at a cost of 4 to 10 cents/gal.

Progressive Recovery, Inc. (Columbia, IL): Distills all common solvents up to a boiling point of 500° F with vacuum assist at a cost of 5 to 8 cents/gal.

pbr Industries (West Babylon, NY): Two portable batch sizes (5 and 14 gal) recycle 90 percent of solvent (acceptable feed includes paint thinners, aromatic hydrocarbons, chlorinated solvents) automatically in a few hours. No pressure valve; costs less than 5 cents/gal. Special additive allows sludge reclamation and production of low-cost rubberized undercoating or gravel guard.

Scrubbers, other methods, or operating principle not known:

Cailcote (Berea, OH): Scrubber uses a proprietary high boiling point organic liquid that is regenerated and recycled. Stripper column has a fractionation section and a condenser. Process is continuous.

Tri-mer Corp. (Owosso, MI): A wet scrubber system for various types of industrial sources which can be combined with other devices, such as a distillation/condensation device, for solvent recovery.

Detrex Chemical Industries (Southfield, MI): Modular approach which can be used with most chlorinated and fluorinated solvents. Many systems have paybacks of less than 1 year.

Venus Products, Inc. (Kent, WA): Systems can recover 95 percent of solvent and up to 4 barrels per shift with automatic barrel filling.

Union Carbide (Danbury, CT): Recovery efficiencies of up 99 percent in large systems which can pay for themselves in about 2 years.

[a]This table is for illustrative purposes. The appearance of a technology in this table should not be construed as a recommendation or endorsement by OTA.

SOURCE: Office of Technology Assessment, based on information supplied by companies and P.M. Cheremisinoff, *Pollution Engineering*, June 1986, pp. 26-33.

vents that are immiscible with water and when only a single solvent is being recovered. Since the carbon must be regenerated, two or more units are required to keep the operation continuous. There can be problems and costs associated with hydrochloric acid formation from chlorinated solvents, carbon bed plugging by particulates, and buildup of certain volatile organics on the carbon.

- *Distillation and condensation* are used to separate and recover the solvent from other liquids. Removal efficiency can be very high with this process. It can be used for solvent mixtures as well as single solvent streams.
- *Dissolving the solvent* in another material (i.e., scrubbing) can be used. The solvent must then be recovered from the resulting solution, for example through distillation and condensation. Efficiency of removal is often not high with this method.

Mechanical Instead of Liquid Processes

Whenever liquids are used to transfer or remove material, it may be possible to accomplish the job by a mechanical means. For example, metal beads can replace a caustic solution to remove dirt or oxide on metal parts. Some types of plating can be done mechanically rather than with traditional electroplating methods. Paint

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Laboratory Counsel/General Law

DATE: September 11, 1989
IN REPLY REFER TO: LC/GL:89-767
MAIL STOP: A187
TELEPHONE: (505) 667-3766

Mr. Walter Youngblood
New Mexico Environmental
Improvement Division
Harold Runnels Building
1190 St. Francis Drive
Santa Fe, NM 87503

Re: Correction of the Record for the Hazardous Waste Permit Hearing Held July 18, 19, and 20, 1989

Dear Mr. Youngblood:

In reviewing the record of the permit hearing, we discovered that Exhibit No. 3 of the DOE's comments submitted to the New Mexico Environmental Improvement Division during the hearing contains a copying error.

Enclosed is a correct copy of Exhibit No. 3 with all pages included in order to complete the record.

We are sorry for any inconvenience this may have caused you. If you have any questions, please do not hesitate to call Marja Shaner, Laboratory Counsel/General Law, at 667-3766.

Sincerely,

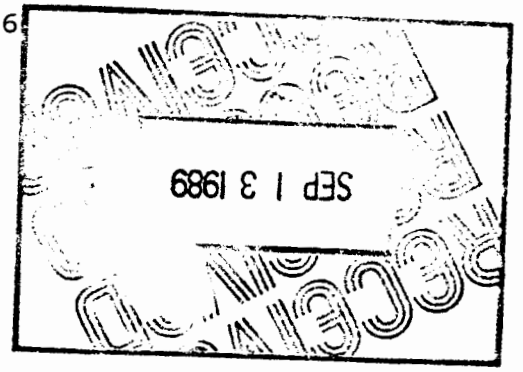
Sheila E. Brown
Staff Attorney

filed with Hearing Record exhibits

SEB:MS:jm

Enclosure: Exhibit No. 3 to DOE Comments on the Hazardous Waste Permit, submitted during July, 1989 hearing.

Cy: Joyce Laeser, DOE CNSL, w/o enc., MS A316
Ken Hargis, HSE-9, w/o enc., MS K490
Jim White, HSE-8, w/o enc., MS K490
Hazardous Waste Bureau, NMEID, w/o enc.
CRM-4 (1), w/o enc., MS A150 (1441-1452)
LC Records (1), w/o enc., MS A187
File (2)



The Fire Department personnel make regular tours of the Laboratory facilities to detect and discuss hazards associated with individual facilities and are instructed in hazardous material handling and emergency procedures. They are aware of the hazardous waste practices at the Laboratory, and are well equipped to handle any credible emergency situation.

D.2.1.7 Mason & Hanger Protective Force (Pro-Force)
The Pro-Force consists of more than 300 personnel who are responsible for Laboratory security. The security force is provided by Mason & Hanger, Silas Mason, under contract to the Laboratory.

During an emergency, the Pro-Force activities include maintenance of security, direction of traffic within the Laboratory, and control of access to the emergency site. The Pro-Force maintains the necessary equipment to perform these functions such as crowd control equipment, patrol cars, etc.

D.2.1.8 PAWS
PAWS provides a maintenance support force on contract to the Laboratory. This support force is under the Laboratory's direction in an emergency. PAWS conducts inspections of Laboratory equipment, maintains equipment, and participates in emergency cleanup.

D.2.1.9 Los Alamos County Police
In keeping with the principle of handling emergencies internally, the Los Alamos County Police have only a minimal interaction with the Laboratory in an emergency. That interaction is limited to traffic control on DOE roads with public access. The limits of interaction are included in a signed agreement, a copy of which is included as an attachment to this document. There are no agreements with other agencies.

D.2.1.10 WX and M Division Personnel
Personnel in WX and M Divisions are trained to safely handle and dispose of highly reactive materials (High Explosives). Any spill or uncontrolled release of material at the burning grounds (TA-14 and -16) or the detonation pads (TAs 14, 15, 36, and 39) will be cleaned up by personnel from these divisions. The Fire Department may be called to respond if a burn or detonation results in an uncontrolled fire.

D.2.2 Emergency Equipment
A list of emergency equipment for use at the Laboratory and the location of this equipment can be found in Table D-3. The equipment immediately available for use is located at TA-54, Area L, the TA-50 batch treatment system and modular container storage buildings, the TA-50 waste incinerator and Room 117 storage, the TA-16 incinerator, and the TA-60 storage pads.

In addition, PAWS, the Fire Department, and HSE-2 maintain emergency equipment. Major emergency facilities are shown in Figure D-4.

D.2.3 Communications
Effective emergency response at Los Alamos National Laboratory requires an efficient communication system which will integrate all personnel into the emergency response procedure.

There are two central alarm systems (CAS) at the Laboratory; an emergency CAS and a mechanical CAS. The emergency CAS is activated by:

Telephone communication (9-911)

Automatic fire alarms

Manual pull alarms

Computer interface (to warn of critical events or loss of confinement at selected facilities)

Break-in security

Radio communications

The emergency CAS is located in the central control room in Building 440 at TA-3. The control room is manned 24 hours a day and is equipped with telephones, medium and short range radios, direct line telephones, a National Warning System (NAWAS) station, and an emergency power system. The fire alarm board at the control room gives the location of automatic and pull fire alarms.

The maintenance CAS board, located in Building 223 at TA-3, is manned by PAWS personnel 24 hours a day. The maintenance CAS board interfaces with computers which monitor critical equipment throughout the Laboratory. Activation of an alarm triggers a call-out procedure to provide maintenance personnel and management supervision to correct the malfunction. The maintenance CAS does not directly trigger an emergency response.

Internal communication systems at the Laboratory include:

Centrex telephone system
Medium range radio nets (30-60 miles)
Limited range radio nets (3-10 miles)
Telephone/radio paging
Two-way hand held radios

Off-site communications with Federal, state, county and other agencies are maintained by the following:

Centrex telephone system
Private telephone lines (if Centrex fails)
Medium range radio nets (30-60 miles)
Limited range radio nets (3-10 miles)
Two National Warning System Stations (NAWAS)
Direct line to KRSN (local radio station)
Microwave telephone circuits to [illegible]

All alarm systems and internal and external communication systems are available for use by all employees.

Activation of the emergency CAS automatically alerts the Fire Department, the Mason Hanger Pro-Force, and the CAS dispatcher. For hazardous waste emergencies, the CAS dispatcher notifies the Emergency Preparedness Office Deputy Officer (EP-DO) who notifies upper management of the problem.

Alternate Emergency Control Center (ECC)

HSE-7 has access to all communications systems including a short wave radio base station located at TA-60-4. During normal working hours, communications to support response groups can be handled by HSE-7. During off hours, the EP-DO uses the CAS Dispatcher to contact support groups.

HSE-7

D.3 NONSUDDEN RELEASES

Nonsudden releases include those incidences which, if uncontrolled, impact the environment over a long period of time. Such incidences include minor leaks of containers, loss of integrity of secondary containment, incomplete treatment, and leachate migration from disposal areas.

D.3.1 Responsibility

Correction of nonsudden release shall be the responsibility of the operating group and can be handled with normal maintenance and management procedures. Correction methods for nonsudden releases that have resulted in environmental contamination shall be coordinated with the New Mexico Environmental Improvement Division (NMEID).

D.3.2 Credible Nonsudden Releases

Not all failures can be predicted. In general, the response to nonsudden release will (1) contain the release, (2) correct the cause of the release, and (3) clean up any release to a level that protects health and the environment.

D.3.3 Nonsudden Release Surveillance

In addition to routine inspection and site-specific sampling and testing, the Laboratory maintains an area-wide environmental monitoring network maintained by HSE-8. Routine monitoring for radiation, radioactive materials, and chemical substances on the Laboratory site helps to fulfill the Laboratory's policy to protect the general public, employees, and the environment.

Monitoring and sampling locations for various types of measurements are organized into three main groups. Regional monitoring stations are located within the five counties surrounding Los Alamos County. They are placed up to 80 kilometers (50 miles) from the Laboratory, and serve to determine background conditions. Perimeter stations are located within approximately four kilometers (2.5 miles) of the Laboratory boundary, and document conditions in residential areas surrounding the Laboratory. On-site stations are within the Laboratory boundary, and most are accessible only to employees during work hours.

The types of routine surveillance conducted at these stations includes radiation measurements and collection of air particulates, waters, soils, sediments, and foodstuffs for subsequent analyses.

Additional samples are collected to gain information about particular events such as major runoff events and nonroutine releases. Data are used for comparison with standards, background radiation levels, and dose calculations.

D.4 SUDDEN RELEASES

This section deals with incidents involving sudden release such as spills, fires, or explosions which pose a significant threat to human health or the environment and includes the release of hazardous materials and hazardous wastes. Hazardous materials are chemical substances that become a regulated waste as the result of the incident and can include hazardous raw materials that are spilled, products of combustion, and products of uncontrolled reactions.

D.4.1 Hazardous Waste Emergency Coordination

The [redacted] is responsible for coordinating all emergency response measures involving sudden releases of hazardous wastes with the exception of the open burning and open detonation units at TA-14, 15, 16, 36, and 39. HE waste handling is the responsibility of M and WX divisions, who have developed Standard Operating Procedures (SOPs) based on safe handling practices designed to eliminate the risk of fire and explosions. Unplanned detonation or combustion of HE renders the HE waste nonlocdc. In some cases, residuals contain barium. Cleanup of barium contaminated areas due to unplanned detonations shall be coordinated with the [redacted].

The EPGDO can be reached during working hours by contacting the Emergency Management office (7-6211) or the CAS Dispatcher during off hours (Table D-4).

The EPGDO shall respond to all incidents involving the release of hazardous wastes including spills, fires or explosions; assess the possible hazards to human health or the environment; and use whatever response group or emergency equipment needed to control and contain the wastes.

D.4.2 HWF Emergency Contingency Plan

This section defines the guideline used to initiate the HWF Emergency Contingency Plan and the resulting actions taken.

D.4.2.1 Guidelines for Implementation

The decision to implement the HWF Emergency Contingency Plan depends upon whether or not an imminent or actual incident could threaten human health or the environment. The following guidelines shall be used by the EPGDO in making the decision whether or not to institute the HWF Emergency Contingency Plan.

The HWF Emergency Contingency Plan could be implemented in the following situations involving hazardous wastes or hazardous materials:

Spills

A hazardous waste or hazardous material spill cannot be contained with secondary containment or application of absorbents.

Precipitation threatens to move spilled material off site.

A hazardous waste or hazardous material spill causes the release of flammable material creating a fire or explosion hazard.

A hazardous waste or hazardous material spill results in toxic fumes which threaten human health, or

An earthquake or other natural disaster threatens containment integrity.

Explosions

An unplanned explosion involving hazardous wastes occurred (except at TA-14, 15, 16, 36, and 39), or

An imminent danger exists that an explosion involving hazardous wastes or hazardous material could occur.

Fires

Any fire involving hazardous wastes or hazardous material (except planned burning of HE waste), or

Any building, grass, forest, nonhazardous waste fire that threatens to ignite hazardous wastes.

D.4.2.2 Emergency Notification

Immediately upon discovery of an imminent or actual incident involving hazardous wastes or hazardous materials, the EPODO will be notified first. In the case of fire involving hazardous wastes or hazardous materials, this is superseded by the Laboratory fire alarm system. A fire is reported by dialing 9-911, activation of automatic alarms, or activation of a fire pull box. All fire alarms simultaneously alert the CAS Dispatcher, the Fire Department, and the Mason and Hanger Pro-Force. For fire involving hazardous wastes, hazardous materials, or hazardous waste units, the CAS Dispatcher shall contact the EPODO (Figure D-5). Orange [illegible] signs on buildings which contain HE are a warning to fire fighters not to approach or enter the building without obtaining information from WX or M Division personnel about the nature and location of HE materials in the building.

During off hours, all incidents involving hazardous wastes or hazardous materials shall be reported to the CAS Dispatcher, who will contact the on-call EPODO.

The EPODO shall proceed to the incident and assess the nature of the problem. On an as-needed basis, the EPODO shall contact response groups directly or instruct the CAS Dispatcher to contact them or contact the HSE-Duty Officer (HSE-DO) who will notify the appropriate HSE groups. Table D-2 shows the assistance available from each emergency response group. The EPODO will use this list as criteria to determine which groups to contact in an emergency.

Each response group maintains an on-call person and/or a call-down procedure to answer emergencies.

Because the initial observer may not be able to recognize the involvement of hazardous materials, the EPODO shall be notified of any incident as described in Section D.4.1. The EPODO shall use whatever means available including the assistance of other response groups, computer data searches, and sampling to determine if a hazardous waste is generated. HSE-5 and HSE-8 have the expertise to determine the nature and extent of contamination, the chemicals involved in the incident, and the characteristics of the hazardous waste.

D.4.2.3 EPODO Actions

Upon notification of an incident, the EPODO shall:

1. Proceed directly to the site;
2. Assess the nature of the incident, and quantities and types of hazardous wastes or hazardous materials involved; and
3. Based on the guidelines in Section D.4.2.1 of the Contingency Plan, determine if implementation of the HWF Emergency Contingency Plan is warranted.

Upon the decision to implement the HWF Emergency Contingency Plan, the EPODO shall perform, in this order, the following actions:

1. Assess the hazards to human health and the environment including both direct and indirect effects such as generation of toxic, irritating, or asphyxiating gases, hazards of runoff of fire water or treatment chemicals. The EPODO will use the guidelines in Section D.4.2.1 to assess the hazards to human health and the environment. If any of the criteria under Section D.4.2.1 are met, evacuation of the immediate area will be initiated.

2. Determine if evacuation of the local area is advisable, and if so, immediately notify appropriate response groups and/or the Los Alamos County Police

3. Notify required response personnel and DOE LAAO by phone, radio, or through the CAS Dispatcher in the case of a spill or incident other than fire. In the case of fire, since the fire fighters have already responded, he shall confirm that the Fire Department Officer-in-Charge is aware of the hazardous waste or hazardous materials involvement and the special hazards associated with the wastes.

4. Warn the remaining personnel of imminent or actual hazards using the radio and/or the PA system.

5. DOE LAAO through the Emergency Management office will notify the New Mexico Environmental Improvement Division (505) 827-9329, and the National Response Center (800) 424-8802, reporting:

   - Name and telephone number of the reporter
   - Name and address of the facility
   - Time and type of incident
   - Name and quantity of materials involved, to the extent known
   - The extent of injuries, if any
   - The possible hazards to human health or the environment outside the facility

6. Advise the response groups as needed to minimize personnel exposure and expedite control; and

7. For the Batch Treatment Plant and Controlled Air Incinerator, where the emergency stops operations, HSE-7 personnel must monitor for leaks, pressure buildup, gas generation or equipment ruptures. The instruments that are monitored during shutdown and what they are monitored for are shown on Table D-5 for the Batch Treatment Plant and Table D-6 for the Incinerator

Once control of the emergency is established, the DOE shall:

1. Arrange for site cleanup
2. Provide for treating, storing, or disposing of recovered wastes, contaminated soil or contaminated surface waters
3. Provide for decontamination of equipment as needed
4. Replace and/or repair equipment as needed
5. Conduct testing as needed to verify successful cleanup

6. Within 15 days of the incident, submit to the Regional Administrator and Environmental Improvement Division the report described in Section D.1.1.

D.5 SPECIFIC EMERGENCY RESPONSE PROCEDURES FOR HAZARDOUS WASTE UNITS

The following section summarizes the guidelines for handling emergencies.

D.5.1 Chemical Spills

Hazardous wastes are handled and stored in small containers, lab packs, 55-gal. drums, and dumpster tanks. The individual volumes handled are small. Handling of hazardous materials may involve truckload quantities of material such as solvents, fuels, acids, and bases.

The general steps in handling hazardous wastes are:

Containment including spreading of absorbents or forming of temporary dikes,

Waste pickup and packaging in sound containers, and

Decontamination followed by testing to assure adequate clean-up.

The emergency preparedness procedures related to flammable organic solvent spills call for stabilization of the spilled material with the organic solvent spill kit. Other chemical spills are to be stabilized using the acid and caustic spill kits or by the addition of absorbents such as vermiculite. Personnel protective equipment will be worn during spill control and cleanup. The stabilized material will be treated as hazardous waste. Runoff which might occur from spills outside containment areas during precipitation must be contained and handled as a hazardous waste unless analyzed and found to be nonhazardous. Temporary dikes can be constructed to contain runoff.

D.5.1.1 Spill Control Procedures

Vermiculite or Pell-O-Cell will be used to control all chemical spills except hydrofluoric acid spills. Vermiculite and Pell-O-Cell are compatible with all chemicals except fluorine and hydrofluoric acid. Hydrofluoric acid is generally only handled in very small volumes, in small containers, so that a spill would be limited to a very small volume (less than 1 gallon). A hydrofluoric acid spill will be neutralized by carefully adding calcium hydroxide or other caustic to the spill. After an excess of caustic has been added and the reaction has ceased, the resulting solution will be cleaned up using vermiculite. Vermiculite and caustic are stored at all the TSD units at the Laboratory.

DOT approved drums will be used to collect all spilled material and contaminated absorbent. There are many drums of this type, located at all treatment and storage facilities at the laboratory. For corrosives, the drums will be lined with polyethylene drum liners. The list of emergency equipment (Table D-3) shows the equipment available at each area to be used to control a spill. The ultimate disposition of any contaminated absorbent or waste material will be decided by HSE-7 according to permit conditions and RCRA standards. The material will be temporarily stored at TA-54, Area L.

Decontamination will be accomplished at the spill site. After the spilled material has been absorbed by vermiculite or Pell-O-Cell, the material will be drummed. If the spill occurs on a cemented area, water or an appropriate solvent will be used to clean the area and this liquid will be adsorbed onto vermiculite or Pell-O-Cell and drummed.

A composite sample will be taken of the material used to absorb the final waste water. No contamination should be present in this sample. If contamination is present, the procedure will be repeated in the same area and collect and analyze a composite sample. The composite sample will be taken from a drum using a thief or trier as specified in SW-846.

If the spill occurs on soil, any free liquid present will be absorbed onto vermiculite and the resulting material will be drummed. The contaminated soil will be dug up and drummed. For a spill of less than one gallon, the visibly contaminated dirt plus a sufficient amount of dirt around the spill site will be dug up. For a spill of more than one gallon, the contaminated dirt plus the perimeter dirt will be drummed and a sample taken of the perimeter dirt using the same method as discussed for the vermiculite sample.

There will be no sampling for a spill in a sealed storage area. Once all visible signs of contamination have been removed, it will be simple to verify any remaining contamination because the floors are sealed with epoxy. In addition, sealed storage areas have secondary containment structures that will control potential spills. At closure, if there is any residual contamination, it will be removed.

If a spill is from a known source, the waste will be analyzed for materials present in that container. Analytical procedures specified in Table D-7 will be used. If the spill is from an unknown source, the chemical composition will be determined by using the parameters and test methods specified in Table D-7.

D.5.2 Fire

Depending on the size of the fire and fuel source, portable ABC fire extinguishers may be used to put out fires. However, the Laboratory is discouraging the use of portable fire extinguishers by employees and encouraging the immediate evacuation and notification of the Fire Department. The person fighting the fire must wear appropriate protective equipment. If the fire spreads or increases in intensity, all personnel should evacuate to an upwind point at least 100 yards away from the fire. For any fire involving hazardous waste, the EPODO must be contacted immediately, and he will alert all necessary emergency management personnel. The Fire Department is automatically alerted when the CAS is activated. The EPODO should remain near the site, but at a safe distance, so he can advise the personnel responding to the fire of the known hazards. The EPODO is familiar with RCRA provisions, spill response, and emergency actions and therefore, is qualified to advise fire-fighting personnel of the potential hazards involved. Upon arrival at a fire, the Fire Department Officer-in-Charge will be in command of fire fighting. He will accept and evaluate the advice of Los Alamos personnel and emergency management organization members, but he will retain the responsibility to select the fire fighting methods and tactics. The EPODO will be in overall control of the Laboratory's emergency response efforts until the emergency is terminated.

D.5.3 Explosion

In the case of explosions, all personnel will immediately evacuate the area. Any injured personnel will be immediately transported to the Medical Department for treatment. The EPODO must be contacted immediately upon activation of the CAS, and then he must alert all necessary emergency response personnel. The Fire Department is notified automatically upon CAS activation. The EPODO will remain near the site, but at a safe distance, so he can advise the personnel responding to the explosion of the known hazards.

Upon arrival at the site, the Fire Department Officer-in-Charge will be in command of fire fighting. He will accept and evaluate the advice of Los Alamos personnel and emergency management organization members, but he retains the responsibility to select the fire fighting methods and tactics. The EPODO will be in overall control of the Laboratory's emergency response efforts until the emergency is terminated.

D.5.4 Exposure

Chemical material in the eye or on the skin will be washed either with the entire contents of the portable eye wash station or for at least 15 minutes. The eyelids will be held open during washing. The injured person will then be quickly transported to the Medical Department for evaluation. If possible the chemical material involved in the injury will be ascertained and the information given to the Medical Department.

Other potential chemical exposures will necessitate evaluation if anyone notices any of the following conditions:

- Irritation of the eyes, breathing passages, or skin
- Difficulty in breathing, or
- Nausea, light-headedness, vertigo, or blurred vision.

The affected person will be transferred to the Medical Department and the HSE-5 Group representative will attempt to ascertain what, if any, chemical exposure occurred and what corrective measure is appropriate.

D.5.5 Flood

The U.S. Army Corps of Engineers has documented that Los Alamos National Laboratory's waste management facilities are not located within the 100-year floodplain. This documentation has been included as an attachment to this document.

D.6 EVACUATION

A facility will be evacuated upon the voice command of "evacuate the area," or upon the sounding of the evacuation alarm, or upon the fire alarm.

D.6.1 Evacuation Plan

Emergency situations may warrant the shutdown and evacuation of an area(s) or building(s) in order to protect personnel and property, to anticipate the emergency condition, or to enhance the appropriate response. Table D-8 shows the criteria for evacuation, persons responsible for initiating evacuations, and reentry conditions.

To initiate building evacuation, the evacuation alarm is sounded and/or the public address system is used. The evacuation alarm, which is more suitable for evacuation of the whole facility, is a steady continuous, audible signal. This alarm cannot be silenced and reset by site personnel. The Fire Alarm Maintenance Section at 667-4027 and the Fire Department Platoon Chief at 667-7026 can silence and reset the alarm.

To evacuate a portion of the building, the public address system is more appropriate. The PA system will notify the occupants of the area to be evacuated, and additionally, will advise personnel in the rest of the facility of the existence of a problem in that specific area.

Upon initiation of an evacuation, either via the PA or evacuation alarm, all personnel are to leave the specified area and go to the muster area, turning off all equipment that could contribute to the hazard if left unattended.

In the event of an evacuation of only a portion of the building, one of the out buildings, or outlying work areas, the Group Leader will designate a control point at the closest and/or the most convenient location. This area will be outside the affected area and will serve as a muster point and provide control of the affected area to prevent further spread of the hazard.

Sweep Team personnel will remain in the area for a visual inspection of all the affected work areas (laboratories, and offices. At least two persons will do the sweep to insure that if an injured person is found or if a single person is fighting a small fire (turning off equipment or activating fire suppression systems), the sweep team member can give assistance while the other reports to the muster area or [illegible] additional aid.

If the building is evacuated during normal working hours, the secretary will remove the personnel attendance roster that is posted near the secretary's desk, take it to the muster area, call roll, and report the personnel accounting to the Group Leader. During second and third shift operations the designated person will be responsible for evacuation and roll call. The evacuation procedure follows:

Group Leader determines cause and probable extent of hazard.

Group Leader will sound the evacuation alarm or make an announcement on the PA system.

Group Leader will designate an assembly area if other than muster area.

Group Leader will notify the on-call SPOEO.

Personnel will shut down equipment that might contribute to the hazard.

Personnel will activate fire suppression systems.

Personnel will not remain in affected area except to assist injured personnel.

Personnel will report to the muster area or designated control point.

Roll call (general evacuation) or personnel accounting (partial evacuation).

Building or Area sweep by assigned personnel.

For a small scale evacuation, the Group Leader takes control. For a large-scale evacuation, the CAS will be activated, the EMOSO will be notified and will be responsible for the evacuation.

LEDO

D.6.2 Process Shutdown

Personnel are instructed to shut down equipment prior to evacuating a building unless an immediate building evacuation is announced. To ensure efficient shutdown, training and exercises in process shutdown are required. In the case of an immediate evacuation, a selected team may shutdown designated equipment in an evacuated area. The team will be equipped with the proper equipment, clothing and breathing apparatus. If present, HSE-1, HSE-3, and HSE-5 will provide advice and assistance. Process shutdown procedures only apply to the TA-50 batch treatment system and waste incinerator and the TA-16 industrial incinerator. Process shutdown procedures are as follows.

D.6.2.1 TA-50 Batch Treatment System

The Batch Treatment System will be operated in accordance with current Standard Operating Procedures. If a fire or evacuation alarm sounds during the operation of the Batch Treatment System, the operating crew will initiate a process shutdown. Because the process is a batch treatment, cessation of treatment is adequate to bring the process to a safe condition. In general, the process shutdown should include the following:

- Shutdown of treatment chemical feeds.

  Shutdown of the waste pump discontinuing waste transfer or circulation.

  Shutdown of steam/hot water to the reactor jacket, if any.

  Shutdown cooling water only if there is a risk of contamination of the water with waste (continued cooling removes residual heat from the system), and

Allow the reactor mixer to operate unless it is operation poses a greater hazard (operation helps remove heat and prevents stratification)

D 6.2.2 TA-50 Waste Incinerator

If a fire or evacuation alarm sounds during the operation of the controlled air incineration process, the operating crew will initiate a process shutdown in accordance with the current operating instructions. Three logic sequences are provided to shut down the process in a safe and orderly manner.

Controlled Shutdown - initiated when there is potential for significant damage to minor process components. This is also the normal shutdown mode at the completion of a run. When controlled shutdown is initiated, feeding of waste to the incinerator is stopped and a programmable set-point generator is activated that directs remote set-point inputs to the temperature controllers, causing a gradual decrease in chamber temperatures. Switches internal to the set-point generator cause an orderly-timed shutdown of process components.

Fast Shutdown - initiated for conditions that could likely result in loss of containment or damage to major process components. Waste feeding is stopped. Following a two-minute timed interval following the last feedi ng of solid waste (immediate if feeding liquid waste), the upper and lower chamber burners are shut down and the system valves and dampers are positioned so as to maintain a negative pressure in the system while minimizing flow through the system. Snuffing steam is introduced into the lower chamber. The two-minute delay when feeding solid waste allows for the ignition of pyrolitic gases formed immediately after feeding.

Scram Shutdown - initiated at the discretion of an operator. The chain of events are identical to the fast shutdown except that the sequence is not delayed when feeding solid waste. Scram buttons are located at the incinerator and in the control room.

The last two shutdown modes are potentially destructive to the incinerator refractory and are initiated only when the consequences of not shutting down are greater than the consequences to the incinerator during a scram or fast shutdown. It is the responsibility of the operating personnel and the process lead engineer to assess any situation and initiate the proper process shutdown sequence.

D 6.2.3 TA-16 Industrial Incinerator

If a fire or evacuation alarm sounds during the operation of the TA-16 Industrial Incinerator, the operating crew will initiate a process shutdown. The TA-16 incinerator is equipped with automatic and manual controls for shutdown of burners. Burners may be shut down manually by tripping a single switch. Automatic shutdown of the burners will occur on occurrence of a power failure, limit failure, or flame failure.

D.7 SALVAGE AND CLEANUP

The affected area will be surveyed by appropriate representatives from HSE Groups before any [illegible] and return to normal operations. Visual observation of the affected area will be supplemented by [illegible] determine whether cleanup is complete. After determination of any existing hazards from toxic or [illegible] gases or fumes, electrical hazards, or other unsafe conditions, personnel or selected teams equipped with proper breathing apparatus and protective clothing will reenter the area to perform designated tasks [illegible] decontamination, repairs, and salvage to allow the return to normal operations. After an emergency, the EPODO will

> Provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion. Contaminated material will be treated as a hazardous waste and temporarily stored at one of the permitted hazardous waste storage areas at the laboratory. HSE-7 will be responsible for determining the final disposition of the waste. This determination will be made in compliance with the permit and RCRA standards.
>
> Remain at the site to ensure that no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed.
>
> Ensure that emergency equipment is cleaned and fit for its intended use before operations are resumed. Equipment will be visually inspected and sampled to determine the type and degree of contamination and appropriate cleanup measures will be used.

Prior to resuming operations, appropriate local authorities will be notified that cleanup procedures are completed and emergency equipment is cleaned and fit for its intended use.

Damage assessment and recovery shall be performed within the reporting and investigative requirements of DOE Order 5484.1. The [illegible] has general responsibility for coordinating post-emergency actions, particularly during the time period immediately after the emergency. Such actions include cleanup operations, repair of vital equipment, or interim hazard-removing operations (such as demolition of unstable walls). The services of the affected operational organizations, HSE Division, the PAWS, and other on-site talent will also be utilized to estimate cleanup costs and operational impact. The [illegible] declares the end of the emergency, an Incident Report is filled out, and the Group Leader and his staff review emergency actions.

D.8 POST-EMERGENCY ASSESSMENT

When the emergency is over, the causes of the emergency and the effectiveness of the response are investigated, in order that future emergencies may either be prevented, or that the response to them may be more effective. Following each event requiring the implementation of the HWF Contingency Plan, the EPODO shall meet with representatives of all response functions to determine the adequacy of the response.

D.9 EMERGENCY RECORDS

The details of any incident that requires implementation of the HWF Emergency [illegible] noted in that unit's log book. This record must include the time, date, and [illegible]

D.7 SALVAGE AND CLEANUP

The affected area will be authorized by [illegible] representatives [illegible] and will be [illegible] determine whether cleanup is complete. After determination of any existing hazards from toxic or hazardous gases or fumes, electrical hazards, or other unsafe conditions, personnel or selected teams equipped with proper breathing apparatus and protective clothing will enter the area to perform designated tasks to effect decontamination, repairs, and salvage to allow the return to normal operations. After an emergency, the EPODO will:

Provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion. Contaminated material will be treated as a hazardous waste and temporarily stored at one of the permitted hazardous waste storage areas at the laboratory. HSE-7 will be responsible for determining the final disposition of the waste. This determination will be made in compliance with the permit and RCRA standards.

Remain at the site to ensure that no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed.

Ensure that emergency equipment is cleaned and fit for its intended use before operations are resumed. Equipment will be visually inspected and sampled to determine the type and degree of contamination and appropriate cleanup measures will be used.

Prior to resuming operations, appropriate local authorities will be notified that cleanup procedures are completed and emergency equipment is cleaned and fit for its intended use.

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D.9 EMERGENCY RECORDS

The details of any incident that requires implementation of the HWF Emergency Contingency Plan must be noted in that unit's log book. This record must include the time, date, and full description of the incident.

D.10 EMERGENCY REPORTS

Any emergency that requires implementation of the HWF Emergency Contingency Plan will be reported in writing within 15 days to the EPA Region [illegible] Division (6 PD).

The report shall include the following items:

Name, address, and phone number of owner or operator

Name, address and phone number of the facility

Date, time, and type of incident (e.g. fire, explosion, spill)

Name of material involved

Quantity of material involved

Extent of injuries (if any)

Assessment of actual or potential hazards to human health or the environment

Estimated quantity and disposition of material recovered from the incident

D.11 CONTINGENCY PLAN AMENDMENT

The Contingency Plan shall be reviewed by EPOOD, HSE-7, and HSE-8 and immediately amended if determined to be inadequate to handle nonsudden and sudden releases, and whenever:

The HWF permit is revised

There is significant change in the design or operation of the HWF (i.e., waste quantities handled, handling techniques, or final disposition)

The list of emergency coordinators changes

The list of emergency equipment significantly changes

Operating experience, drills, or technical review demonstrates the plan is inappropriate

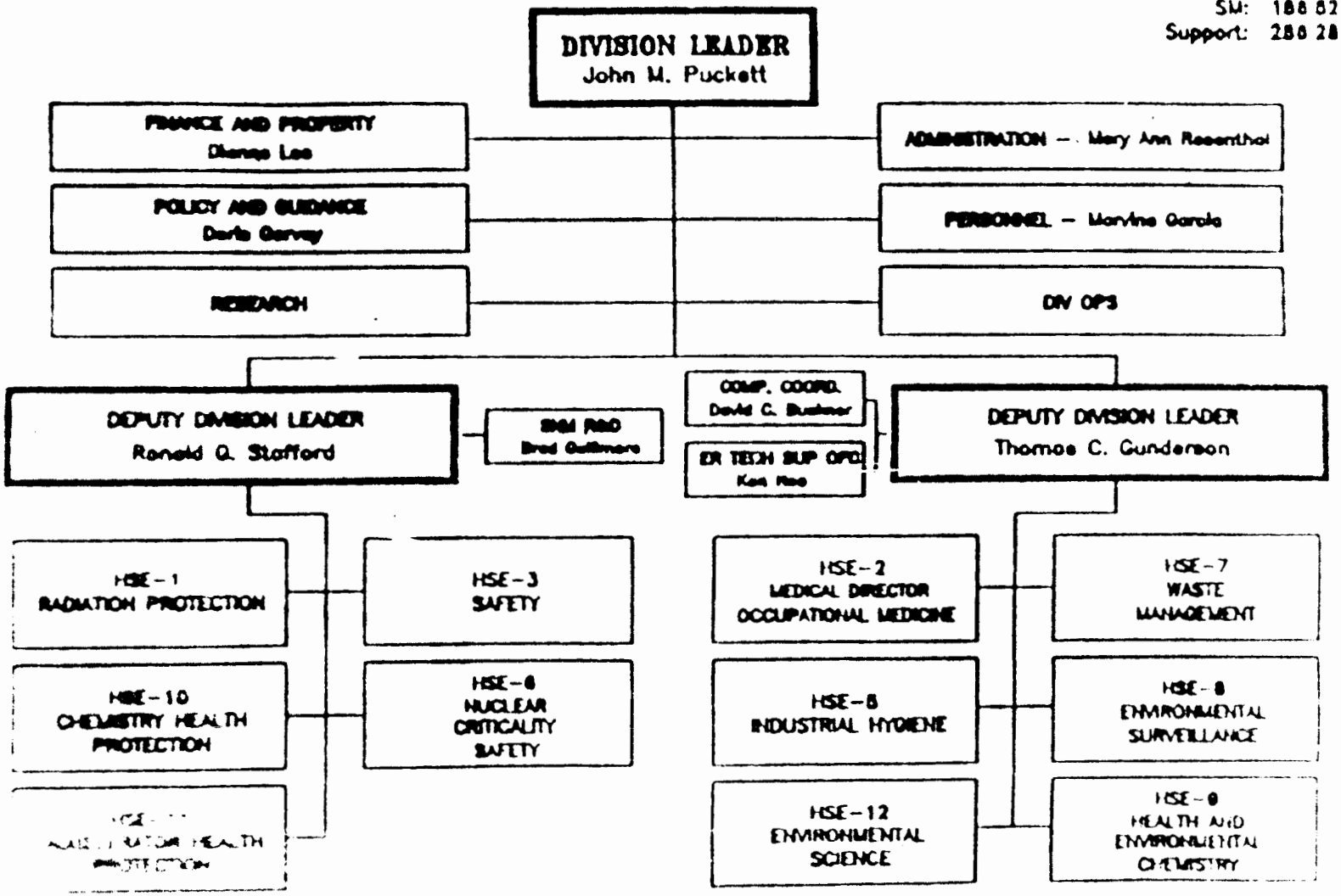
Actual implementation of the plan demonstrates inadequacies

The Contingency Plan shall have a cover sheet noting the date of the last amendment. Amendments shall be issued to all HWF Contingency Plan holders and shall include a cover letter that describes the plan changes and rationale for those changes.

HEALTH, SAFETY, AND ENVIRONMENT DIVISION
LOS ALAMOS NATIONAL LABORATORY

March 21, 1989

Total Staff: 472.80
SM: 188.52
Support: 284.28



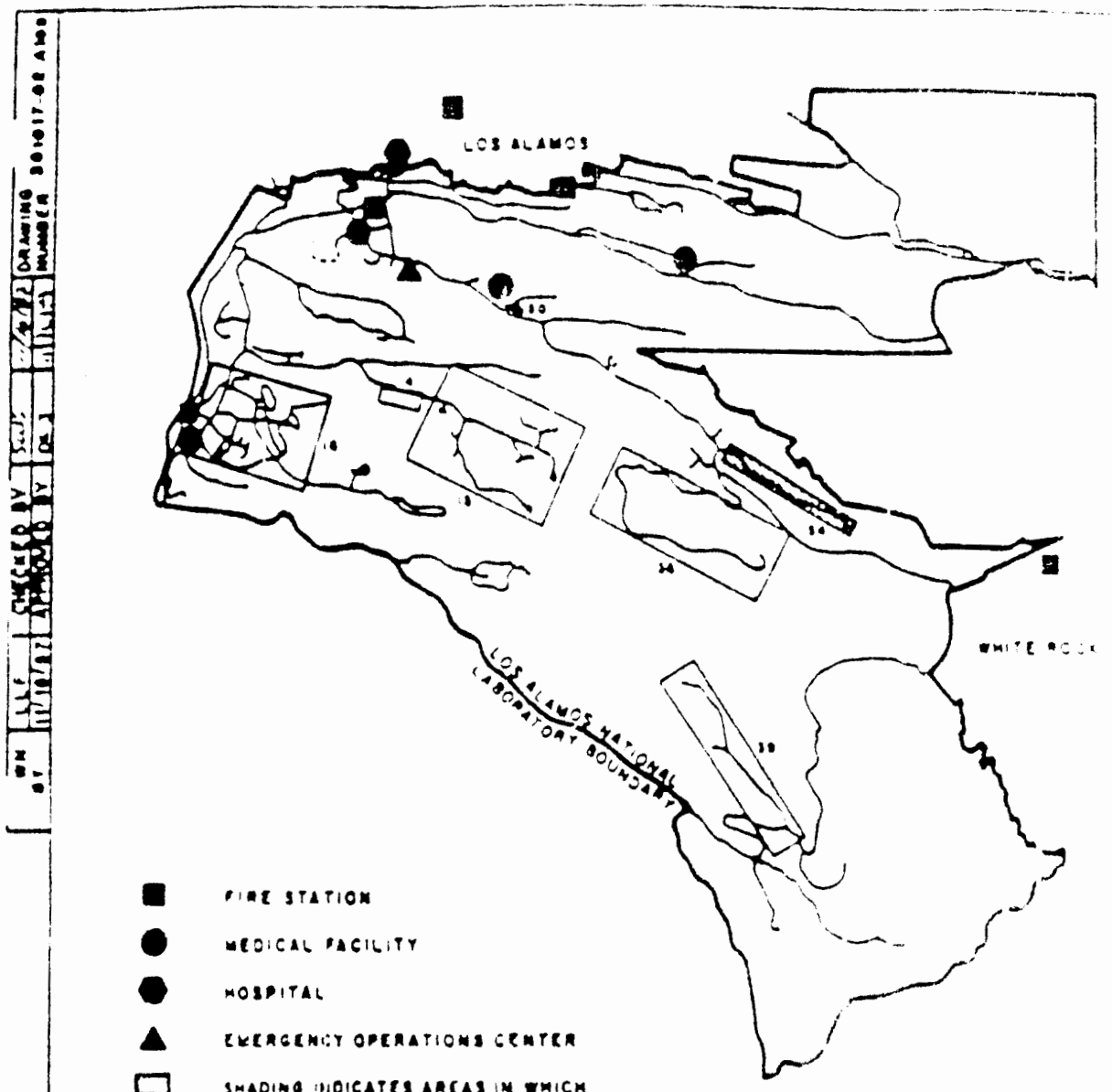


Figure [illegible]

EMERGENCY FACILITIES

PREPARED FOR

LOS ALAMOS NATIONAL LABORATORY

LOS ALAMOS, NEW MEXICO

IT CORPORATION

Table 1-1

SUMMARY OF HAZARDOUS WASTE UNITS
LOS ALAMOS NATIONAL LABORATORY

Technical Area and Building or Area Designation	Wastes Handled	Activity Description
TA-14, 15, 16, 36, and 39	High explosives (HE)	Open burning/open detonation units used to treat waste HE and HE-contaminated material
TA-50-01	Electrochemistry wastes Isotope separation wastes	Chemical batch treatment by neutralization, metal precipitation, and cyanide destruction
TA-50 Modular Storage Units	Shops department wastes Wastes from Basic and Applied Chemistry R&D programs Electrochemistry wastes Isotope separation wastes	Storage of wastes prior to treatment, incineration
TA-50-37	Combustible liquids and solids, including chlorinated and fluorinated hydrocarbons, and carcinogenic materials	Waste incineration with flue gas treatment
TA-50-37 Room 117 Storage Area	Combustible liquids and solids, including chlorinated and fluorinated hydrocarbons, and carcinogenic materials	Storage/Staging area for incinerator
TA-50 Storage Pads	Shops department wastes Wastes from Basic and Applied Chemistry R&D programs	Waste storage prior to treatment, incineration, or shipment off-site
TA-[illegible] Area [illegible]	Shops department wastes Wastes from Basic and Applied Chemistry R&D programs	Wastes are segregated and stored prior to treatment, incineration, recycling, or shipment off-site

TABLE D-2
(Continued)

	Emergency Telephone	Assistance Available
Laboratory Controlled Response Force		
Pan Am World Services	667-6196	Maintenance personnel and equipment
Non-Laboratory Controlled		
Los Alamos County Police	662-4176	Traffic control on DOE roads with public access
Los Alamos Medical Center*	662-4201	Medical Services

*Medical services related to hazardous wastes injuries provided under the direction of HSE-2.

COMMENTS OF THE DEPARTMENT OF ENERGY AND THE REGENTS OF THE UNIVERSITY OF CALIFORNIA ON DRAFT PERMIT NUMBER 0890010515-1 TO OPERATE HAZARDOUS WASTE FACILITIES, BEFORE THE NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION-JULY 18, 1989.

The Department of Energy and the Regents of the University of California respectfully request the Environmental Improvement Division's (EID) consideration of the following comments regarding draft permit number 0890010515 relating to the operation of hazardous waste facilities at Los Alamos National Laboratory (LANL):

FACT SHEET

Although the Fact Sheet is not technically part of the permit, it contains a sentence which may cause some confusion and warrants clarification. The sentence is found in the paragraph titled "Description of the permit" and reads, "The controlled air incinerator may burn any waste capable of destruction by burning, except for a few prohibited wastes, including chlorinated phenols." Because of the structure of the sentence, it may appear that the burning of chlorinated phenols is prohibited. In fact, LANL's application has always included F027 and F028 waste types that will be incinerated and these are included in the draft permit.

MODULE II

Section II.C.3. (p.17).

The reference listed in this section is out of print and no longer available. LANL has obtained a copy of the American Society for Testing and Materials' version of this document and requests that the reference be changed to reflect this. The ASTM is substantially the same as the EPA document. The new reference is D-34 P 168, "Proposed Guide for Estimating the Incompatibility of Selected Hazardous Wastes Based on Binary Chemical Reactions."

Section II E.2.a. (p.18)

This section refers to surface water samples taken at locations in Table II-1 (p.52). Several of these locations are inappropriate for sampling for the following reasons:

a.) There is no perennial water at Canada del Buey or Water Canyon at Beta. Annual water samples may be impossible to obtain.

b.) Acid Weir, Pueblo 2, and Pueblo 3 are all in the same canyon. None of these stations would detect the results of any current activities (post 1980) from Laboratory operations. They would possibly detect activities by the town/county of Los Alamos, as well as past (pre-1980) Laboratory activities. Sampling and analysis at these stations is already addresssed in EPA's HSWA permit (Module VIII) on page 7 under the section entitled "Monitoring of Surface and Ground Water" and it is therefore unnecessary and duplicative to require additional sampling in this section of the permit.

Section II.E.2.c.

Analysis of variance to compare data from up-gradient and down-gradient stations is inappropriate and doesn't make sense under these circumstances. None of the station pairs reflect any current laboratory activity and thus such analysis is inappropriately included in the operating permit. Up-gradient and down-gradient stations exist at the two Frijoles Canyon Stations but are not impacted by run-off from Laboratory operations. A like situation exists, as explained above, for the Acid Weir/Pueblo Canyon complex.

Section II.K.1.g. (p.21)

The requirement that the Permittee must maintain "sufficient" records and documentation to demonstrate compliance is vague and creates substantial uncertainty as to what records are required to meet this "sufficiency" standard. The draft permit contains many detailed and specific requirements with regard to recordkeeping and documentation. If these records are kept correctly and accurately, LANL assumes that they will meet the requirement of sufficient documentation. If documentation in addition to that already set forth in the draft permit will be required to meet the sufficiency standard LANL requests that the permit include a specific description of the nature of such documentation so that it can be on notice as to the requirements. If, on the other hand, the recordkeeping requirements already in the permit are considered sufficient to document compliance, LANL requests that the first sentence of paragraph g. be deleted. In the alternative, LANL requests that the following additional sentence be added after the first sentence in the existing paragraph g.:

"For purposes of this paragraph, records and documents which are required to be maintained by this permit shall constitute sufficient documentation to demonstrate compliance."

Section II.K.1.h. (p. 21)

The requirement in this paragraph that automatically extends the retention period for "all records required by this permit" during the course of an unresolved enforcement action appears to be unnecessarily overbroad. For example, an enforcement action involving monitoring records at a particular unit should not require the retention of inspection records at another, unrelated unit. LANL requests that this paragraph be amended to limit the automatic extension of the period to all records which are relevant to the enforcement action. This will avoid unnecessary and burdensome retention of irrelevant records.

MODULE III

Section III. A.1.c. and e. (p.24)

"Figure III-1" in each of these paragraphs should be "Figure 6".

Section III A.2.b.c. and d. (p. 24 and 25)

"Figure III-2" in each of these paragraphs should be "Figure-4". Also, the nomenclature of the units doesn't match that on Figure 4.

Section III H.3. (p. 28)

The inspections referred to in this section are performed weekly. Therefore "quarterly" should be changed to "weekly".

MODULE IV

Section IV.D.1.c. (p.30)

LANL requests that this section explicitly clarify that effluents from this unit may qualify for the exclusions set forth in HWMR-5 261.3(a)(2)(iii) and (iv.) and therefore that some residues from the unit will not be defined as hazardous wastes.

Section IV.E.3. (p.31)

The inspections referred to in this section are performed weekly. Therefore "quarterly" should be changed to "weekly".

MODULE VII

Section VII A. 2. (p.43)

LANL is subject to and must comply with state and federal air standards and regulations under the Federal Clean Air Act and the New Mexico Air Quality Control Act. There is no authority, however, for EID to include compliance with such requirements as part of this hazardous waste permit. This provision could unfairly subject LANL to double penalties under both the air Acts and the hazardous waste regulations.

MODULE VIII

Section A.4. (p.1)

This section requires notice within 24 hours of any release from a solid waste management unit. Release is broadly defined and by its terms includes any quantity, even de minimus amounts with no potential for any significant impact on the environment or human health. An inordinate amount of time and effort may be required to report even trivial amounts. LANL requests that this definition be further refined to include some criteria for types and quantities of releases which must be reported.

Section B.4. (p.2)

This section appears to be mooted by the addition of the new sections F. and G. which also deal with notification requirements for discovery of, and releases from, newly-identified solid waste management units. Section B.4 contains provisions which directly conflict with Sections F. and G. and LANL requests that it be deleted.

Section B. Perched Zone Monitoring (p.5)

This section requires the installation of the monitoring wells to be completed within 90 days of the effective date of the permit. LANL is informed that the permit will likely be issued in November. Although LANL will begin installation of the wells this fall, during the winter months, the canyons where the wells will be installed are largely inaccessible due to snowfall and winter conditions. Winter conditions are followed by spring runoff, and if there is significant snowfall, the canyons may not be accessible until May. The 90-day completion date is therefore unrealistic and LANL requests that it be changed to 270 days from the effective date of the permit.

The last paragraph, second sentence should read, "238 Pu, and 239Pu, 240 Pu" rather than "238, 240 Pu."

Section B. Monitoring of Surface and Groundwater (p.7)

LANL requests that the time period for submitting the summary describing the ongoing monitoring program, including sampling points, media, and constituents analyzed for be changed from 90 to 120 days from the effective date of the permit. The LANL Environmental Surveillance Program is extensive and complex and a thorough summary will take some time to compile.

Section B. Vertical Extent of Saturation (p.7A)

The last two sentences of this paragraph seem to require that all core material shall be analyzed for all constituents. LANL requests that this section be revised to allow for the exercise of professional judgement in determining the number of samples and subsequent constituent analysis during the investigation.

Section B. Identification and Summary of Previous Studies (p.7A)

LANL requests that the time period for submitting the reference list be changed from 120 to 180 days in order to insure adequate time to compile a thorough and accurate list. Additionally, LANL suggests that the intent of the section would be clearer if it was revised as follows:

> " Within 180 days of the effective date of this permit, the permittee shall develop and submit to the Administrative Authority, a reference listing of all known geologic, hydrogeologic, and all environmental studies previously performed at and/or by the facility relevant to potential contamination or migration of contamination from SWMUs, with a summary of the scope of the study and significant findings thereof."

Section D. Corrective Action for Continuing Releases (p.9)

The second paragraph on this page discusses the consequences of failure to comply with plans and schedules and references 40 CFR 270.41 for guidance on modifications. It is not clear how the permit modification process will apply to LANL's annual update of the Installation RI/FS Work Plan which must be approved by the Administrative Authority.

In the fourth paragraph on page 9, LANL requests that the following sentence be inserted after the sentence "The ER Program strategy for dealing with the large number of tasks is to prepare a single installation-wide work plan and task-specific RI/FS documents for each task":

"Depending on site-specific findings during the Corrective Action Plan process, a site within a task may be removed by a

determination that no further action is necessary. A site may also be assigned, to a different task, for example, by implementing interim corrective measures. Either of these actions may be taken by the permittee with the approval of the Administrative Authority."

Section H. (3) (p.14)

In the first paragraph, after the sentence "The scope of the RFI...from solid waste managment units," LANL requests that the following be inserted:

"As appropriate and with the approval of the Administrative Authority, the RFI Work Plan will be developed and implemented using the phased approach as described in EPA Corrective Action Plan guidance documents. Information obtained during the preceding phase will be incorporated in the modified RFI Work Plan for the subsequent phase. The draft RFI Report shall be prepared when all phases of the RFI have been completed to the satisfaction of the Administrative Authority."

More than one phase will be required in most cases at LANL during the RCRA Facility Investigation to provide sufficient information for the Corrective Measures Study.

Section H. (3) (p.14-19)

Some of the SWMUs identified in this section already have closure plans submitted to the State of New Mexico or characterization information has been requested by the State of New Mexico. Based on the characterization results, a determination will be made by LANL and the state with regard to appropriate further action. A list of these SWMUs is provided below. LANL requests that these SWMUs be deleted from the permit in order to avoid unnecessary and costly duplication of effort.

0-001	18-003
0-012	21-003
3-001(a-c)	21-011
3-001(m)	22-005
3-001(p)	22-006
3-001(r)	22-010
3-013	33-002
3-014	33-004
3-020	33-012(a)
3-028	33-013
3-033	35-004(e)
3-037	35-009(f-h)
3-039	35-010
6-001	36-002

6-006	36-003
9-004	36-005
9-005	39-002(a)
9-007	39-004(c,d)
9-009	39-006(b)
11-002	40-001(b,c)
11-004	40-005
11-005	41-002
11-009	46-002
14-004(b)	46-003(g)
14-005	48-002
14-007	48-003(a,b)
15-003	50-001
15-006	50-002
15-009	52-002
16-003(a-v)	53-001(a)
16-003(a-f)	53-001(b)
16-006	53-002
16-010(a-g)	53-006(b-e)
16-12	53-007(a,b)
	54-001(a)
	54-001(c)
	54-003
	54-005
	54-007(a-c)
	39-006(b)

Section I.1. (p.21)

This section is incomplete and appears to be superceded by later sections L., M., N., O., P., and Q of the permit. LANL requests that it be dropped.

Sections J. and K. (p.22-23)

It appears that Sections J. and K. might be most logically placed after Section G., Notification Requirements for Newly Discovered Releases at SWMUs. Approval of the annually updated Installation RI/FS Work Plan by the Administrative Authority as required by Section H might also serve as a mechanism for the Administrative Authority to reach a determination of no further action for specific sites.

Section L (p.23-24)

Task/site-specific bench-scale and pilot-scale studies are included in Section N, Corrective Measures Study Final Report, but not as a requirement for the corrective action measures study plan. The permit should clarify review, concurrence and reporting requirements for bench and pilot studies.

Section P.2. (p.27) and Task II (p.30)

Both of these provisions contain requirements for financial assurance. Current RCRA regulations at Section 264.140(c) state that the States and the Federal government are exempt from the financial requirements. For similar policy reasons, LANL presumes that when the proposed Subpart S regulations are issued, they will contain a similar exemption. LANL therefore requests that these provisions be deleted from the draft permit.

Section Q., Summary, (p.29-30)

Several changes are needed to make the facility submission summary schedule consistent with the text and LANL's requested changes.

1. Under notification of newly-identified SWMUs and newly-discovered releases the word "written" should be added.

2. Task I deliverables are due 180 days after issuance rather than 90 days.

3.The SWMU Assessment for newly-identified sites is due 90 days after receipt of a request is consistent with Section F.3, p.10, however it is inconsistent with Section B.4.(b) which contains a requirement of 45 days. LANL requests that Section B.4.(b) be changed to 90 days.

4. The SWMU Assessment Report is due 60 days after completion of the SWMU Assessment Plan, however, Section F.5. indicates that it is due in 25 days. The 60 day period is preferable.

5. The requirement that the Revised RFI Work Plan be submitted within 30 days of receipt of the NOD applies to the Installation Work Plan and the Task/Site Work Plans.

6. The RFI Report and Summary Report are due 60 calendar days after completion of the RFI. This requirement is not specified in the text.

7. The Interim Measures Plan is required 30 days after notification. There is no plan requirement specified in the text.

8. The requirement to provide a CMS Plan 90 days from notification to perform CMS is consistent with page 23, Section L., Corrective Action Measures Study Plan, but not with page 21, Section 1., Correction Measures Study, that the draft report be submitted within 90 days. The 90-day requirement for the plan is more reasonable than the 90-day requirement for the report.

Section R. Task I.A.1.c. (p.33)

The request that a the report include a "Topography (with contour interval of five (5) or ten (10) feet and a scale of 1 inch-100 feet), waterways, all wetlands, floodplains, water features, drainage patterns"; is a significant task in terms of time and expense for a facility the size of LANL. LANL covers 43 square miles and is located on the Pajarito Plateau. The plateau consists of a series of finger-like mesas separated by deep eastwest oriented canyons cut by intermittent streams. The mesa tops range in elevation from approximately 7800 feet on the flank of the Jemez Mountains to about 6200 feet at their eastern termination above the Rio Grande Valley. It is unreasonable and impracticable to require this information to be submitted within 180 days from the issuance of a permit. LANL believes that one year from the effective date is a more realistic timeframe to compile this information and requests that the due date be changed to allow one year for preparation of the maps.

LANL also requests that the features required to be included in the topography be more clearly defined, including a definition of the geographic area that needs to be mapped and definitions of floodplains and wetlands. Wherever the term wetlands appears in MODULE VIII it should be further refined to mean "natural wetlands." Additionally, the requirement that the maps be to a scale of 1 inch-100ft. will result in preparing a large number of maps (approximately 400 standard-sized sheets to cover the entire facility), which currently do not exist. Some of the features requested exist on maps of different scales (e.g., 1 inch-500 feet), therefore, some flexibility should be allowed relative to map scale at the facility level. Detailed site-specific maps will be provided on a task-by-task basis displaying these features as appropriate during the RFI/CMS process.

Section R. Task I.A.1.h. (p.33)

The requirement that the Preliminary Report include "A detailed geologic map overlain on contour map (contour interval at least 10 feet) with a scale of 1 inch = 400 feet depicting all units of the Tshirege member of the Bandelier Tuff be prepared" and that, "Maps must depict all springs, faults, gravel deposits, alluvium, and pumice deposits." is not reasonable. Depicting all units of the Tshirege member in Bandelier Tuff as requested will in many cases result in useless maps given the LANL topography. Additionally, it is not clear how development of such a costly map will benefit evaluation of the SWMUs. To the extent that this information is needed on a site-specific basis, it will be provided in the appropriate site-specific documents during the

RFI/CMS process. However, if the Administrative Authority believes that the LANL-wide map is absolutely necessary, a due date of 180 days from the effective date of the permit is not reasonable. A due date of 360 days from issuance of the permit is more realistic. The features requested (e.g. springs and alluvium) should also be defined in the permit, including minimum size of those features which require mapping.

Section R. Task VI.C.

Previously, in Section N., mention is made of pilot studies, however, this Section R. omits them. Additionally, the term "laboratory studies" is not defined.

Overall, MODULE VIII requires LANL to submit a great many documents to EPA for concurrence within short time frames. LANL requests that EPA make available sufficient staff to review and approve these documents in a timely manner.

FIGURES

A current version of Figure 4, regarding locations of units at TA-50 is included in the draft permit after the Modules. However, outdated versions of Figure 4 are included in several places in Attachment E and need to be replaced with the updated Figure 4. The following pages reflected the outdated version of the figure and need to be replaced with the current figure 4:

E. 3.1
E. 4.1
E. 5.1
E. 6.1
E. 7.1

Additionally, there appears to be an unnecessary and duplicative copy of Figure 4 after Figure 6 following the Modules. Attached (as Exhibit 1) to these comments is an updated version of Figure 6 relating to the location of waste management units at TA-54 Area L. The new Figure 6 should replace the outdated one found after the Modules and also the outdated ones found at:

E.3.2
E 7.2
E.8.1
E.9.1

ATTACHMENT A

Section A.5

In general, all of section A.5. is highly redundant with the requirements already set forth in A.4. Section A.4 already describes the verification analysis that will be performed in each category and subcategory of chemicals. This obviates the need for Section A.5.2. with regard to verification of routine wastes.

The discussion of discharges to the Industrial Wastewater System found at A.5.3. should replace the discussion of the same item found at Section A.4. relating to waste residues.

Section A.5.1.

The requirement that one in each two hundred knowledge-of-process determinations be verified by quantitative chemical analysis does not make sense in the context of LANL's waste operations and is not necessary to protect public or employee health and safety or the environment. For the reasons set forth below, LANL requests that Section A.5.1 be deleted from the permit.

At the present time, knowledge of process determinations can be divided into two categories at the Laboratory. The wastes are either routine wastes or labpack wastes. Labpack waste is defined as waste in original chemical containers of less than five-gallon size. Routine wastes are already subject to the annual verification program. Additionally, every new batch or container of routine waste must be reanalyzed for key parameters before treatment. Labpack waste by definition contains information on its original label and has additional information available on the material safety data sheets. If for some reason, this information is not available, the container is handled as an unknown.

As the attached letters (Exhibits 2 and 2A) from two reputable hazardous waste handlers demonstrate, it is generally accepted in the field that labels on containers and/or Materials Safety Data Sheets (MSDS) data is sufficient information for treating and disposing of labpack wastes. Disposal companies have indicated to LANL that they are unaware of any other jurisdiction in the country which has required the analyses contained in Section A.5.1., nor do these companies' own permits for treatment and disposal require these analyses to be performed. If such analyses are not required for incineration and other treatments, it makes little sense to require it for simply storing wastes.

Verification of labpack wastes also presents another problem in that there is no standardized protocol for proving that no contaminants are present when it is not known what chemicals one is looking for. Chemists can perform tests to determine that a specific compound is not present. But without analyzing for the entire universe of chemicals, a chemist cannot determine that a compound is free of contamination. Another problem encountered is that there are different grades of chemical purity. For example, nitric acid is available in purites ranging from technical grade to chromatography grade. This raises the need to make a determination on the issue of how pure is pure.

In summary, performing verification analysis on labpack waste serves little purpose, is costly and time consuming, and does not provide significant additional protection to public health or the environment. In fact, the requirement increases risk to Lab employees by increasing chemical exposure potential while obtaining little new information.

ATTACHMENT B

Section B.1.3. (p. B-3)

In line 5, in order to be consistent with other sections, insert "Figures B-1 and B-2" after "inspection log sheet."

Section B.2.3. (p.B-4)

Beginning on line 2, "Figures B-7 through B-9" should be "Figures B-5 and B-6."

Section B.3.4. (p.B-6)

On line 2, "Figures B-3 through B-6 and B-12 through B-18 should be "Figures B-7 and B-8."

ATTACHMENT C

Introductory paragraph (p.C-1)

At line 8 after "at the facility." insert "and handle hazardous wastes." Not all LANL or contractor employees handle hazardous waste and, as such, are not required to undergo training. A similar change should be made at line 9 after "all personnel" insert "handling hazardous waste."

Section C.2.1 (p. C-2)

At line 4 after "All employees" insert "involved with hazardous waste handling," for the reason set out above.

RCRA Job Description Table

Please delete the name of A. Torres, Chemical Waste Coordinator for WX-3, from the table.

Figure C-1, Section II.C.

First Aid training and recertification is given in accordance with Red Cross policy, which requires recertification every three years. Please change this section to read "First Aid (IC) introductory, triennial recertification."

ATTACHMENT D

Section D.1.2 (p.D-1)

On the first line of the second paragraph, "Table D-2 should be "Table D-1."

Section D.2.

In order to accurately reflect the current organizational structure and title changes, LANL requests that the following new paragraph be inserted:

D.2.1.11 Operational Management Group I (Emergency Management)

This group provides a 24-hour duty officer, called the Laboratory Emergency Duty Officer (LEDO), to respond to all credible emergencies, including hazardous materials releases. The LEDO is the On-Scene Commander (OSC) for all emergencies, including releases of hazardous materials when an On-Scene Control Group (OSCG) is formed. Emergency Management maintains the Emergency Operations Center (EOC) in operational ready status should the center be required.

Additionally, throughout Attachment D wherever the term "EPODO" appears, it should be replaced with the term "LEDO." Attached (as Exhibit 3) to these comments is a marked-up copy of the draft Attachment D which shows where these changes need to be made.

ATTACHMENT E

Throughout this attachment, as listed below, reference is made to sending wastes, residues, filters, mops, rags, etc., off-site for disposal. LANL would like the option of treating or providing further treatment of such items on-site. LANL suggests that the term "treatment and/or disposal at a permitted facility" be substituted for the term "off-site disposal" in the following sections:

a) Page E.2-2, Paragraph 1, last sentence.
b) Page E.2-2, Paragraph 2, last sentence.
c) Page E.2-2, Paragraph 3, next to last sentence.
d) Page E.2-2, Paragraph 2, last sentence.
e) Page E.3-2, First sentence
f) Page E.2-3
g) Page E.3-2. Paragraph 2, third and forth sentences
h) Page E.3-2, Paragraph 5 eighth and ninth sentences.
i) Page E.4-2, Paragraph 4, forth and fifth sentences
j) Page E.5-2, Paragraph 1, second sentence.
k) Page E.5-2, Paragraph 2, forth and fifth sentences.
l) Page E.6-2, Paragraph 1, line 5.
m) Page E.6-2, Paragraph 2, Last sentences.
n) Page E.7-2, Paragraph 2, Third sentence.
o) Page E.8-2, Paragraph 2, Third sentence.
p) Page E.8-2, Paragraph 3, second and seventh sentences
q) Page E.8-3, Paragraph 2, Second sentence.
r) Page E.9-1, Paragraph 6, First sentence.
s) Page E.9-2, Paragraph 1, First sentence.
t) Page E.9-2, Paragraph 4, Last sentence.

Section E.1.6. (p.E.1.6)

To be consistent with Section E.1.7. this section should be amended to require that field blank samples be taken as well.

Section E.2.3.2. (p.E.2-2 and 2-3)

Reference is made throughout this section to the disposal of decontamination solutions containing hazardous constituents. LANL requests that this section be clarified to indicate that if the hazardous constituents meet the exclusions found in HWMR-5, Sections 261.3(a)(2)(iii) and 261.3(a)(2)(iv), the liquid may be disposed of as a non-hazardous waste.

Table E.2.3. (p.E.2-12)

The text explaining closure activities requires sampling of washwater prior to decontamination activities, but such a requirement is not listed in this table. Additionally, the text of the permit requires protective clothing washwater be analyzed for hazardous constituents but this requirement is also not

included in the summary table. Most decontamination activities will require washing protective clothing and analyzing the liquid prior to disposal, however, some of the "Sampling Summary" sections have not included this. All closure plans should be consistent.

Section E.3.3.2. (p.3-2)

LANL believes that the first sentence of paragraph 4 should be clarified to state that it is the "surface" rather than the "units" which must be sampled differently depending upon whether the surface is pervious or impervious.

Table E.4.1. (p.4-9)

LANL notes there are inconsistencies and omissions between this table and the actual activities required on p.E.4-2, paragraph 2.

Section E.8.5.3 (p.E.8-2)

The third paragraph of this section requires that for demonstration of final decontamination, soil samples will be analyzed for the parameters in Table E.8.2. This is inconsistent with Table E.8.3 on page E.8-12 which requires that final decontamination samples be analyzed for Appendix IX constituents. LANL requests clarification on which parameters apply.

Section E.4.1. (p.E.4.1)

The maximum inventory of three cubic meters (800 gallons) stored or treated at any one time in the TA-50 incinerator was calculated based on the volume contained in containers and feed tanks. If it is necessary to also include the wastes contained in piping and scrubwater tanks, the figure should be changed to eight cubic meters (2200) gallons).

Section E.9.4. (p.E.9-2)

LANL requests that this paragraph be clarified to indicate when sampling is required both within and outside the containment area.

ATTACHMENT G

LANL requests that the following changes be made to this attachment in order to make it consistent with the changes requested to the Part A application. These changes are requested because after reevaluating the wastes, LANL determined that the

following wastes may be incinerated within the conditions of the permit:

P043	Add T03
P092	Add T03
U005	Add T03
U006	Add T03
U092	Add T03
U123	Add T03
U136	Add T03
U234	Add T03

Additionally, LANL requests that the following waste code amounts and handling codes be added to attachment G:

U248	1000	S01, T03
U249	1000	S01
U326	1000	S01, T03
U353	1000	S01, T03
U359	1000	S01, T03

Based on additional analysis of generation data, LANL also requests the following changes to the amounts of material under the "D" designation:

D003	Change amount to 20,000.
D010	Change amount to 7,500.

ATTACHMENT I

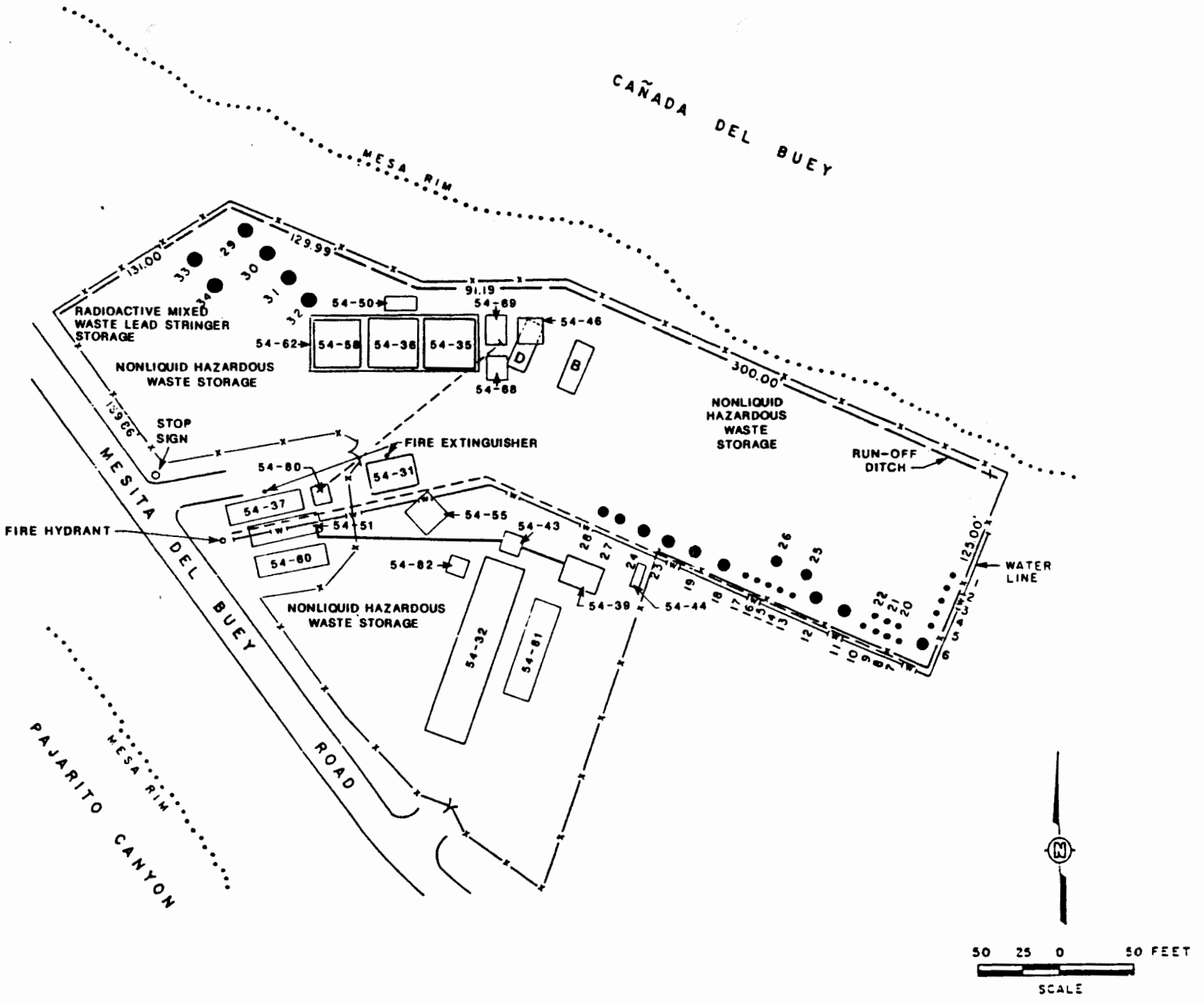
Attachment I is a solid waste stream characterization. EID has no authority to require this characterization nor to impose a schedule for doing so. The HWMR regulations at 262.11 require generators to determine if their wastes are hazardous. There is no requirement for an over-all solid waste stream characterization. As presently drafted, the additional data submittal would require a tremendous amount of time and personnel to verify such waste streams as cafeteria trash and office waste. Such requirements are totally outside the purview of this permit.

Furthermore, the determination of whether wastes are hazardous is a generator requirement, enforcible under Part 262 and is improperly included in the permit. Permits ought to deal exclusively with the operational requirements for treatment, storage, and disposal facilities. Additionally, it is highly impractical to include the plan in the permit because changes to the plan or additional characterization may require permit modification. Waste stream analysis is an ongoing responsibility and must adapt to the changing circumstances at LANL.

Nevertheless, LANL believes that it would be useful to better define waste streams in a more comprehensive manner. LANL therefore proposes to be bound by a solid waste stream characterization plan, seperate and apart from the permit. A necessary component of this plan would be to require generators to characterize, via a waste profile sheet, all wastes that could potentially contain a hazardous waste or constituent. This would eliminate the need for annual verification as required in Section II.C.4. because verification would be obtained continually. The proposed plan will be submitted under separate cover.

ATTACHMENT J

Attachment J, in its present form, covers matters which are outside the jurisdiction of EID and should be deleted from the permit. Section 74-4-3H NMSA 1978 states that source, special nuclear or by-product material as defined in the Atomic Energy Act are not solid wastes and therefore cannot be hazardous wastes. Such materials may not be regulated by EID under the Hazardous Waste Act. Throughout Attachment J there are references to procedures, equipment, and personnel which are specifically and solely related to the proper control and management of radioactive materials. Clearly, these matters are improperly included in the hazardous waste permit and should be deleted. In lieu of the present Attachment J, the Laboratory has prepared a substitute Attachment (Exhibit 4) which addresses incinerator operational safety with regard to hazardous wastes. LANL requests that this document be substituted for Attachment J in the draft permit.



LEGEND

MATERIAL DISPOSAL UNITS

54-31 PACKAGING BUILDING
54-32 ROOFED WASTE STORAGE PAD
54-35 TREATMENT PAD
54-36 SAMPLING PAD
54-37 OFFICE TRAILER
54-39 PCB BUILDING
54-43 SEPTIC HOLDING TANK
54-44 PROPANE TANK
54-46 EQUIPMENT STORAGE BUILDING
54-50 EQUIPMENT STORAGE BUILDING
54-51 OFFICE TRAILER
54-55 SAMPLE PREP LAB BUILDING
54-58 TRANSPORT PAD
54-60 OFFICE TRAILER
54-62 CANOPY OVER MD-35,MD-36,MD-58
54-68 MODULAR STORAGE BUILDING
54-69 MODULAR STORAGE BUILDING
54-80 SEPTIC HOLDING TANK
54-81 PCB OIL TANK STORAGE
54-82 DRUM CRUSHER
B SURFACE IMPOUNDMENT
D SURFACE IMPOUNDMENT

● LOCATION OF AREA L INACTIVE SHAFTS

FIGURE 6

TA-54 AREA L
WASTE MANAGEMENT UN

PREPARED FOR

LOS ALAMOS
NATIONAL LABORATORY
LOS ALAMOS, NEW MEXI

IT ... Creating a Safer Tc

Exhibit 1

CHEMPAK

June 19, 1989

Mr. Patrick Josey
Los Alamos National Laboratories
P. O. Box 1663 - Mail Stop E-517
Los Alamos, NM 87545

Subject: Sampling/Analysis of CHEMPAK Prepared Lab Packs

Dear Patrick,

When lab packs are prepared by our personnel under the provisions of 49 CFR 173.12, no sampling or analysis is required for acceptance by any Rollins Environmental Services facility. The nature of lab packs is such that the wastes are not homogeneous and are present in small quantities. Since a detailed drum inventory sheet is prepared for each drum, which fully identified each inner container, any sampling or analysis serves little purpose.

Should you have any further questions on this or any subject, I can be contacted at 302-479-3446.

Sincerely,

Rean T. Swanson
National Quality Control Manager

RTS/ch/078

cc: Allison Sommer

ROLLINS CHEMPAK INC.

Exhibit 2

Chemical Waste Management, Inc.
Technical Services Division
3760 Yale Way
Fremont, California 94538
415 770 0575

June 13, 1989

Anthony F. Drypolcher
Los Alamos National Laboratories
P.O. Box 1663 Mail Stop E-518
Los Alamos, New Mexico 87545
(Fax 505-665-3750)

RE: Sampling and Analysis of Labeled Lab Pack Material at CWMI Facilities

Dear Tony,

CWMI has a number of permitted facilities and handles labpack type waste from a wide range of research, development and manufacturing industries. There is no case in which a Waste Analysis Plan (WAP) at a CWMI owned, Part B permitted facility requires sampling of labeled lab pack containers prior to acceptance, treatment and/or disposal.

Permitting agencies have agreed that sampling and analysis would yield no better information than that furnished by the label. In addition, sampling involves additional personnel and environmental exposure risks as well as additional cost. Agencies have not sought to impose the risks and cost of additional sampling where there is not a clear added information benefit.

For more detailed discussion of this issue, CWMI would be pleased to make available the expertise of Jack Kolopanis or Marty Cahill who have worked with a variety of agencies in developing CWMI's WAP's. Jack works out of CWMI's Oak Brook, Illinois office and can be reached at (312) 218-1715. Marty works out of CWMI's Technical Center in Riverdale, Illinois. She can be reached at (312) 841-8360.

Sincerely,
Chemical Waste Management, Inc.

Bill Van Dyke
Technical Services Division

cc: Jack Kolopanis
Marty Cahill

Exhibit 2A

The Fire Department personnel make regular tours of the Laboratory facilities to detect and discuss hazards associated with individual facilities and are instructed in hazardous material handling and emergency procedures. They are aware of the hazardous waste practices at the Laboratory, and are well equipped to handle any credible emergency situation.

D.2.1.7 Mason & Hanger Protective Force (Pro-Force)
The Pro-Force consists of more than 300 personnel who are responsible for Laboratory security. The security force is provided by Mason & Hanger, Silas Mason, under contract to the Laboratory.

During an emergency, the Pro-Force activities include maintenance of security, direction of traffic within the Laboratory, and control of access to the emergency site. The Pro-Force maintains the necessary equipment to perform these functions such as crowd control equipment, patrol cars, etc.

D.2.1.8 PAWS
PAWS provides a maintenance support force on contract to the Laboratory. This support force is under the Laboratory's direction in an emergency. PAWS conducts inspections of Laboratory equipment, maintains equipment, and participates in emergency cleanup.

D.2.1.9 Los Alamos County Police
In keeping with the principle of handling emergencies internally, the Los Alamos County Police have only a minimal interaction with the Laboratory in an emergency. That interaction is limited to traffic control on DOE roads with public access. The limits of interaction are included in a signed agreement, a copy of which is included as an attachment to this document. There are no agreements with other agencies.

D.2.1.10 WX and M Division Personnel
Personnel in WX and M Divisions are trained to safely handle and dispose of highly reactive materials (High Explosives). Any spill or uncontrolled release of material at the burning grounds (TA-14 and -16) or the detonation pads (TAs 14, 15, 36, and 39) will be cleaned up by personnel from these divisions. The Fire Department may be called to respond if a burn or detonation results in an uncontrolled fire.

New paragraph D.2.1.11-

D.2.2 Emergency Equipment
A list of emergency equipment for use at the Laboratory and the location of this equipment can be found in Table D-3. The equipment immediately available for use is located at TA-54, Area L, the TA-50 batch treatment system and modular container storage buildings, the TA-50 waste incinerator and Room 117 storage, the TA-16 incinerator, and the TA-60 storage pads.

In addition, PAWS, the Fire Department, and HSE-2 maintain emergency equipment. Major emergency facilities are shown in Figure D-4.

D.2.3 Communications
Effective emergency response at Los Alamos National Laboratory requires an efficient communication system which will integrate all personnel into the emergency response procedure.

There are two central alarm systems (CAS) at the Laboratory; an emergency CAS and a mechanical CAS. The emergency CAS is activated by:

Telephone communication (9-911)

Automatic fire alarms

Manual pull alarms

D.3 NONSUDDEN RELEASES

Nonsudden releases include those incidences which, if uncontrolled, impact the environment over a long period of time. Such incidences include minor leaks of containers, loss of integrity of secondary containment, incomplete treatment, and leachate migration from disposal areas.

D.3.1 Responsibility

Correction of nonsudden release shall be the responsibility of the operating group and can be handled with normal maintenance and management procedures. Correction methods for nonsudden releases that have resulted in environmental contamination shall be coordinated with the New Mexico Environmental Improvement Division (NMEID).

D.3.2 Credible Nonsudden Releases

Not all failures can be predicted. In general, the response to nonsudden release will (1) contain the release, (2) correct the cause of the release, and (3) clean up any release to a level that protects health and the environment.

D.3.3 Nonsudden Release Surveillance

In addition to routine inspection and site-specific sampling and testing, the Laboratory maintains an area-wide environmental monitoring network maintained by HSE-8. Routine monitoring for radiation, radioactive materials, and chemical substances on the Laboratory site helps to fulfill the Laboratory's policy to protect the general public, employees, and the environment.

Monitoring and sampling locations for various types of measurements are organized into three main groups. Regional monitoring stations are located within the five counties surrounding Los Alamos County. They are placed up to 80 kilometers (50 miles) from the Laboratory, and serve to determine background conditions. Perimeter stations are located within approximately four kilometers (2.5 miles) of the Laboratory boundary, and document conditions in residential areas surrounding the Laboratory. On-site stations are within the Laboratory boundary, and most are accessible only to employees during work hours.

The types of routine surveillance conducted at these stations includes radiation measurements and collection of air particulates, waters, soils, sediments, and foodstuffs for subsequent analysis.

Additional samples are collected to gain information about particular events such as major runoff events and nonroutine releases. Data are used for comparison with standards, background radiation levels, and dose calculations.

D.4 SUDDEN RELEASES

This section deals with incidents involving sudden release such as spills, fires, or explosions which pose a significant threat to human health or the environment and includes the release of hazardous materials and hazardous wastes. Hazardous materials are chemical substances that become a regulated waste as the result of the incident and can include hazardous raw materials that are spilled, products of combustion, and products of uncontrolled reactions.

D.4.1 Hazardous Waste Emergency Coordination

LED0

The [redacted] is responsible for coordinating all emergency response measures involving sudden releases of hazardous wastes with the exception of the open burning and open detonation units at TA-14, 15, 16, 36, and 39. HE waste handling is the responsibility of M and WX divisions, who have developed Standard Operating Procedures (SOPs) based on safe handling practices designed to eliminate the risk of fire and explosions. Unplanned detonation or combustion of HE renders the HE waste nonlocde. In some cases, residuals contain barium. Cleanup of barium contaminated areas due to unplanned detonations shall be coordinated with the ~~EPCRA~~

LED.0

D.4.2.2 Emergency Notification

Immediately upon discovery of an imminent or actual incident involving hazardous wastes or hazardous materials, the ~~EPOOC~~ will be notified first. In the case of fire involving hazardous wastes or hazardous materials, this is superseded by the Laboratory fire alarm system. A fire is reported by dialing 9-911, activation of automatic alarms, or activation of a fire pull box. All fire alarms simultaneously alert the CAS Dispatcher, the Fire Department, and the Mason and Hanger Pro-Force. For fire involving hazardous wastes, hazardous materials, or hazardous waste units, the CAS Dispatcher shall contact the ~~EPOOC~~ (Figure D-5). Orange ~~LEDO~~ signs on buildings which contain HE are a warning to fire fighters not to approach or enter the building without obtaining information from WX or M Division personnel about the nature and location of HE materials in the building.

During off hours, all incidents involving hazardous wastes or hazardous materials shall be reported to the CAS Dispatcher, who will contact the on-call ~~EPOOC~~.

The ~~EPOOC~~ shall proceed to the incident and assess the nature of the problem. On an as-needed basis, the ~~EPOOC~~ shall contact response groups directly or instruct the CAS Dispatcher to contact them or contact the HSE-Duty Officer (HSE-DO) who will notify the appropriate HSE groups. Table D-2 shows the assistance available from each emergency response group. The ~~EPOOC~~ will use this list as criteria to determine which groups to contact in an emergency.

Each response group maintains an on-call person and/or a call-down procedure to answer emergencies.

Because the initial observer may not be able to recognize the involvement of hazardous materials, the ~~EPOOC~~ shall be notified of any incident as described in Section D.4.1. The ~~EPOOC~~ shall use whatever means available including the assistance of other response groups, computer data searches, and sampling to determine if a hazardous waste is generated. HSE-5 and HSE-8 have the expertise to determine the nature and extent of contamination, the chemicals involved in the incident, and the characteristics of the hazardous waste.

D.4.2.3 EPOOC Actions

Upon notification of an incident, the ~~EPOOC~~ shall:

1. Proceed directly to the site;
2. Assess the nature of the incident, and quantities and types of hazardous wastes or hazardous materials involved; and
3. Based on the guidelines in Section D.4.2.1 of the Contingency Plan, determine if implementation of the HWF Emergency Contingency Plan is warranted.

Upon the decision to implement the HWF Emergency Contingency Plan, the ~~EPOOC~~ shall perform, in this order, the following actions:

1. Assess the hazards to human health and the environment including both direct and indirect effects such as generation of toxic, irritating, or asphyxiating gases, hazards of runoff of fire water or treatment chemicals. The ~~EPOOC~~ will use the guidelines in Section D.4.2.1 to assess the hazards to human health and the environment. If any of the criteria under Section D.4.2.1 are met, evacuation of the immediate area will be initiated.

6. Within 15 days of the incident, submit to the Regional Administrator and Environmental Improvement Division the report described in Section D.10.

D.5 SPECIFIC EMERGENCY RESPONSE PROCEDURES FOR HAZARDOUS WASTE UNITS

The following section summarizes the guidelines for handling emergencies.

D.5.1 Chemical Spills

Hazardous wastes are handled and stored in small containers, lab packs, 55-gal. drums, and dumpster tanks. The individual volumes handled are small. Handling of hazardous materials may involve truckload quantities of material such as solvents, fuels, acids, and bases.

The general steps in handling hazardous wastes are:

Containment including spreading of absorbents or forming of temporary dikes,

Waste pickup and packaging in sound containers, and

Decontamination followed by testing to assure adequate clean-up.

The emergency preparedness procedures related to flammable organic solvent spills call for stabilization of the spilled material with the organic solvent spill kit. Other chemical spills are to be stabilized using the acid and caustic spill kits or by the addition of absorbents such as vermiculite. Personnel protective equipment will be worn during spill control and cleanup. The stabilized material will be treated as hazardous waste. Runoff which might occur from spills outside containment areas during precipitation must be contained and handled as a hazardous waste unless analyzed and found to be nonhazardous. Temporary dikes can be constructed to contain runoff.

D.5.1.1 Spill Control Procedures

Vermiculite or Pell-O-Cell will be used to control all chemical spills except hydrofluoric acid spills. Vermiculite and Pell-O-Cell are compatible with all chemicals except fluorine and hydrofluoric acid. Hydrofluoric acid is generally only handled in very small volumes, in small containers, so that a spill would be limited to a very small volume (less than 1 gallon). A hydrofluoric acid spill will be neutralized by carefully adding calcium hydroxide or other caustic to the spill. After an excess of caustic has been added and the reaction has ceased, the resulting solution will be cleaned up using vermiculite. Vermiculite and caustic are stored at all the TSD units at the Laboratory.

DOT approved drums will be used to collect all spilled material and contaminated absorbent. There are many drums of this type, located at all treatment and storage facilities at the laboratory. For corrosives, the drums will be lined with polyethylene drum liners. The list of emergency equipment (Table D-3) shows the equipment available at each area to be used to control a spill. The ultimate disposition of any contaminated absorbent or waste material will be decided by HSE-7 according to permit conditions and RCRA standards. The material will be temporarily stored at TA-54, Area L.

Decontamination will be accomplished at the spill site. After the spilled material has been absorbed by vermiculite or Pell-O-Cell, the material will be drummed. If the spill occurs on a cemented area, water or an appropriate solvent will be used to clean the area and this liquid will be adsorbed onto vermiculite or Pell-O-Cell and drummed.

Other potential chemical exposures will necessitate evacuation if anyone notices any of the following conditions:

- Irritation of the eyes, breathing passages or skin,
- Difficulty in breathing, or
- Nausea, light-headedness, vertigo, or blurred vision.

The affected person will be transferred to the Medical Department and the HSE-5 Group representative will attempt to ascertain what, if any, chemical exposure occurred and what corrective measure is appropriate.

D.5.5 Flood

The U.S. Army Corps of Engineers has documented that Los Alamos National Laboratory's waste management facilities are not located within the 100-year floodplain. This documentation has been included as an attachment to this document.

D.6 EVACUATION

A facility will be evacuated upon the voice command of "evacuate the area," or upon the sounding of the evacuation alarm, or upon the fire alarm.

D.6.1 Evacuation Plan

Emergency situations may warrant the shutdown and evacuation of an area(s) or building(s) in order to protect personnel and property, to anticipate the emergency condition, or to enhance the appropriate response. Table D-8 shows the criteria for evacuation, persons responsible for initiating evacuations, and reentry conditions.

To initiate building evacuation, the evacuation alarm is sounded and/or the public address system is used. The evacuation alarm, which is more suitable for evacuation of the whole facility, is a steady, continuous, audible signal. This alarm cannot be silenced and reset by site personnel. The Fire Alarm Maintenance Section at 667-4027 and the Fire Department Platoon Chief at 667-7026 can silence and reset the alarm.

To evacuate a portion of the building, the public address system is more appropriate. The PA system will notify the occupants of the area to be evacuated, and additionally, will advise personnel in the rest of the facility of the existence of a problem in that specific area.

Upon initiation of an evacuation, either via the PA or evacuation alarm, all personnel are to leave the specified area and go to the muster area, turning off all equipment that could contribute to the hazard if left unattended.

In the event of an evacuation of only a portion of the building, one of the out buildings, or outlying work areas, the Group Leader will designate a control point at the closest and/or the most convenient location. This area will be outside the affected area and will serve as a muster point and provide control of the affected area to prevent further spread of the hazard.

Sweep Team personnel will remain in the area for a visual inspection of all the affected work areas, laboratories, and offices. At least two persons will do the sweep to insure that if an injured person is found or if a single person is fighting a small fire, turning off equipment or activating fire suppression systems, one sweep team member can give assistance while the other reports to the muster area or control point to obtain additional aid.

Allow the reactor mixer to operate unless its operation poses a unique hazard (operation helps remove heat and prevents stratification).

D.6.2.2 TA-50 Waste Incinerator

If a fire or evacuation alarm sounds during the operation of the controlled air incineration process, the operating crew will initiate a process shutdown in accordance with the current operating instructions. Three logic sequences are provided to shut down the process in a safe and orderly manner.

Controlled Shutdown - initiated when there is potential for significant damage to minor process components. This is also the normal shutdown mode at the completion of a run. When controlled shutdown is initiated, feeding of waste to the incinerator is stopped and a programmable set-point generator is activated that directs remote set-point inputs to the temperature controllers, causing a gradual decrease in chamber temperatures. Switches internal to the set-point generator cause an orderly-timed shutdown of process components.

Fast Shutdown - initiated for conditions that could likely result in loss of containment or damage to major process components. Waste feeding is stopped. Following a two-minute timed interval following the last feedi ng of solid waste (immediate, if feeding liquid waste), the upper and lower chamber burners are shut down and the system valves and dampers are positioned so as to maintain a negative pressure in the system while minimizing flow through the system. Snuffing steam is introduced into the lower chamber. The two-minute delay when feeding solid waste allows for the ignition of pyrolitic gases formed immediately after feeding.

Scram Shutdown - initiated at the discretion of an operator. The chain of events are identical to the fast shutdown except that the sequence is not delayed when feeding solid waste. Scram buttons are located at the incinerator and in the control room.

The last two shutdown modes are potentially destructive to the incinerator refractory and are initiated only when the consequences of not shutting down are greater than the consequences to the incinerator during a scram or fast shutdown. It is the responsibility of the operating personnel and the process lead engineer to assess any situation and initiate the proper process shutdown sequence.

D.6.2.3 TA-16 Industrial Incinerator

If a fire or evacuation alarm sounds during the operation of the TA-16 Industrial Incinerator, the operating crew will initiate a process shutdown. The TA-16 incinerator is equipped with automatic and manual controls for shutdown of burners. Burners may be shut down manually by tripping a single switch. Automatic shutdown of the burners will occur on occurrence of a power failure, limit failure, or flame failure.

D.7 SALVAGE AND CLEANUP

The affected area will be surveyed by appropriate representatives from HSE Groups before salvage, cleanup and return to normal operations. Visual inspections of the affected area will be supplemented by sampling to determine whether cleanup is complete. After determination of any existing hazards from toxic or hazardous gases or fumes, electrical hazards, or other unsafe conditions, personnel or selected teams, equipped with proper breathing apparatus and protective clothing, will reenter the area to perform designated tasks to affect decontamination, repairs, and salvage to allow the return to normal operations. After an emergency, the [redacted] will:

- LEDO

Provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion. Contaminated material will be treated as a hazardous waste and temporarily stored at one of the permitted hazardous waste storage areas at the laboratory. HSE-7 will be responsible for determining the final disposition of the waste. This determination will be made in compliance with the permit and RCRA standards.

Remain at the site to ensure that no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed.

Ensure that emergency equipment is cleaned and fit for its intended use before operations are resumed. Equipment will be visually inspected and sampled to determine the type and degree of contamination and appropriate cleanup measures will be used.

Prior to resuming operations, appropriate local authorities will be notified that cleanup procedures are completed and emergency equipment is cleaned and fit for its intended use.

Damage assessment and recovery (LEDO) shall be performed within the reporting and investigative requirements of DOE Order 5484.1. The [redacted] has general responsibility for coordinating post-emergency actions, particularly during the time period immediately after the emergency. Such actions include cleanup operations, repair of vital equipment, or interim hazard-removing operations (such as demolition of unstable walls). The services of the affected operational organizations, HSE Division, the PAWS, and other on-site talent will also be utilized to estimate cleanup costs and operational impact. The [redacted] LEDO declares the end of the emergency; an Incident Report is filled out, and the Group Leader and his staff review emergency actions.

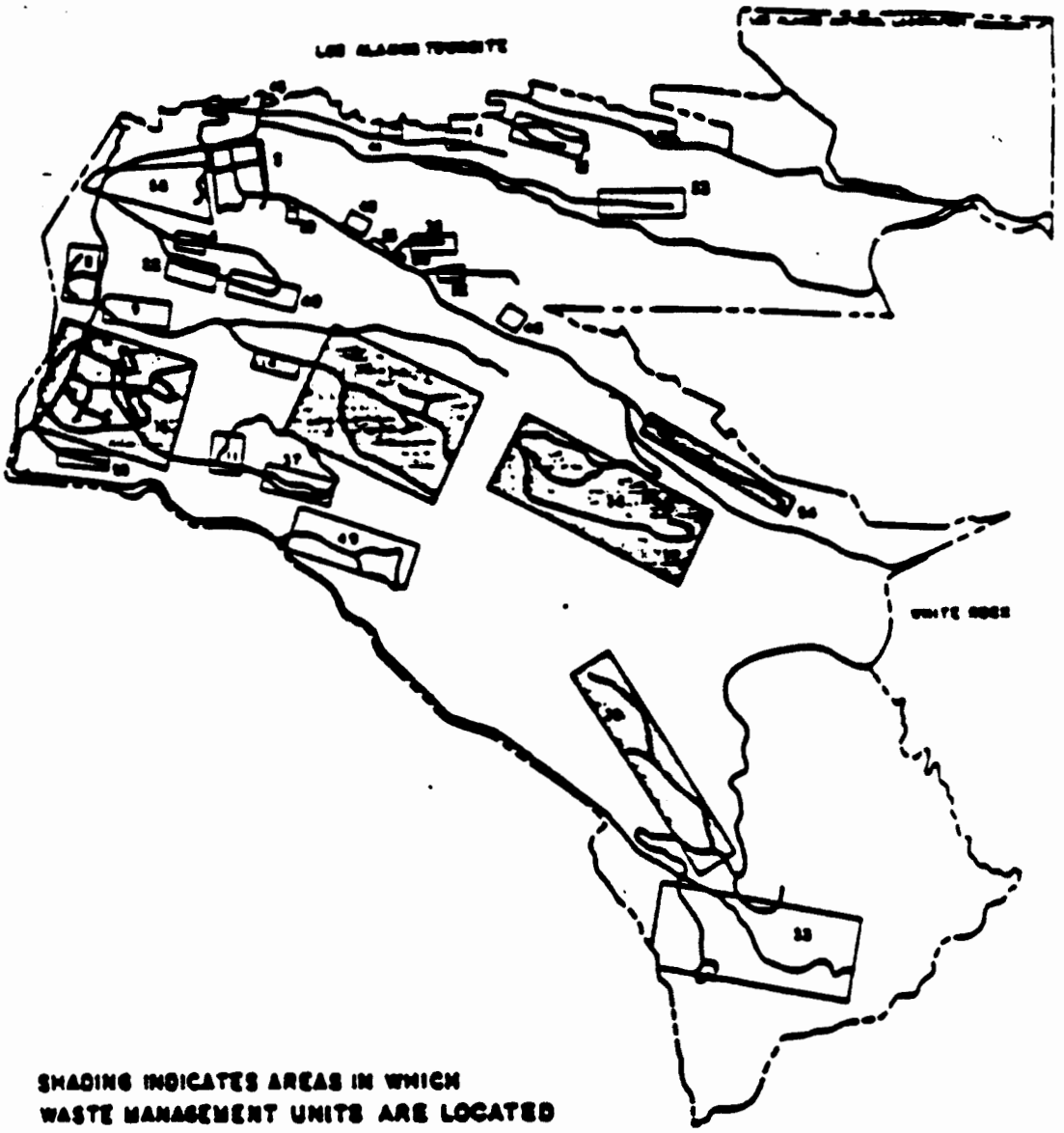
D.8 POST-EMERGENCY ASSESSMENT

When the emergency is over, the causes of the emergency and the effectiveness of the response are investigated, in order that future emergencies may either be prevented, or that the response to them may be more effective. Following each event requiring the implementation of the HWF Contingency Plan, the [redacted] shall meet with representatives of all response functions to determine the adequacy of the response. LEDO

D.9 EMERGENCY RECORDS

The details of any incident that requires implementation of the HWF Emergency Contingency Plan must be noted in that unit's log book. This record must include the time, date, and full description of the incident.

Add page 14?



SHADING INDICATES AREAS IN WHICH WASTE MANAGEMENT UNITS ARE LOCATED

4000 0 4000
SCALE

Figure D-1

LOS ALAMOS
TECHNICAL AREAS

PREPARED FOR

LOS ALAMOS
NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

INTERNATIONAL TECHNOLOGY CORPORATION

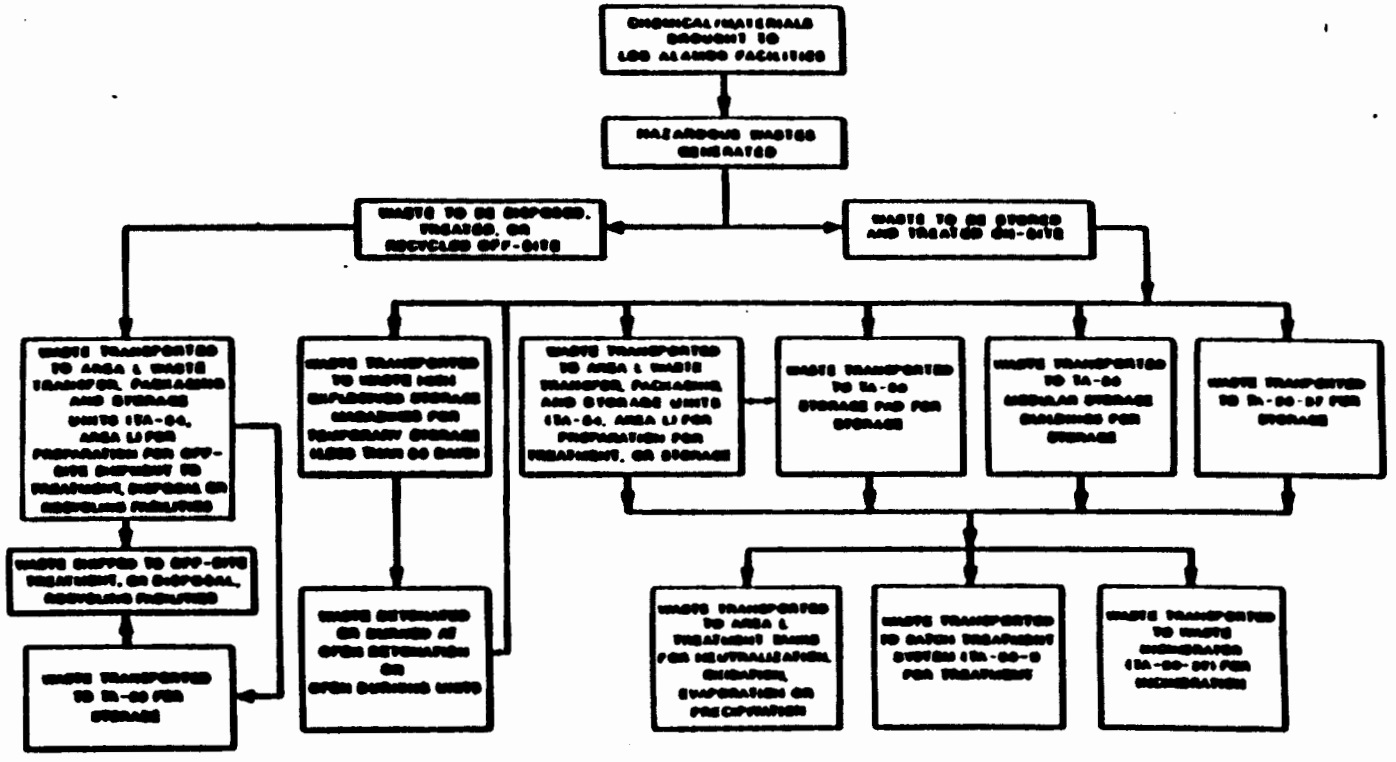


Figure D-3

SCHEMATIC DIAGRAM OF LOS ALAMOS HAZARDOUS WASTE MANAGEMENT ACTIVITIES

PREPARED FOR

LOS ALAMOS NATIONAL LABORATORY

LOS ALAMOS, NEW MEXICO

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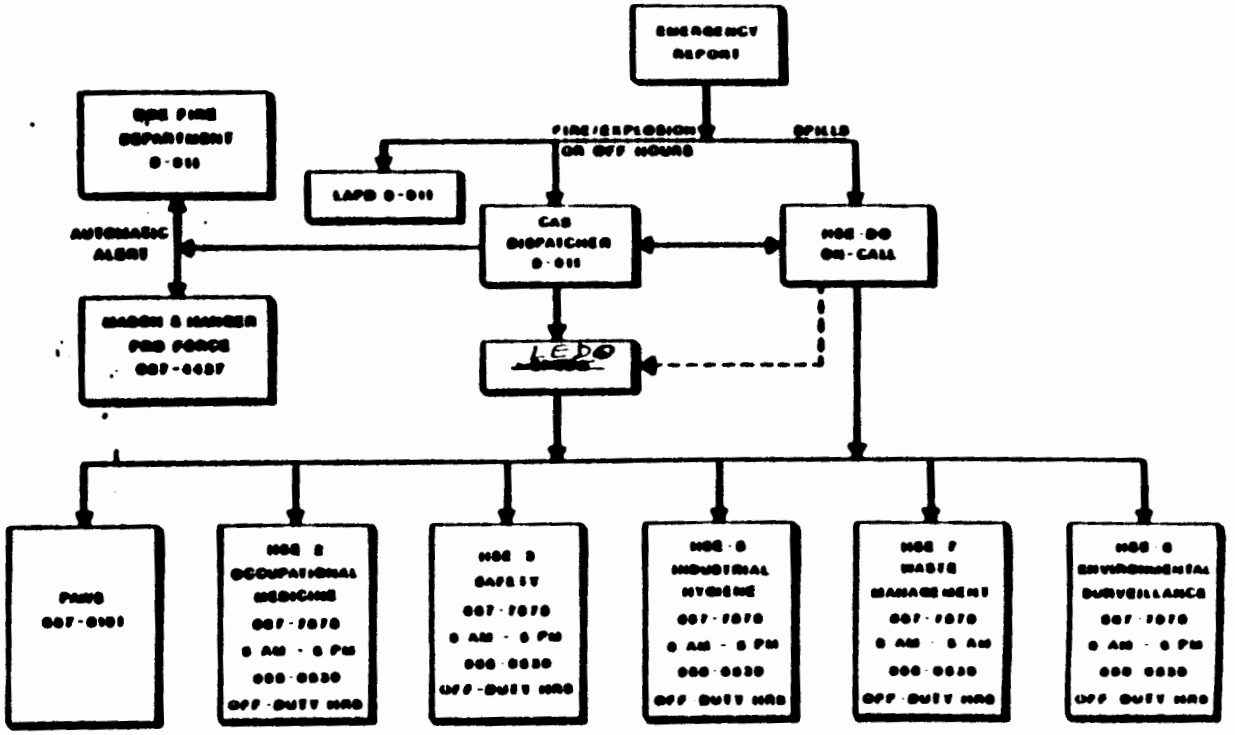

Figure D-5
HAZARDOUS WASTE
EMERGENCY
NOTIFICATION STRUCTURE
PREPARED FOR
LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

TABLE D-2
HAZARDOUS WASTE EMERGENCY RESPONSE GROUPS

Laboratory Controlled Response Group	Emergency Telephone	Assistance Available
HSE-2 Occupational Medicine	667-7878 (8 am - 5 pm) 988-0539	Emergency medical treatment
HSE-3 Safety	off-duty hours	Reviews and approves fire protection procedures. May assist in process shutdown and evacuation
HSE-5 Industrial Hygiene		Site evaluation - field testing to determine the nature and extent of contamination (nonradiological)
		Specify protective clothing and equipment
		Information services regarding hazards of wastes and treatment for exposure
HSE-7 Waste Management		Hazardous waste cleanup, handling, treatment, and disposal
HSE-8 Environmental Surveillance		Field surveys to determine spread of contamination and adequacy of clean up
		Meterological information
		Geohydrologic support
HSE-9 Health and Environmental Chemistry		Chemical analytical services
Fire Department	9-911	Firefighting personnel and equipment
		Ambulance and paramedic service
Mason & Hanger Protective Force (Pro Force)	667-4437	Traffic Control
		Security
Emergency Management Group	667-6211 (8am-5pm) 667-7080 (OFF-Duty Hours)	24-hour Duty Officer (EDO) On-Scene Command & Control, Personnel reporting, evacuation and operations critique

TABLE D-8
EVACUATION DETERMINATION AND REENTRY

Reason for Evacuation	Determination Made By	Reentry Conditions
Fire	Fire or Evacuation Alarm; Group Leader; Alternate; Lead Engineer, Senior Staff Member present, or HWEC	Following survey by the Chief Fire Officer, HSE-1 and/or HSE-5, and R&D Supervision Approval by LEDC
Explosion	Same as above	Same as above plus HSE-3 and Survey by HSE-5,
Loss of Ventilation	Group Leader, Alternate, Senior Staff Member, Lead Engineer, or Senior Technician	Following survey by HSE-1 and/or HSE-5, and R&D Supervision
Loss of Electric Power	Same as above	Same as above
Extensive Contamination	Same as above or HSE-1 Representative	Same as above
Airborne Contamination	Same as above or Rad Monitor	Same as above
Escape or Release of Toxic or Hazardous Gas or Fumes	Group Leader, Alternate, Senior Staff Member, Lead Engineer, Senior Technician, or HWEC	Same as above plus HSE-5
Bomb Threat	HSE-3 or Protective Force Representative, R&D Section Leader, Alternative, Senior Staff Member or Lead Engineer, LEDC	~~Following determination by HSE or Protective Force Representative and R&D Supervision~~ Following determination by the Hazardous Devices Team, and LEDC only.

ATTACHMENT J

INCINERATOR OPERATIONAL SAFETY

J.1 LIMITING CONDITIONS FOR PROCESS OPERATION

J.1.1 Objective

To ensure safety and protection of the environment, the CAI process operations will be conducted within the limits herein, and the following equipment, as appropriate to the activities, must be operating or available before process operations can be conducted.

J.1.2 Process Feed Operation

J.1.2.1 Plant Utilities

Electrical service (normal and auxiliary generator in 10-second standby mode); compressed air (designated and standby compressors); and building fire protection systems (the main water supply is integral to the supply for the wet- and dry-pipe fire sprinkler systems) must be available. Prior to operations in the liquid feed preparation area, the special HALON^{R} fire protection system must be available. The process area HEPA filtered ventilation system must be operating.

J.1.2.2 Plant Instrumentation

Prior to liquid waste operations, a survey of the ambient air in the Liquid Feed Preparation Room must be made, and instruments for measuring combustibles and oxygen concentrations must be at hand during preparation of volatile liquids.

J.1.2.3 Personnel

At least two persons must be on hand during any feed preparation operations.

J.1.3 Low-Temperature Check-Out Operations for the CAI

At low temperatures (below 500^{o}F) the following are required:

J.1.3.1 Equipment

In addition to the minimum equipment requirements listed in J.1.2 above, low temperature operations for instrumentation and equipment checkout and calibration require the following:

J.1.3.2 Utilities

Liquid (diesel oil) and/or fuel gas (natural gas) supply systems; auxiliary cooling water system; uninterruptable power supply (UPS); and instrument air supply (designated and standby compressors).

J.1.3.3 Equipment in the CAI

Quench column pumps and sprays; incinerator induced draft (ID blower or automatic crossover to the HEPA filter plenum in building exhaust); process off-gas HEPA filter banks.

J.1.3.4 Instrumentation

All instrument and control panels must be on and operating. Prior approval of the Section Leader for Technical Support must be obtained to disable any safety interlock. If any interlocks are disabled, the front of the instrument chassis must be tagged and the interlock identified. An appropriate entry must be made in the Operations Log Book when any interlock is disabled or restored to operational condition.

J.1.3.5 Personnel

At least two persons must be present during operation of the incinerator. These are a shift supervisor and an additional process engineer.

J.1.4 High-Temperature Operations for the CAI

During incinerator startup for operation at temperatures above 500°F, and in addition to the items listed in J.1.3, the following must be fully functional:

J.1.4.1 Utilities

Auxiliary generator and automatic switchgear (running and ready); primary, secondary, and cooling tower loops and pumps; cooling tower blower(s) (depending on the outside and process scrub system temperatures); and the process steam generator with the pre-ignition interlock satisfied.

J.1.4.2 Equipment in the CAI

Venturi scrubber system; packed-column scrubber system; process liquid filter and recirculation system; off-gas superheater; and induced draft (ID) blower.

J.1.4.3 Instrumentation

All of the process controls and interlocks listed in the Second Edition of the Final Safety Analysis Report must be operable. No interlocks shall be disabled.

J.1.4.4 Personnel

Personnel requirements are the same as for low temperature operations.

J.1.5 Waste Feed Operations

In addition to the above, the following are required for waste feed operations:

J.1.5.1 Utilities

Waste feed will be terminated if the primary electrical supply system is lost. The loss of the primary water supply system initiates a controlled shutdown of the incinerator.

J.1.5.2 Equipment

During incinerator waste feed operations, all equipment specified in the previous sections must be fully operational. Waste feed operations shall cease until any discrepancies are corrected.

The NMEID permit for incineration of RCRA-listed and characteristic wastes specifies minimum operating temperatures, minimum percent oxygen in the secondary chamber, maximum carbon monoxide levels in the off-gas, maximum feed rates, and other parameters for hazardous waste feed operations. These parameters are detailed in Permit Module V for RCRA waste.

J.1.6 Process Off-gas Treatment

The following are required for off-gas treatment:

J.1.6.1 Equipment

Gas stream exit temperature from the quench column not greater than 350^{o}F; gas stream exit temperature from the packed-column scrubber not greater than 180^{o}F; gas stream inlet temperature to the process HEPA filters not greater than 250^{o}F; scrubber solution temperature not greater than 180^{o}F.

J.1.6.2 Personnel

In addition to the shift supervisor and process engineer, operations personnel shall be assigned to each shift as required to meet programmatic goals of the incinerator run plan.

J.1.7 Basis

Basis for limiting conditions for process operations is the 1979 AL/OSD Facility and Process Operational Safety Review and subsequent approval of the Operational Safety Requirements, the Technical Development Facility (TDF) Quality Assurance Manual (which includes requirements for reviews by the TDF experiment safety committee and design committee), and Administrative Requirement 1-8 of the Los Alamos Health and Safety Manual, Chapter 1.

J.2 DESIGN FEATURES

J.2.1 Construction

Except for the office addition, the TDF is constructed of precast, prestressed, pretensioned concrete double-"Tee" sections. The exterior walls are load bearing and are

interior insulated. All sections contain weldments to provide connection of the reinforcing steel between adjacent panels, floors, and roof decks. The interior load bearing walls are of filled concrete block construction. Non-load bearing walls are of metal stud and gypsumboard construction. The building shell is designed to remain as a confinement structure in all but a beyond design basis accident (BDBA).

Building design loads used were in accordance with ANSI Standard A58.1; 1972, and the Uniform Building Code for Earthquake Zone 2, 100 mph wind with a 100 year mean recurrance interval, Exposure B, and roof loads determined for 30 psf snow in addition to the ANSI Standard dead loads.

J.2.2 Fire Protection

The facility is designed for one hour Fire Code resistance with wet pipe sprinklers in all heated areas, except for the chemical storage area and the liquid feed preparation area. Antifreeze and dry pipe systems are installed in unheated areas to meet or exceed DOEM 0552 minimum requirements for "Improved Risk" level of protection.

The CAI process area exhaust duct to the facility main HEPA filter plenum contains a dry pipe water spray cooldown system upstream of the plenum. The plenum contains a mist eliminator/fire screen upstream of the filter banks. The main HEPA filter plenum has a dry pipe sprinkler system and the Bay 2 exhaust HEPA filter plenum contains an antifreeze sprinkler system. The chemical storage area contains a deluge fire sprinkler system and the liquid feed preparation area contains a HALON^{R} 1301 fire protection system.

J.2.3 Ventilation System

Three levels of containment with appropriate ventilation are provided. The four resulting zones are separated from each other by physical barriers and/or pressure gradients. All air exhausted from the process areas of the facility and the waste storage/staging bay is not less than double HEPA filtered before release from the facility stack. The ventilation supply and exhaust blowers are interlocked with the fire alarm system. A fire alarm initiates shutdown of these blowers to reduce the amount of oxygen available to a fire. Likewise, the liquid feed preparation area inlet air supply louvers and the ventilation exhaust blowers are interlocked with the fire alarm and the HALON^{R} system to isolate the room before the fire extinguishing medium is discharged.

J.2.4 Liquid Effluents

Except for the sanitary sewer system, all liquid effluents from the facility and the process are collected in sumps and are transferred through the double-contained and monitored radioactive waste line to the Industrial Waste Treatment Facility.

J.2.5 Utilities

The TDF has a diesel powered auxiliary generator and automatic switchgear which, when on standby mode, will supply electrical power to critical equipment, as well as communications and lighting to critical areas, within 10 seconds of a power failure. In

the running and ready mode used during all incinerator operations, the transfer time is less than one second. A battery powered Uninterruptable Power Supply (UPS) system provides power to the instrumentation and controls if the auxiliary generator and line power are both lost.

Designated and backup air compressors, powered from both the line and auxiliary sources, provide instrument air to the pneumatic process devices. These compressors are backed up by compressed gas (nitrogen) bottles.

J.2.6 Process

The CAI has a number of engineered safeguards:

J.2.6.1 Fire Protection Systems

In addition to the facility wet pipe, antifreeze filled, deluge, and dry pipe sprinkler systems, the process has several engineered fire protection systems:

The liquid feed preparation room has a HALON^{R} 1301 fire protection system, also initiated by UV detectors, temperature sensors, or manual pull station. The air supply louvers and exhaust blowers are interlocked with the alarm system to isolate the room prior to the HALON^{R} release.

The chemical storage area deluge sprinkler system is provided with a Fire Department connection for the addition of foam fire suppressant from a tanker truck.

The blowers supplying and exhausting air from the CAI process area and the waste storage/staging area are shut down upon the initiation of a fire alarm, to limit the oxygen available to a fire.

The floor drains in the CAI process and support areas and the sump in the radioactive waste storage area are connected to the facility sump tank in pit in Room 112. This tank discharges to the double contained and instrumented industrial waste water pipe line to the treatment plant at TA-50, Building 1. Fire water from the CAI process and support area sprinkler systems is collected by the floor drains. The radioactive waste storage area fire water is collected in a floor sump and is pumped to the facility sump tank. This floor sump is provided with an overflow drain to one of the chemical storage area sumps in the event that sprinkler flow in this room exceeds the pump capacity. Fire sprinkler water in Bay 2 and the main HEPA filter plenum system flows through floor drains and directly into the industrial waste line to the treatment plant.

There are no floor drains in the bermed liquid feed preparation area. The chemical storage area is provided with sumps of sufficient volume to contain the entire contents of the storage area containers and not less than thirty minutes of the deluge sprinkler system flow.

J.2.6.2 Liquid Blend/Feed System

Except for the transferring of liquids from the shipping containers to the waste feed tanks (which requires hands-on operations), liquid blend/feed station operations are performed from the control panel outside the liquid feed enclosure. Selected controls and

instrument readouts are also located at the incinerator main control panel and the liquid burner station at the incinerator.

J.2.6.3 Incinerator Controls and Interlocks

Incinerator startup and operation are automatically controlled and the systems are interlocked to prevent unsafe operation. Three shutdown modes (controlled, fast, and scram), with automatic and/or manual initiation, are provided to ensure safe shutdown of the process. Both visible and audible alarms are provided for fault indication.

J.2.6.3.1 Pre-Ignition Interlocks

Incinerator startup is prevented if faults are detected in the incinerator negative pressure, burner fuel supplies, and off-gas cleaning and cooling systems.

J.2.6.3.2 Startup Controls

A sequential timer controls air purge, pilot ignition, burner ignition, and flame failure shutdown.

J.2.6.3.3 Temperature Controllers

After startup, the incinerator is brought to temperature manually or automatically by a single station microprocessor-based controller. In the run mode, incinerator temperatures are maintained at set levels by temperature controllers.

J.2.6.3.4 Waste Feed Interruption and Cut-Off Interlocks

During operation, certain fault conditions require that liquid and solid waste feed be interrupted. In the case of solid waste feed, the loading cycle timer is disabled and the ram feeder is placed into standby mode. Liquid waste feed is instantaneously interrupted by closing of a solenoid shutoff valve on the liquid waste feed line.

J.2.6.3.5 Shutdown Controls

The detection of certain faults in the process equipment controls and interlocks will initiate one of three logic sequences (controlled, fast, or scram) provided to shut down the process in a safe and orderly manner, as dictated by the nature and potential consequences of the fault.

J.3 ADMINISTRATIVE CONTROLS

J.3.1 Responsibilities

Ultimate safety of the TDF operations lies with the HSE Division Leader, who appoints personnel to be responsible for the daily operation of the facility. These responsibilities include oversight of all engineering functions associated with maintenance and modifications of the building and with operating, maintaining, and modifying the CAI process.

J.3.2 Training

Training requirements for personnel assigned to the incinerator operations are delineated in Permit Attachment C.

J.3.3 Other Controls

The Technical Support Section maintains an emergency plan that is reviewed annually and updated as changes occur. Each employee assigned to the TDF has a copy of the emergency plan.

J.3.4 Internal Safety Review System

HSE-7 maintains a safety committee and appoints a safety officer to oversee safety functions of the group. The safety committee performs routine safety inspections of all HSE-7 facilities. A representative of HSE-3, Industrial Safety, is an ad hoc member.

J.3.5 Documentation of Operating Procedures

J.3.5.1 Operating Manual

An Operating Manual for the CAI process is maintained at the TDF. This manual is reviewed and updated as required. Each person assigned to TDF operations receives a copy of the manual. Manual contents are as follows:

1. Technical Support Section Organization
2. Operational Safety Requirements (OSRs)
3. Standard Operating Procedures (SOPs)
4. The TDF Emergency Plan
5. Facility Description
6. Facility Operating Instructions (OIs)
7. Process Description
8. Process Operating Instructions (OIs)
9. Utility Operating Instructions (OIs)

J.3.5.2 Standard Operating Procedures

Standard Operating Procedures (SOPs) are in effect for operations in the TDF, as specified in Administrative Requirement 1-3 of the Los Alamos Health and Safety Manual. The Technical Support Section reviews all SOPs at least annually and submits updates and revisions to the HSE Division SOP Committee for review and approval.

J.3.5.3 Special Work Permits

A Special Work Permit (SWP) must be obtained prior to conducting potentially hazardous activities not covered by an SOP. The building manager reviews and approves SWPs. The appropriate disciplines in Facility Engineering (ENG-5), Radiation Safety (HSE-1), Industrial Safety (HSE-3), and Industrial Hygiene (HSE-5) also review the SWPs.

J.3.5.4 Operating Instructions

Operating Instructions (OIs) are the detailed process equipment operating procedures and check lists required to safely start, operate, and shut down the CAI process, utilities, and other mechanical equipment. Members of the section's engineering staff write the OIs, which are then submitted for peer review within the section. The OIs are revised as operational requirements dictate.

MARCH EXHIBIT NO. 1

Information from No Immediate Danger, Prognosis for a Radioactive Earth by Rosalie Bertell (published in 1985)

Review of professional health literature makes several facts clear:

1. Numerical projections of health effects have been made primarily for selected causes of death and ill health, namely malignant solid tumors, leukemia and serious transmittable genetic diseases.

2. Analysis and reporting of more generalized ill health, earlier occurrence of chronic diseases, and most especially, the mild mutations in offspring, have been superficial or non existent.

3. The measurements of fatal radiation-induced cancers and severe congenital malformations or disease syndromes in offspring are highly imprecise and probably underestimate the problems.

4. The prestigious US NAS Committee on the Biological Effects of Ionizing Radiation, when deadlocked on the issue in 1979, asked Dr. Edward Radford and Dr. Harold Rossi, the two principal contenders for opposing estimates, to leave the committee. In their absence the committee decided on what the press described as a "marvelous compromise" estimate of the expected number of excess cancer deaths per rad exposure to ionizing radiations.

5. The prediction, the "marvelous compromise" is used as a basis for legal liability in case of accidents such as Three Mile Island or for environmental impact statements prior to licensing a new nuclear installation (such as WIPP).

6. The "marvelous compromise" is also used for deciding risks versus benefits, and the level of ill health which is deemed "acceptable" to the public. It forms the basis for denying veterans' claims and worker compensation cases.

7. Actual deaths, and radiation-related illnesses other than those officially selected in exposed individuals and their children, still go unmeasured.

8. No major study has been undertaken to resolve the scientific controversy and no public debate has demonstrated the human acceptability of the value judgments made by the "experts".

9. A compromise between two estimates of the number of radiation-induced fatal cancers reached by a committee will have little or no effect in the real world of sickness and death.

10. These estimates only affect the legal and political world. It is a bizarre way to solve a problem which has such tragic human consequences.

Above ground nuclear testing, the venting to the atmosphere during underground testing, the routine, daily releases from power plants and bomb factories, and the accidental or experimental massive releases of radionuclides into the atmosphere has in the past and continues today to build up a layer of radioactive particles in the upper atmosphere which will slowly drift to earth over the next decades. Further, released radionuclides produce nitric oxides in the stratosphere, where they act to deplete the ozone layer. They later return to earth as acid rain.

In spite of the handicap posed by the inadequate information routinely gathered on public health in the US, several attempts have been made by scientists to demonstrate an increase in birth defects, neonatal deaths or cancers due to nuclear weapon testing or contamination near nuclear installations, both commercial and military.

An outspoken critic of above-ground nuclear weapons tests was Dr. Ernest Sternglass, a physicist

There is a curious misconception in some quarters about alpha particles. Those who endeavor to assure the public about the safety of nuclear power and nuclear bomb building are fond of a little demonstration they make. They place an alpha-emitting source near a machine that counts the emissions, and show the counter whirring. Then a piece of paper is placed between the source and the counter, and the whirring ceases. What the public is supposed to construe from this demonstration is the "weakness" of alpha particles for causing biological damage. "After all, they can't even make it through a sheet of paper." The reader by now knows how ludicrous this demonstration is. **The reason the alpha particles do not get through the paper is that they are so effective in damaging chemical bonds in the paper that they transfer all of their energy in just the thickness of the sheet of paper.** The appropriate conclusion is that alpha particles should be expected to be very damaging in going through tissue. If an alpha-emitter is lodged, for example, in the lining epithelium of the bronchi (where lung cancer originates), three or four sensitive cells there will get an enormous blast of energy as one alpha particle expends its energy in passing through them. To be sure, however, an alpha-emitter on the surface of the body cannot produce radiation injury to internal tissues.

Health effects are cumulative, that is, health effects increase with an increase in the total amount of radiation delivered to a particular tissue. Age at irradiation is all- important in determining cancer induction by radiation: the young are far more sensitive than the old. The scientific literature is rife with a lack of appreciation of the importance of age at irradiation.

The "Permissible Dose"

An early ICRP recommendation was that the permissible dose for occupational exposure should be calculated according to this formula:

Dose accumulated at a particular age = (5) x (age minus 18) rems,

with a maximum permissible yearly dose of 12 rems and 3 rems per quarter. There is not a shred of scientific substance behind this elaborate minuet of 5-rem and 12-rem annual doses. Nor is there any basis for the 3-rems-per-quarter limitation. In the author's opinion the reason for all these variations of permissible dose is to make it **appear** to the worker that someone somewhere must know what he is doing in setting dose limits.

The real issue is the use of the word **permissible.** Workers are encouraged directly and indirectly to believe that **permissible** means **safe**. The reader of this book now knows that **there is not a shred of evidence whatever for any safe dose of ionizing radiation with respect to cancer induction: cancer is expected to be in excess in proportion to the dose received.**

(Karl Z. Morgan suggested a reduction of the permissible exposure to plutonium and other transuranic elements. Karl Morgan has stated that there is 20 times more damage caused by plutonium than was suspected at the time of standard setting.)

The Redesigned Forest

Chris Maser

EXHIBIT NO. 1

Please submit as an Exhibit and Read before deciding —

Part Three

CHANGE, WHY ARE WE AFRAID OF IT?

The unleashed power of the atom has changed everything save the way we think and thus we drift toward unparalleled catastrophe.

—Albert Einstein

submitted by
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As we move toward a new design for forests, we need to pause and consider the whole matter of changes. Large changes are indeed called for, and they are not merely a matter of trees. Change is defined as: to make different in some way. Change is definable mainly in terms of its opposite, constancy—that which is constant. Long-term changes, such as occur in unmanaged forests, are seen by short-lived human beings as constants. Constant is defined as: something that is invariable or unchanging. If everything were constant, change would not exist. We are comfortable with that which appears to be constant because it lulls us into thinking that we know what to expect. We take constancy for granted, however, and are surprised, often hurt, and sometimes terrified when we find that change has occurred. We therefore do our best to avoid change in ways that we are not even aware of. According to Bella (1987a), organizations, such as the U.S. Forest Service and the Bureau of Land Management, launder data and information for the "good" of the respective agency but not with the intent of dishonesty or malice. And I agree. Bella (p. 360) states:

> Modern society depends . . . [on] organizational systems for much of its information, particularly with respect to the assessment of large-scale technological projects [such as management of our forests]. It is reasoned that organizations tend to distort information to meet organizational needs. Such distortions do not depend upon dishonest behavior on the part of individuals. Rather, tendencies to distort information are systemic properties of the organizational systems themselves. As the power of modern technology grows, the consequences of distorted assessments become more serious and potentially catastrophic. . . .

Change is inevitable, however, and we can learn something about change from Buddhism, the whole philosophy of which is based on the *acceptance of change.* The Buddha taught the Four Noble Truths. The First Noble Truth—Truth of Suffering—states that the outstanding characteristic of the human situation is suffering or frustration, which comes from our difficulty in accepting that everything around us is impermanent and transitory. "All things," said the Buddha, "arise and pass away." The root of Buddhism is that flow and change are the basic features of Nature, and suffering arises whenever we resist the flow of life, whenever we try to control circumstances and cling to fixed forms, such as things, events, people, or ideas (Bukkyo Dendo Kyokai 1985, Capra 1975).

The second Noble Truth—Truth of the Cause of Suffering—deals with clinging or grasping. It is futile to grasp life from a wrong point of view, from ignorance. We divide the world we perceive into individual and separate things out of ignorance and thus attempt to confine fluid forms of reality in unchanging mental boxes. So long as we do this, we are bound to experience one frustration after another. Trying to create anything fixed or permanent in life and then trying to cling to its perceived permanence is a vicious circle, which is driven by karma, the never-ending chain of cause and effect (Bukkyo Dendo Kyokai 1985, Capra 1975) (see Fig. 1). As stated by the Buddha, "It is the everlasting and unchanging rule of this world that everything is created by a series of causes and conditions and everything disappears by the same rule; everything changes, nothing remains constant" (Bukkyo Dendo Kyokai 1985, p. 42).

This idea, that everything is constantly changing, that nothing is permanent, can be looked at another way—*acceptance of what is.* What is, is. It cannot be otherwise. I can't, for example, control circumstances, but I can control how I *react* to circumstances. If I simply accept the circumstance, I am in control of myself; if I fight the circumstance, try to control it, it controls me. What we resist persists.

One fascinating way in which people resist political and social change is to project their biases onto Nature. Taylor (1986, p. 334) cites a couple of interesting examples:

> . . . in the seventeenth century . . . during the English Civil War[,] the beehive, with its queen, drones or "nobles," and its workers, was regularly employed by Stuart supporters to defend the concept of feudalism and social hierarchy. This tendency to project human values onto nature and then use such values to lend support to a particular world-view or social structure can again be witnessed throughout the nineteenth and twentieth centuries. Thus, for . . . William Bateson, the natural hierarchy of the biological world was seen to legitimize British class structure. Indeed, for a number of late nineteenth and early twentieth century thinkers, such concepts as biological hierarchy and homeostasis [a state of physiological equilibrium] were employed to validate and support those traditional values that were being eroded away in a rapidly expanding industrial world.

Acceptance of a circumstance—that which is—is based on the notion that you can't move away from a negative; you can only move towards a positive. To illustrate, you are near timberline on a mountain that is rich in patches of huckleberries. It is a warm, sunny, autumn afternoon and you are peacefully picking berries, sweet, juicy huckleberries. Suddenly you come face to face with a large bear also eating berries. Without thinking, you start to run away from the bear, and because you are running away from it, looking at the bear over your shoulder to see how close it is, you will either run into the tree you wanted to climb or you will run past it. Your other choice is to run toward the tree, not away from the bear. In this case, you focus all your attention on the tree and simply run like hell. You don't know where the bear is and you don't care, but you know exactly where the tree is and you care about that very much.

Go back to the discussion of "Where are you?" and reread it. You can only accept what is if you are present in the here and now. We, in Western culture, spend an inordinate amount of time wanting things, circumstances, to be different; we therefore frustrate ourselves by refusing to accept what is as it is now, right now, this instant. We cannot control circumstances, be they how a forest functions or how the market for woodfiber products acts over time. *We can only accept what is and control how we react to it* (Fig. 21a, b, c).

Because nothing is fixed or constant, no matter how much we insist on thinking it is, nothing is as it appears to be. As Capra (1975, p. 44) wrote, "Whenever the Eastern mystics express their knowledge in words—be it with the help of myths, symbols, poetic images or paradoxical statements—they are well aware of the limitations imposed by language and 'linear' thinking. Modern physics has come to take exactly the same attitude with regard to its verbal

models and theories. They, too, are only approximate and necessarily inaccurate." The same is true in managing forests; everything we do is "only approximate and necessarily inaccurate." There are no absolutes.

So how do we deal with change? Taylor (1986) made an astute observation in regard to this question. He wrote (p. 334):

> Throughout Western literature, our descriptions of the natural world have reflected the values and biases of a given period in our history. Indeed, our perceptions of nature often tell us less about what is actually "out there" in the landscape, and more about the types of mental topography and projections that we carry about in our heads. It is natural, therefore that as values change, so too do our views regarding nature. . . .
>
> . . . the form that our Western knowledge has taken has been predicted . . . [on] . . . the "objectification" and control of other people as well as the natural environment. However, we are at a stage in history when—if only for our very survival—it becomes increasingly necessary to realize that our ultimate security lies not in the ongoing separation of ourselves from one another and the environment, and not in a consciousness based upon fragmentation and manipulation—but rather in the relinquishment of such thought patterns in favor of a consciousness of wholeness and integration. . . . And so in order to step successfully into the future, we must find the courage to step first into the deepest recesses of ourselves. . . .

Gentle reader, we cannot change history, and we cannot change each other. We can only change ourselves, and as we change ourselves, our perception of each other and everything else changes.

No "enemies" are "out there"

Enemy is defined as: one seeking to injure, overthrow, or confound an opponent; something harmful or deadly; a hostile unit or force. Fear is defined as: an unpleasant, often strong emotion caused by anticipation or awareness of danger; reason for alarm. Frightened is defined as: to make afraid, terrify; to drive or force by frightening. There are no "enemies" "out there," only other frightened people who perceive the need to defend themselves from potential loss of what they value—dignity, a human resource that is strangely affected by the supply and demand for products from natural resources. We do not think of ourselves as an enemy

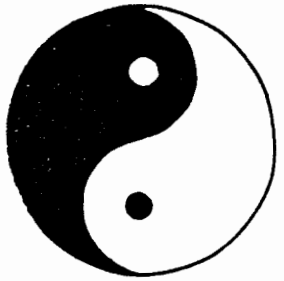


Fig. 21. (A) Everything is cyclic in Chinese thought; this notion is expressed in a symmetric arrangement of the dark *yin* and the bright *yang*. The rotational symmetry forcefully suggests a continuous cyclic movement: As the *yang* returns cyclically to its beginning, the *yin*, attaining its maximum, gives place to the *yang*. The two dots symbolize the idea that each time one of the forces, *yin* or *yang*, reaches its extreme, there already is contained within it the seed of its opposite.

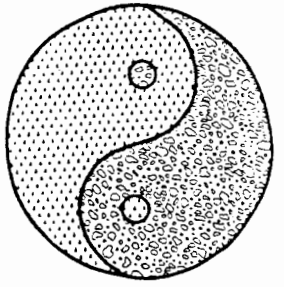


Fig. 21. (B) In this figure are the aboveground portion of the forest (tree crowns) and the belowground portion of the forest (tree roots and soil) shown in a dynamic cycle. The dots represent that old-growth forests recycle nutrients into the soil and the soil in turn gives up the nutrients to the next forest.

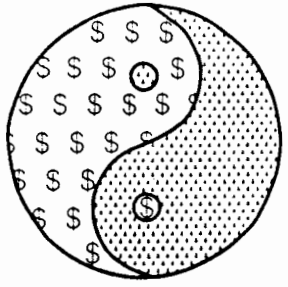


Fig. 21. (C) This figure represents the managed forest with forest biology and forest economics in a dynamic cycle. The dots represent the idea that a healthy forest is the most economical and it takes a reinvestment of mineral and organic capital in the forest to ensure its health.

because we are convinced that *our* position, *our* values are the *right* ones, and everyone knows "the enemy" is wrong. That is what we are taught. That is the unchanging, eternal verity around which Nationalism and Patriotism rally.

Stoessinger (1974) uncovered some enlightening common denominators in his book *Why Nations Go to War.* Some of his ideas (selected from pp. 219–230) are worth repeating here because when and where we see another human being as an enemy we perceive a potential war:

> 1. Turning to the outbreak of war, the case studies indicate the crucial importance of the personalities of leaders.
>
> 2. The . . . most important single precipitating factor in the outbreak of war is misperception. Such distortion may manifest itself in four different ways: in a leader's image of himself; a leader's view of his adversary's character; a leader's view of his adversary's intentions toward himself; and, finally, a leader's view of his adversary's capabilities and power.
>
> 3. Distorted views of the adversary's character also help to precipitate a conflict.
>
> 4. If a leader on the brink of war believes that his adversary will attack him, the chances of war are fairly high. If both leaders share this perception about each other's intent, war becomes a virtual certainty.
>
> 5. A leader's misperception of his adversary's power is perhaps the quintessential cause of war. It is vital to remember, however, that it is not the actual distribution of power that precipitates a war; it is the way in which a leader *thinks* that power is distributed.
>
> 6. Thus, on the eve of each war, at least one nation misperceives another's power. In that sense, the beginning of each war is a misperception or an accident. The war itself then slowly, and in agony, teaches men about reality.
>
> 7. At the very moment when mankind has the power to destroy the earth, men also have begun to perceive the planet as a whole.
>
> 8. Similarly, problems of resources and environment will be surmounted on a global basis or not at all. Thus, in both cases, the brute logic of the insensate machine has dictated a modicum of world order: the terror of atomic fire, and the prospect of man choking in his own waste. And out of this terror has sprung the recognition of the need for flexibility and change. The bomb must not become the earth, nor must the earth become the bomb.

What Stoessinger has outlined as war is a cycle of attack and defense based on the *judgment of appearances.* Appearance is defined as: outward aspect; outward indication, and judgment is defined as: the process of forming an opinion or evaluation by discerning and comparing; a proposition stating something believed or asserted; a formal utterance of an authoritative opinion. Our judgments are necessarily wrong because nothing is as it appears since appearance is external. Therefore, those whom we define as enemies are those whom we mistakenly perceive as dangerous. And mistake means to make a wrong judgment of character or ability based on inadequate knowledge. If we are not each other's enemies, what is the enemy? What are we afraid of?—change, loss of something we value through circumstances we cannot control.

Control, a synonym for power, is an interesting phenomenon in our lives. We pay dearly for control, but regardless of the price, there are limitations. For example, have you ever had a "bad" day, a day when nothing went right, a day when you "felt out of sorts"? On such a day, every little external thing that can go awry does so and unduly annoys you. That is because you "feel out of sorts," not at peace with yourself internally, and you therefore feel compelled to control the environment around you. If, on the other hand, you have a "good" day, a day when everything goes right, a day when you "feel in tune with the world," you have inner peace, inner control. On such a day, external things that still "delight" in going awry do not bother you. We cannot control circumstances. We can control how we react to circumstances, and that is both our problem and our solution. Because we are afraid of change, of loss, we want to remain the same and control the circumstances so other people—our perceived enemies—will have to risk change, but not us. There are no enemies out there, only people frightened of change or being out of control, and therefore mistakenly rejected by their fellow human beings.

How does this relate to management of our forests? When we focus our attention on the human enemies we perceive in land-management agencies and industry, we are really focusing on the wrong thing, as Bella (1987a, p. 367–368) points out:

> . . . Organizational systems filter information . . . to protect their members from information unfavorable to the system itself and its behaviors. Organizational systems shape the perceptions and

beliefs of those within the organizations in ways that "keep the system going" even when catastrophic outcomes are involved.

The human fault that leads to the distortion of information is not limited to willful deceit. Individual honesty is necessary but insufficient to prevent the widespread distortion of information. The human fault of concern is more insidious than willful deceit. This fault involves the acceptance of a life that involves completing one's assignments. This hardly sounds untrustworthy, much less dangerous, but it is this "functionary" behavior that allows systematic distortions to occur.

Bella (1987a) goes on to say that a person who limits his or her inquiries and questions only to his or her assignments turns his or her mind over to the system and allows the "system" to shape it according to its needs. "One becomes a functionary of the system not by compromising one's beliefs, but rather, by turning responsibility for one's perceptions and beliefs over to the system." The fault lies not in the assignment but in not accepting personal responsibility for the outcome of the assignment on the environment and on society as a whole. Performing an assignment (simply taking orders without thinking about them) is personally safe and environmentally and socially risky. On the other hand, it is often personally risky—if you want to keep your job—to question orders, which is what people in land-management agencies and industry are given, but to question the orders is both environmentally and socially responsible (Bella 1987b).

The point is that most professionals in land-management agencies and in industry are told what level of professionalism they will practice if they want to keep their jobs. So they trade their dignity and professionalism in on fear and that is what we judge them for. There are no enemies out there, only frightened people who have lost control of their lives to an ever-growing system that dehumanizes individuals in order to maintain itself.

The crack in the sidewalk

Have you ever been dressed up in your Sunday finest and gone for a casual stroll on a warm, sunny afternoon? And as you saunter along feeling quite debonair you suddenly trip on a crack in the sidewalk. Instantly embarrassed and feeling foolish, you look around to see who saw you trip, who saw the "real" you. Feeling

foolish is one of our greatest fears because we think it leads to rejection by other people when they find out what we are "really" like.

Although "feeling foolish" seems to be one of our greatest fears, it is really only "performance anxiety." Performance anxiety is the fear of ridicule, rejection by other people as not being okay because they did not approve of our performance. Again, if someone actually laughs because you tripped on the crack, the person who laughed is judging appearances—a mistake—because by profession you are a tightrope walker who performs 50 feet above the ground with no net under you, and last Friday at the circus the person who just laughed applauded your performance as part of a standing ovation. The problem now is that the person who laughed simply did not recognize you. There was nothing personal in the laugh, but *you took it personally—and that is your choice.*

Even animals feel "foolish" and get "embarrassed." Have you ever watched a cat get embarrassed and sniff a table leg? It's really very common and is called "displacement activity." The cat is trying to shift attention from the "embarrassment" to the table leg. I used to have a small dog, Jamuna, who was fiercely protective—in her mind anyhow. We lived at the edge of a forest. I came home at dusk one evening, and as I walked up the gravel road, my little dog came roaring out snarling and barking at the top of her voice. She was in fact running right at me with great presence of mind because, when I spoke to her, she swerved just enough to race past me and give the unseen boogie behind me a good, professional barking. Then she came to greet me, "knowing" all the time that it was I.

Our fear of rejection by other people, of being judged as not okay, causes us to do a variety of things based on our perceived "need" to "protect ourselves from attack." Our major defense against attack is to become inaccessible (unknowable, a proverbial mystery). We become inaccessible in a number of ways. I used to be inaccessible by growing a large, bushy beard to so terrorize the world that people would keep their distance. When asked, "Why do you have a beard?" I would answer, "Anything that *hides* (to become inaccessible) the lower half of my face is an improvement." (The only problem was that I am bald and all that bush made me look like my head was on upside down!) My beard had become my identity. My dreams told me that. I used to dream that I was shaping my beard with a razor and, slipping, would cut a chunk out of it. I would then go into a blind panic because I was exposed—my "cover was blown."

Although I initially grew my beard as a creative gesture, it unconsciously became my identity and then my hiding place, my inaccessible retreat, my self-prison. We also hide behind mustaches, those little caterpillars that cling desperately to the upper lip and cringe every time the razor comes by. We hide behind dark glasses, big glasses, and glasses with fancy frames. Exuberancy with bright facial makeup is another way to hide. I used to have a neighbor who had to "put on her face" before she could face the day. I say hide because anything that diverts your eyes from contacting mine allows me to hide. After all, "the eyes are the window to the soul." We're really not different from a child standing in the middle of a bare room, covering his eyes with his hands and thinking he is hidden. The ultimate in being inaccessible these days—tuning out the world—is a fancy hat, dark glasses, a big beard, and earphones from which you can hear "music" emanating 10 feet away. And I do all this because I am afraid of you; afraid my performance of just being human is not up to your standard of what is "okay." Of course, since I'm also afraid to ask you what you think of me, I'll never know; I am afraid of not knowing, so I expect the worst and feel compelled to hide—to be inaccessible. And, in addition to all of this, we hide behind our social masks or persona, that carefully rehearsed and projected behavioral pattern that we think is acceptable to others while "hiding our real selves."

Again, what does this have to do with managing our forests? Well, if I feel trapped in an agency or industry that demands something less than my best professionalism, I am afraid of being not okay in your eyes, of being judged and found guilty because I am afraid to risk being honest with myself, which means I might have to resign to maintain my integrity. My job is at stake, and I'm afraid to resign because I don't know what I would do, and I don't feel good about my fear, so I hide behind my defensive masks. That way, I'm okay so long as you don't "know" me and find out how frightened I really am and how lousy I feel about my lack of courage. I'm okay so long as you don't challenge my professionalism—my ultimate mask—which brings up my self-failure, which I must then defend knowing all the time that I'm not being honest. Fear of being judged a nonprofessional becomes the crack in my sidewalk.

I always do the best I know how because my survival depends on it. Some days I may do something better than other days, yet each day is my best. My best is always tempered by how I feel, physically, mentally, and emotionally. You cannot see this, and I often do not know it; refresh your memory with our discussion about "good days" and "bad days." Of course, there is no such thing as a "good day" or a "bad day," there are only days in which our best is controlled by how we feel, not by what we think. When I tell myself that I "should" do better, I am anticipating what so and so would think if they only knew. I judge myself guilty for not living up to what I think so and so's expectations of me are. I don't ask them so I really don't know what they expect, but I still take myself to the mental woodshed and severely beat myself about the head and shoulders with a club named "guilt."

I believe *everyone*—everyone—does the level best he or she knows how to do at all times, myself included. If this is true, where is the basis for judgment? As stated in *A Course in Miracles* (Manual For Teachers 1975, p. 26):

> Judgment, like other devices by which the world of illusions is maintained, is totally misunderstood by the world. It is actually confused with wisdom, and substitutes for truth. As the world uses the term, an individual is capable of "good" and "bad" judgment, and his education aims at strengthening the former and minimizing the latter. There is, however, considerable confusion about what these categories mean. What is "good" judgment to one is "bad" judgment to another. Further, even the same person classified the same action as showing "good" judgment at one time and "bad" judgment at another time. Nor can any consistent criteria for determining what these categories are be really taught. At any time the student may disagree with what his would-be teacher says about them, and the teacher himself may well be inconsistent in what he believes. "Good" judgment, in these terms, does not mean anything. No more does "bad."
>
> It is necessary for the teacher of God to realize, not that he should not judge, but that he cannot. In giving up judgment, he is merely giving up what he did not have. He has actually merely become more honest. Recognizing that judgment was always impossible for him, he no longer attempts it.

I recently was on a TV program that I was told would air the issue of ancient forests from several points of view. The purpose of the program, I was led to believe, was to help the public understand the scope of the issue. In reality, however, the program was staged as a battlefield on which the moderator both directed and fueled the fires of war at the enormous cost of human dignity. And as the battle raged all around me, I could hear nothing but the drums of fear.

Fear, as I mentioned, is defined as a feeling of alarm or disquiet caused by the expectation of danger, pain, or disaster; a state or condition of alarm or dread. The definition of fear reminds me of a little dog I once knew named "Buster." Buster was afraid of the dark for some unknown but very important reason, important to Buster at least. Every night before Buster was put to bed in the utility room, he had to go outside. That meant Buster must face his fear—the dark out-of-doors—every night, and to bolster his courage, every night he played the same tune on his drum of fear. When Buster heard "bedtime," he flew into a frenzy of barking at the front door. When the door was opened, he dashed outside, hiked his leg on the nearest object, and raced back in, all the time barking at top decibel. Whether Buster's barking was to frighten boogies or to create so much noise that he did not have to listen to those awful night sounds, such as an owl hooting, or frogs croaking, or crickets chirruping, I don't know. All I do know is that every night Buster traded his dignity for fear and beat his drum for all it was worth.

As I again think about the TV program, the ancient forest comes to mind and with it a lesson in humility. When we look at an ancient forest, we focus on the large, old trees that to us signify primeval majesty, a deep sense of place, and a connectedness with ourselves in the past, the present, and the future, where for an instant time becomes irrelevant and forever is now.

Although there is something mystical about each old tree, only together can they give us our own, inner definition of an ancient forest. And yet, we do not even see the forest for the trees. Could we but see belowground, we would find gossamer threads from special fungi stretching for millions of miles through the soil. As described in Part I, special fungi grow on and in the feeder roots of the ancient trees as symbionts that not only acquire food, in the form of plant sugars, from the ancient trees' roots but also provide soil nutrients, vitamins, and growth regulators to the ancient trees. These symbiotic fungus-root structures (mycorrhizae) are the termini of the gossamer threads that form a complex fungal net under

the entire ancient forest and, evidence suggests, connects all trees one to another.

The ancient forest over which the battle raged in the TV studio was unfortunately seen as a commodity of time, a pawn in a struggle of values, but not as a living organism. As the hour aged, the ancient forest became more and more of an isolated abstraction pierced by economic arrows and sliced by preservationist swords. And the protagonists, manipulated by the moderator, judged each other enemies. Thus, we too, the audience, became isolated abstractions. We became "The Forest Service," "The Conservationists," "The Industry," and we ceased to be human beings. We ceased to be human beings when we traded in our dignity on positions of defense and began to beat our drums of fear with all our strength.

What are we all so afraid of that we judge each other so harshly and condemn each other as enemies? We are all afraid of losing that which we value. Industrialists may fear the loss of the greatest profit margin they will ever have in forests—ancient trees that cost them nothing to grow, quality woodfiber that is essentially free for the taking, which if not taken is seen only as an economic waste. Conservationists may fear the loss of the same ancient trees because once gone, so are all other options that involve those trees. And most of the professionals in the public land management agencies are told, through insidious, covert, political pressure, what level of professionalism they will practice if they want to keep their jobs; and because they may be afraid of losing their jobs if they are honest in how they feel about what they are being told to do, they're damned if they do and damned if they don't.

We, like the ancient trees, appear as separate individuals, and we, like the ancient forest united by its belowground fungi, are united by our humanity. But we forget that we are human beings first and everything else second; so we blind ourselves to the fact that there are no "enemies" "out there," only other frightened people who perceive the need to defend themselves from potential loss of what they value—dignity. Dignity is a human resource that is strangely affected by the supply and demand for products from natural resources, and perceived scarcity often erodes human dignity. Of course, we are not the enemy, because our position is the right one, and everyone knows "the enemy" is wrong. The question is: by whose judgment is the "enemy" the enemy and by whose judgment is the enemy wrong? Now and always we must remember that is the time for mercy for as Gandhi pointed out, "An eye for an eye only makes the whole world blind."

decisions, Decisions, DECISIONS

We are products of our decisions, not victims of life. We make hundreds of decisions every day and each fits Robert Frost's poem "The Road Not Taken" (Lathem 1969, p. 105).

> Two roads diverged in a wood, and I—
> I took the one less traveled by,
> And that has made all the difference.

Each decision is a fork in our road of life; each fork is an option, an alternative, a choice. The direction of our lives is a result of many little decisions; a few we remember; most we don't. We usually remember the "big decisions," but we seldom realize that a single, big decision is merely a collection of little decisions along the way.

The life cycle of a salmon epitomizes the destination of choice. A long time ago, before Columbus sailed, a reddish orange egg was deposited in a redd (the gravelly stream bottom that serves as a "nursery" for salmon) in the headwaters of a Pacific Coast stream. There the egg lay for a time as Salmoléttе developed inside. In time, Salmoléttе hatched from the egg and struggled out of the gravel into the open water of protected places in the stream. There she grew until it was time to leave the stream of her beginning and venture into life. She could go only one way—downstream from small to larger and larger streams and rivers until at last she met the ocean. After some years at sea, the inner urge of her species drives Salmoléttе, now an adult, along the Pacific Coast to find the precise river she had descended years earlier. Salmoléttе must make a critical decision. If she selects the wrong river she will not reach her destination, regardless of all the other choices she makes. If Salmoléttе swims into the exact river she had descended, she is on the right track, until she comes to the first fork and must choose again. Each time Salmoléttе comes to a fork in the river, then large stream, then smaller stream, she must choose one or the other; she must accept what the chosen fork has to offer and forgo the possibilities of the fork not taken. Salmoléttе can only return to the redd where her parents had deposited her as an egg if she knows where she is going and when she has arrived. Salmoléttе's goal is to reach a particular place in a particular stream within a particular time to deposit her eggs to be fertilized by a male of her species. Salmoléttе

and her mate will die, but some of their offspring will live to run the same gauntlet of decisions when their time to spawn arrives.

Our lives have a common thread with that of Salmoléttе because every decision we make determines where we are, where we are going, and where we will end up. We are much like Salmoléttе when we are born, but our stream in life is the collective thinking of peer pressure—the need for value, the need to belong. And like Salmoléttе, who goes downstream with the current to the ocean, we accept the route of least resistance, the collective thinking of our peers to fulfill our needs. While Salmoléttе is in the ocean, most of her compatriots and siblings die and become part of the sea. But Salmoléttе and a few others survive and begin swimming against the current, upstream to the place of their beginning—to fulfill their life's purpose of ensuring a new generation.

As we mature, most of us will drown in the ocean of mass thinking, always going with the current, always seeking our sense of value outside ourselves through the acceptance of others who are also drowning in mass thinking. A few, however, will chart their course against the current, against peer pressure, driven by an inner need to find their life's fulfillment in the excellence of achievement. And, like Salmoléttе, they leave behind the seeds, the foundations, for even greater achievements by the next generation—for they have dared to risk the unknown, *change*.

I used to think I had easy decisions and difficult decisions. Now I know all decisions are easy, like the snap of fingers. The difficult part is getting ready to make the decision, which is a process of weighing and making many little, often unconscious, decisions—assessments of risk and benefit. We simply cannot get away from decisions. We have no choice because to avoid a decision is still to make a decision, but often not the wisest one. Nevertheless, we are not victims of life; we are products of our decisions. And our willingness to risk change dictates the boldness of our decisions.

In land management, decisions are often difficult to deal with because one is seldom sure who makes them. Decisions just seem to happen; no one seems to be responsible or accountable, and as Bella (1987a) says, our institutions are self-serving in that they distort "unfavorable" data affecting decisions. For example, in thinking about land-management I find that both the California condor and our ancient forests have been relegated to death row. Who made that decision? Why? What does it mean to society to have both the California condor and our ancient forests on death row?

It only means that 10 years ago it was a good decision—the best I could do. Today, with 10 years more experience, I can make still a better decision, and 10 years from now an even better one. I am not saying that my decision of 10 years ago was socially acceptable, only that for me it was a good one because it was the best I could do at that time.

You, and I, and everyone else always make the best decisions we can at all times given where we are in life. That does not mean that others will necessarily agree with our decisions or we with theirs. It only calls attention to the fact that I must accept your decision as your best because I cannot judge; I don't know *why* you did what you did. I only know what you did and how that *appeared* to me. And if I were to judge, I could only judge the appearance, which tells me nothing about why you did what you did, and, in my experience, *I am always wrong when I presume to judge.*

An older gentleman in the U.S. Forest Service taught me much about judgment and how I sound to other people. I don't remember his name; it was some years ago. Nevertheless, "thank you." I was giving a speech in Spokane, Washington, about fire in forested landscapes and explaining new data and new points of view. When I was finished, the gentleman came up to me and, with a quivering chin and misty eyes, said, "I've been with the Forest Service 29½ years and I'm going to retire in six months. Do you mean to tell me I've been wrong my whole career?" "No sir, I'm not telling you that at all," I said. "You did the best you could with the data you had on hand. Now, however, with much new data, we can make some different choices, different decisions, than you could during your career." Looking at this good man, listening to his faltering question, it came home to me with searing insight how wrong we are when we presume to judge, and that we are doubly wrong when we presume to judge from hindsight. Everyone does his or her best within his or her level of understanding. It is not what we say so much as how we say it. I now know that I can't "hear" myself when I am speaking, so to be gentle and say what I say with love I have to "feel" how I say things.

This makes me wonder how different the TV program, that I mentioned in the section on judgment, might have been had the moderator gently clarified the issue of ancient forests rather than preying on human dignity to maintain a program rating. Keep in mind that, although he had that choice, he also works for a TV station, and, unbeknownst to him, he may have traded in his choice of

heart for the security of his job as dictated by the station and its drive for high viewer ratings. Nevertheless, whether I agree with the program or not, the moderator did the best he could in that circumstance.

Of captains and cooks

Society is composed of individual human beings much as the compound eye of an insect that is composed of individual facets. Each facet has its own light-sensitive element, each has its own refractive system, and each forms but a portion of the image. As there are as many points of view in the compound eye of an insect as there are facets, so there are as many points of view in a society as there are people, and although everyone is right from her or his point of view, no one person has the complete image. Hugh Prather (1980, p. 93) put it nicely:

> . . . Reality is what reality is, and whatever it may be, it is so vast that no one sees it all. There would be no more intellectual standoffs if just this much were realized: we are all looking at the same thing and each one of us is seeing something. But since we are standing in different positions, our points of view differ. Fortunately, we can move. And we must if we are to see more.

It is precisely because we each have our point of view, established after we have considered all the data we have and have reached a conclusion, that I can't convince you of anything. If I am to convince you that my point of view is the right one, then I simultaneously have to convince you that your point of view is wrong. But you will resist because your point of view is also correct from your interpretation of "your" data. For example, people seek counselors to get help in changing how they feel, or behave, or both, but they often resist help as we resist new ideas, even new data. As Patterson and Eisenberg (1983, p. 79) explain:

> A client's resistances have helped the client cope with the stresses and pains of life over a long period. At the same time a person's resistances serve him or her well and also result in forms of self-defeat and misery. Asking or demanding that a client give up resistances is the same as asking him or her to give up a reliable, trusted friend who has been with the client since child-

Gentle reader, permit me to digress for a moment from forests to the California condor to make a point:

The condor once graced the sky of southern California, riding the thermals on its 10-foot wingspan. The sky is empty now. The last condor has been captured to give it a stay of extinction but at the cost of its dignity. And what about our dignity? Is our dignity not linked with that of every living thing that shares the planet with us? How can our dignity be intact when we unilaterally erase even one life form from the earth? Extinction is forever, and the species we make extinct have no voice in the decision.

It is difficult for me to write about the condor because I am also writing about myself and society as a whole. The condor, as am I, is far more than simply one of God's creatures. Both the condor and I also represent ecological functions without which the world will be impoverished. True, someone else may be able to take over my individual functional role, but what creature can take over that of the last condor? And we are more than simply creatures that perform ecological functions; we represent the health of the ecosystem—I as an individual in a much smaller way than the last condor.

As the condor becomes extinct, its ecological function becomes extinct, and both the condor and its function become extinct because the habitat characteristics required to keep the condor alive no longer exist. All this means that the whole portion of the ecosystem of which the condor was once a part must now shift to accommodate the condor's annihilation. Do we know what this means in terms of the ecosystem? No. What about the hundreds or thousands of species humanity is making extinct around the world through habitat destruction? How will the ecosystem respond on a global basis to their loss? What repercussions will humanity face as the ecosystem adjusts to their absence? How much of the world must we humans destroy before we learn that we are not, after all, the masters of Nature but exist at Her courtesy?

Viktor Frankl (1963), a psychiatrist who survived Auschwitz and Dachau, understood the feeling of extinction when he wrote (p. 104), "We who lived in concentration camps can remember the men who walked through the huts comforting others, giving away their last piece of bread. They may have been few in number, but they offer sufficient proof that everything can be taken from a man but one thing: the last of the human freedoms—to choose one's attitude in any given set of circumstances, to choose one's own way."

Can the California condor choose its own way behind its prison bars, or is that right also usurped through human arrogance? Frankl (p. 105) also stated that Dostoevski once said, "There is only one thing that I dread: not to be worthy of my sufferings." The condor, by its nature, is worthy of its suffering. The question is, what have we as a society learned from its suffering?

We have relegated the condor to death row for our iniquities and transgressions. Then, to salve our social conscience, we have plucked it from the sky and put it behind bars, and we continue, freely now, to destroy its habitat. Now we will spend money on breeding programs and perhaps purchase a small reservation on which to free a few individuals, should they survive. Would it not be better, however, and more honest, to restore the remaining condors to the dignity of freedom, to watch them, if they are so destined, become extinct in the majesty of the sky, and to accept responsibility for our human failings? How else can we grow in consciousness than to watch the sky slowly become empty of a child of millennia, a creature it took from the beginning of our planet to perfect, to watch the sky become empty by an act of humans—not of God.

If we as a society were called before the throne of judgment today, how would we answer the questions of each species' right to life, of the value of each species in the universal balance, of the stewardship entrusted to us as custodians for those who follow? I don't know how to answer these questions, but I think a good place to start is to restore the condors to their birthright—the freedom and dignity of the sky. Then, perhaps, our consciousness will be raised a little and their suffering and ours will have value. And if the condors survive, it may lead to a time in history when humans and condors can live together. But the question remains: who makes this decision?

A good decision

Strange as this may sound to your way of thinking, I have always made good decisions. (All my bad decisions have been in hindsight.) I have always made a good decision because I have always made absolutely the best decision I could at that time, under that circumstance, with the data I had on hand. This does not mean, given similar circumstances, I would make the same decision today.

hood. The counselor's efforts to encourage or challenge the client to give up resistances will be resisted.

Although I cannot convince you that you are wrong without stripping you of your dignity, I can give you new data that allows you to reach a new conclusion while maintaining your dignity. What I have done, is raise the value of your making a new decision based on new information. In this way, I can be patient and give you space that allows you to change your mind, for as Prather said, "Fortunately we can move. And we must if we are to see more."

Consider Figure 22. Suppose the ship is sinking. The entire crew,

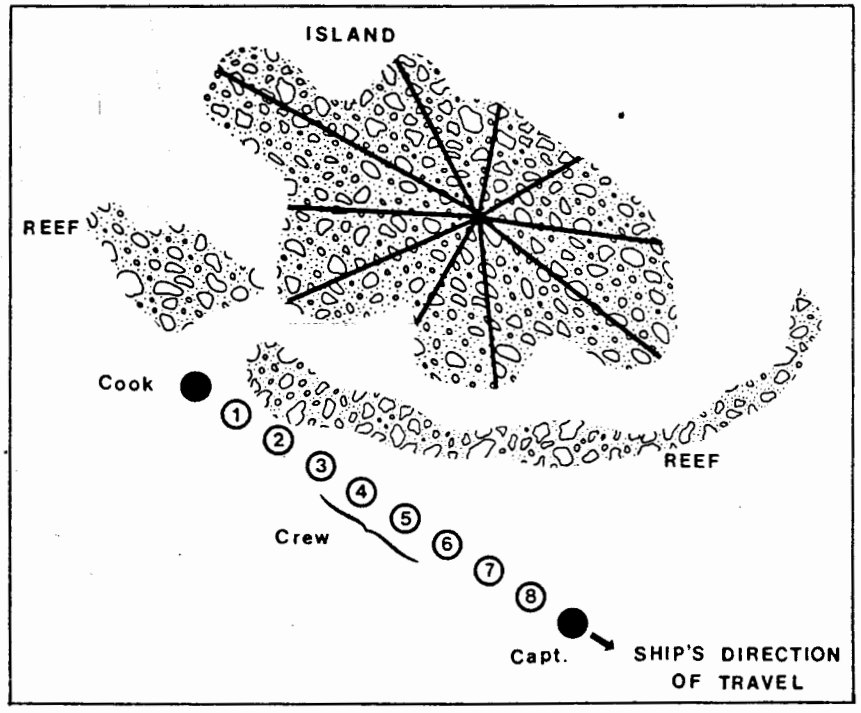


Fig. 22. The ship is sinking, and the entire crew has decided to turn the ship around and head it for the island. Only the cook can see a way to get there. Unless the captain is willing to look at the island from the cook's point of view, the ship will sink and the crew may be lost.

captain and cook included, can see the island, but before they decide to try to get there, they have to decide that is where they want to go. Once that decision is made, the captain looks at the

island and sees no way to reach it because the reef prevents them from getting the ship there. The captain then asks the rest of the crew, including the cook, what they see, because each person is peering out of a porthole. The eight crew members all say they see no way to reach the island, but the cook says, "I see a way to get the ship to the island." Each member of the ship's crew is correct from his or her point of view, his or her line of sight. Each sees something they agree is an island, but each sees something different. The only way the captain can see what the cook sees is to move to where the cook is and look from his point of view. That means the captain must have the courage to risk moving from a known, comfortable position to an unknown, uncomfortable position in order to see more.

To save our forests, indeed to save our planet and the human race, we must be willing to risk moving in order to see more, to validate one another's points of view. The world can only be seen in totality when it is seen simultaneously from all points of view, total open-mindedness. To achieve such open-mindedness, we must become students of processes—not advocates of positions. (An excellent example of the evolution of open-mindedness is the career of Aldo Leopold by James Kennedy, 1984).

Hidden agendas

The mind engaged in planning for itself is occupied in setting up control of future happenings. It does not think that it will be provided for, unless it makes its own provisions. Time becomes a future emphasis, to be controlled by learning and experience obtained from past events and previous beliefs. It overlooks the present, for it rests on the idea the past has taught enough to let the mind direct its future course.

The mind that plans is thus refusing to allow for change. What it has learned before becomes the basis for its future goals. Its past experience directs its choice of what will happen. And it does not see that here and now is everything it needs to guarantee a future quite unlike the past, without a continuity of any old ideas and sick beliefs. Anticipation plays no part at all, for present confidence directs the way.

Defenses are the plans you undertake to make against the truth. Their aim is to select what you approve, and disregard what you consider incompatible with your beliefs of your reality. Yet what remains is meaningless indeed. For it is your reality that is the

"threat" which your defenses would attack, obscure, and take apart and crucify (*A Course In Miracles, Workbook,* 1975, p. 247).

I will defend my point of view at almost any cost because to me it represents my survival, my integrity. In addition, having "made a stand," I don't want to "look foolish" by "backing down," which really means I don't want to risk rejection by other people. So, I become clever and I view the world as a poker game called "fear." I could probably win the game if I were the only one who played it, but the best I can do is to win a hand now and then because almost everyone plays the same game simultaneously. Unfortunately, the game is dishonest, because we don't play with all our cards on the table; we keep a hidden agenda "up our sleeve." This prevents my developing an open mind because I do not trust anyone else to look out for my welfare—my point of view, which no one else can see—so I justify my own objectives, which makes me narrow-minded and rigid. I have now become defensive, because I must lie about my hidden agenda by appearing to be open and honest. As Emerson once said, "Commit a crime [dishonestly hide an agenda], and the earth is made of glass."

The dynamics of this poker game became clear to me some years ago at a consensus group in which I participated as an observer. At least 30 points of view were represented, because at least 30 people were there. I interpreted three general "collective views," two of which were in opposition over the game's stakes—to cut or not to cut a particular city's watershed. Because I knew nothing about the conflict, even though it had been alive for some years, I had no vested interest in it and could therefore see the collective views. Let's examine my interpretations of them one at a time.

View 1: A most sincere elderly lady, who had lived in this city all her life, had been told in the third grade that the city's watershed, covered with virgin old-growth forest, was her National Heritage and would never be cut. Now she finds people of a land management agency cutting down "her watershed," and she feels that she has been lied to, betrayed. Where the third-grade teacher got the notion of inviolate National Heritage is a moot point. The lady, joined by her son, thinks the land management agency should cease and desist all cutting and road building in the watershed forever. On this she is emphatic.

View 2: The conservation groups that were represented were unanimously opposed to further logging and roading of the watershed because the virgin, old-growth forest created and protected the pure quality of the city's water supply.

View 3: The people of the land management agency saw the old-growth as an economic commodity that had to be cut and milled or there would be an irreparable loss to the economy because the old-growth forest would rot—an unbearable economic waste.

All three views, each with a stake in the watershed, played the game with a hidden agenda. This was soon apparent as Emerson's comment became clearer and clearer during the two-day session. "Your attitude thunders so loudly I can't hear what you say." The hidden agenda each side was trying to conceal from the others while acting innocently open-minded became clear only because I was not part of the dispute. Although the hidden agendas were never admitted, much less openly laid on the table, they became visible by the strenuousness of defense when someone got too close to the truth. Let's examine them.

View 1: The elderly lady and her son had become rather prominent as distributors of a small newsletter to the group of conservationists interested in saving the watershed's old-growth forest. If the lady and her son won their point of view, they would disappear into the "oblivion from which they came" because, with the issue resolved, the other folks would turn to new issues. This view (my interpretation) became clear because whenever reconciliation seemed possible, the son categorically refused to accept anything that had the appearance of moving the problem toward solution. The hidden agenda seemed to be to keep the issue alive and thereby forestall the feeling of rejection through loss of importance, loss of identity.

View 2: The conservationists were committed to saving the old-growth forest (trees). Each time the people from the land management agency would concede a point that would benefit water quality but not save the trees, the conservationists had to find a new point to argue from, one that sounded valid with respect to clean water and did not mention trees.

View 3: The people from the land management agency were committed to cutting the timber for the reasons I discussed in Part Two of this book. So they submitted to the procedure but with the knowledge of authority on "their side."

Where do we go from here? First, each person and each "collective view" was right from its point of view, from its interpretation of the data. Second, no one in the room really understood consensus.

Consensus does not mean something will be enacted, it means that the parties agree to agree on something. And the agreement we ended up with was that something needed to be done, which is where we started. The mission was doomed to failure because *no one* laid *all* his or her cards on the table. This environmental poker game called "fear" is global. The face values on the cards represent the degrees with which we fear change; the stakes in the game are high—the sustainability of our renewable natural resources, such as the forests of the world. Again, Hugh Prather (1980, p. 116) summed it up nicely: "The measure of power is honesty. The measure of success is preparation. The measure of enjoyment is responsibility. The measure of communication is trust." And none of these exist in a poker game called "fear."

Why do we have hidden agendas in the first place? Well, over the years that I worked in the Bureau of Land Management and with the U.S. Forest Service, I noticed that the push was always to meet the self-serving needs of the agency at the expense of human relations. To achieve agency needs, steps were skipped in the process of dealing with one another as people. And this was always justified by the agency's perceived needs of the still larger system—society. The outcome was often a personal confrontation of misunderstandings because we were out of touch with our personal values, which in turn were often in conflict with the agency's goals.

How then do we get rid of our hidden agendas? First, we must recognize and accept responsibility for our personal values because they not only motivate us but also determine our perceptions of each other and of the world. Second, we must accept the validity of our values and then make a conscious choice of whether or not to place them in subservience for the "good of the system" to "keep the system going." Third, we must in clear conscience act on our decision. Only then will we be free of our hidden agendas and the fear they instill, only then will we have a clear view of society and its needs—present and future.

Emotion and logic

Emotion is defined as: disturbance, excitement, a state of feeling, a psychic and physical reaction (as anger or fear) subjectively experienced as strong feeling and physiologically involving changes that prepare the body for immediate vigorous action. Logic

is defined as: a science that deals with the canons and criteria of validity of inference and demonstration, interrelation or sequence of facts and events when seen as inevitable or predictable. Emotion and logic are mutually exclusive. There is no logic in emotion and no emotion in logic; this is a lesson, a critical lesson, that my wife, Zane, taught me.

Emotion is the engine and the energy that drives us, gives us values, feelings. I will discuss only two emotions—love and fear. Love is an expansive, unifying emotion that brings diverse elements of life together under a gentle feeling of an integrated relationship in which all parts cooperate in harmony. Fear, on the other hand, is a contractive, isolating emotion that separates diverse elements of life and shatters relationships into huddled disharmony. Although we think of anger as a separate emotion, it is only violently projected fear. A point to consider is that when we are fearful or angry we are always "out of control." Think, for example, of extreme anger—rage—and "temporary insanity" in a court of law. A person in a rage is indeed out of control and insane.

When Zane used to get angry at me, I would say "Babe, there's a logical explanation," and she would promptly "blow up." Why? It took me a long time to understand that *her emotions were valid,* and that *logic was not required to validate them.* My "logical approach" was an invalidation of her emotions. I was in fact saying, "your emotions are invalid because you don't understand how to look at the world." Well, I did not understand that both views are valid because they are different and not substitutable. Negative emotion must be validated and allowed to run its course before logic can be accepted. Recall, for example, the last section "Hidden Agendas" (p. 116). We ended with the consensus that something needed to be done, which is where we had started. We made no apparent headway because the entire two-day meeting was mired with "hidden agendas"; no one exposed "real emotions," his or her fear of loss. Negative emotion can only be brought to logic when all parties are open and honest—where love, trust, and respect prevail.

Negative emotions must be validated before they can be brought to logic. Logic is the steering wheel that allows us to negotiate the values contained in our emotions. Let's look again at the section "Hidden Agendas." We started out with about 30 points of view, 30 individual emotional views, and ended up with three collective emotional views. But the three collective emotional views were really false, "decoy" emotional views, so the real emotional views

could not be validated by anyone because everyone denied their existence. Had the real emotional views been expressed, we might have been able to understand each other and validate each other's set of values. Then, and only then, could our racing engines (emotion) be slowed to cruising speed so that we could use the steering wheel and road map (logic and negotiation) to arrive at a satisfactory conclusion built on love, trust, and respect.

Emotion is the feeling, and logic is the looking of the world. Each is only half. Together they give us sight by allowing us to *see* the world. We shall remain in darkness, however, until we you and I have enough love, trust, and respect for each other that we may bring our emotions and logic to wholeness—light.

As management of our forests becomes more and more of a public concern with public meetings, written responses to management plans, and legal contests in court, it is imperative to understand and account for the difference between emotion and logic. I have found, with the help of my wife, Zane, that one of the most insidious acts of violence that we perpetrate against each other as human beings is in not listening to one another. What goes unheard is how we feel—our emotions. For an example, let's go back a moment to the TV program that I was on, the one that was to air the issue of our ancient forests. There was an old lady on the program who tried in vain to be heard, but the moderator ignored her. Even after we were off the air and she tried to tell him how she was feeling, he ignored her. In the end, just to be heard, perhaps only by herself, she spoke out loud to no one, she spoke into space. She may as well have been alone in the universe.

As I said in the Introduction, all we have in the world as human beings is each other, and all we have to give each other is each other. We are each our own gift to one another and to the world; we have nothing else of value to give. I cannot give my gift, however, if there is no one to receive it, if there is no one to hear. Therefore, if we listen—*really listen*—to one another and validate each other's feelings (emotions) even if we don't agree, we can begin to manage our forests without the violence and pain of not being heard.

A gift from Elisabeth

In 1969, Elisabeth Kübler-Ross published a book *On Death and Dying,* which simultaneously is a book "On Life and Living."

Elisabeth described five stages a terminally ill person goes through when told of her or his impending death: denial and isolation, anger, bargaining, depression, and acceptance. We will examine these stages here, and then I'll relate them to our thought processes and to change:

1. Denial, refusing to admit reality, trying to invalidate logic, is the first stage a terminally ill person goes through. Denial leads to a feeling of isolation, of being helpless and alone in the universe. At some level, however, the person knows the truth but is not yet emotionally ready or able to accept it.

2. Anger, which is a violent projection of fear, can be called emotional panic. The person is emotionally out of control because she or he can no longer control circumstances.

3. Bargaining is when a person attempts to bargain with God to change the circumstances, to find a way out of having to deal with what is.

4. Depression is a somewhat different type of issue because there are two types of depression. In the first type, a person is in the process of losing everything and everyone she or he loves. The second type of depression is one in which a person is no longer concerned with past losses, such as a job, but is taking impending losses into account, such as leaving loved ones behind. I suppose this may be similar to a state of resignation in which a person is simply submissive to the inevitable. Resignation is sterile, without hope.

5. Acceptance, the final stage, is creative and positive. With acceptance, returns a trust, a faith, in the goodness, the rightness of the outcome. Acceptance allows us to acknowledge our problem, which allows us to define our problem, which allows us to solve our problem. But first *we must accept what is,* which is to: *know the truth that sets us free* (John 8:32).

Now let's see how understanding these stages of dying not only helps the living to understand the dying but also helps the living to understand the living—Elisabeth's gift to us. Although we are alive, we die daily to our ideas and belief systems, and in so doing, we go through the five stages of dying that Elisabeth described. They are necessary as they prepare the way for change, a dying of the old thoughts and a birth of the new:

1. Denial of or resistance to change is the first stage of a dying belief system. An example appeared in a story by Ken Slocum (*The Wall Street Journal,* 11 March 1986):

How big a role should the recreation industry play in the Rocky Mountain West when promoting tourism means turning away from timber and mining, industries that helped build the economies of the mountain states? It's a hotly debated question in Idaho, where a lot of people see recreation as an antidote for an economy lagging behind the national recovery.

Walter C. Minnick, president of Trus Joist Corp. of Boise, argues that lumbering should actually be curtailed in areas where logging roads and timber cutting threaten tourism. "The Rocky Mountain West is the marginal timber-producing area of North America because of low rainfall, long winters, and rugged mountains that make roads expensive to build," he says. "It's foolish to subsidize and try to prevent the decline of one industry at the cost of compromising the future of an unsubsidized industry (tourism) that's growing."

Disagreeing sharply is Robert T. Hitchcock, President of Evergreen Forest Products Inc., New Meadows, Idaho. He says environmentalists have encouraged stories of a wounded timber industry for their own political ends. "One of the ploys we see environmentalists using is to say recreation is the true backbone of the economy, and in order to increase and improve that, we have to cut less timber." Adds Mr. Hitchcock: "Our industry is not dead and dying."

We isolate ourselves when we do not accept change. We become defensive, fearful, and increasingly rigid in our thinking; we harden and close our minds. If I become defensive about anything, if I start to form a rebuttal before someone is finished speaking, if I filter what is said to hear only what I want to hear, I am in this denial stage.

2. Anger is the violent projection of uncontrollable fear. I am so afraid of change, of the dying of my old belief system, that I become temporarily insane: "I can't cope with this!" My anger, however, is not aimed at you; it is aimed at my inability to control the circumstances that I find so threatening.

3. Bargaining is looking for a way to alter the circumstances based on "acceptable" conditions. In forestry, I call it fertilization, which is an impatience with Nature's timetable so we look for an "acceptable" shortcut. We bargain with Nature, "If I do this, will you do that?"

4. Depression is when we become resigned to our inability to control or change the "system," whatever that is, to suit our desires. We feel helpless and deliberately give up trying to alter circumstances. We become "victims" of outside forces and our defense is to become cynical—distrustful of human nature and motives. A cynic is a critic who stresses faults and raises objections but assumes no responsibility. A cynic sees the situation as hopeless and is therefore a prophet of doom who espouses self-fulfilling prophecies of failure regardless of the effort invested in success.

5. Acceptance of what is, for example an unplanned change, allows us to define the problem and to solve it. Acceptance of the problem, however, must come before a solution is possible.

Why do we fear change so much? We resist change because we are committed to protecting our existing belief system. Even if it is no longer valid, it represents past knowledge that is safe. We try to take our safe past and project it into an unknown future by skipping the present that represents change and holds accountability. Thus, when confronted with change, we try to control the thoughts of others by accepting "approved" thoughts and rejecting "unapproved" thoughts. We see such control as a defense against change because change after all is "in the mind." As George Bernard Shaw said, "My own education operated by a succession of eye-openers each involving the repudiation of some previously held belief." Change is the death of an accepted, "tried and true" belief system through which we have coped with life; it is our comfort zone that has become synonymous with our identity. Have you ever noticed, for example, that when someone is asked the misstated question "What are you?" they almost inevitably tell what their profession is—their safe identity. When we get "too comfortable" with our belief systems, we might think of the turtle who only gets ahead by sticking its neck out. For only a person who takes risks is free.

Our human experience

I have tried to define the kaleidoscope of fear we call life by examining some of the causes of fear. I have also pointed out that we can alleviate our fears if we change our thinking. For example, we must recognize and accept that we cannot judge except falsely; so we must let go of judgment, which ultimately is isolation from evidence. Second, we must learn to be present, in the here and now; fear is a past experience whose possible recurrence is projected into the future. It is impossible to be afraid in the present. As Mahatma

Gandhi said, "If we will take care of today, God will take care of tomorrow." Third, we must remember the two emotions, love and fear, and that we cannot be afraid of that which we learn to love. There are no "enemies" "out there," only other frightened people. To this end, Gandhi stated, "Intolerance betrays lack of faith in one's cause."

Gandhi spoke of tolerance; so once again, let's put people from land-managment agencies into perspective with a quote from Bella (1987a, pp. 369–370):

> Organizations tend to systematically distort information in self-serving ways. Such distortions do not depend . . . [on] deliberate falsifications by individuals. Instead, people who are competent, hard-working, and honest can sustain systematic distortions by merely carrying out their organizational roles. Unchecked by outside influences or the undeniable realities of catastrophic failures, organizational systems can sustain self-serving distortions. The potential for catastrophic consequences is significant.
>
> A technological culture faces two choices. First, it can wait until catastrophic failures expose systemic deficiencies, distortions, and self-deceptions. . . . Second, a culture can provide social checks and balances to correct for systemic distortions prior to catastrophic failures. This second more desirable alternative, however, requires the active involvement of independent engineers and scientists [and other dedicated professionals and lay people]. They must ask "unfavorable" questions and pursue "unfavorable" inquiries. Without such initiatives, checks and balances are undermined and catastrophic possibilities are likely to increase as the scope and power of organizational technology expands.

I am going to close this section with excerpts from a speech dealing with change that Norman Cousins (1975, p. 103, 104, 112) gave to professional foresters. Titled "The Fatalists [non-risk takers] *versus* The Doers [risk takers]," it was later published in the *Journal of Forestry*, from which I quote:

> . . . It's impossible to conceive of any problem beyond the reach of human intelligence that is definable, because to define a problem gives you access to the answer. We went to the moon not because of our technology; we went to the moon because of our intelligence, because of our imagination. Someone had to imagine

> that it was worth doing. When we imagined that it could be done and that it ought to be done, then everything else became the servant. The technology became the servant of the imagination. . . .
>
> It is unscientific and unhistorical, therefore, to say that we are locked in. We are not locked in so long as (a) we can define the problem, (b) we are willing to attack it. . . . The thing that separates fatalists from other people is that the fatalist is unwilling to struggle; he's unwilling to make the attempt. So the real issue of our time, it seems to me, is that the human race today is divided between those who are willing to make the fight and those who are not. It has nothing to do with knowledge. Both sides, I think, are equally well informed; both sides have access to a wide body of knowledge. But, ultimately, it's a philosophical problem: are we going to make the attempt? The answer, of course, depends on what our view of the human species is, what our understanding of the human spirit is. . . . the question before all of us is, 'can we have an inspired response to our problem, beginning with the environment?'. . . .
>
> Again, it can be done if enough people wish it to be done. The crisis . . . is in the will and the imagination.

HAZARDOUS WASTE INCINERATION AT LOS ALAMOS NATIONAL LABORATORY

ROBINSON EXHIBIT NO. 1

TYPES OF WASTE GENERATED

As by-products of its research programs and operations, Los Alamos National Laboratory (LANL) generates a variety of chemical and radioactive wastes. Hazardous chemical wastes consist primarily of solvents and chemical reagents used in processing operations and laboratories. Most of the radioactive waste consists of solids such as trash, packing materials, plastics, rags, and the like, from laboratories and operating areas where radioactive materials are handled. Los Alamos generates no high-level radioactive waste.

Depending on their source and composition, wastes from LANL may be classified as follows:

Transuranic (TRU) wastes—TRU wastes are defined as materials contaminated with long-lived transuranic radionuclides at levels greater than 100 nanocuries (10^{-9}) of alpha radioactivity per gram of waste (uranium mill tailings average around 5 nanocuries per gram). TRU materials make up only about 10% of the total radioactive waste generated yearly at LANL.

Low-level radioactive waste—Materials that are only slightly contaminated with alpha activity (less than 100 nanocuries per gram) and/or contain fission or activation products are classified as low-level radioactive waste.

Hazardous chemical waste—Hazardous chemical wastes are those listed and regulated under the Resource Conservation and Recovery Act (RCRA). These include chemical wastes specifically listed as toxic or hazardous under the regulation as well as chemicals having certain hazardous characteristics such as corrosiveness or combustibility.

Mixed waste—Materials contaminated with both radioactivity and the chemical constituents regulated under RCRA are called mixed wastes

A large portion of the Laboratory's wastes in the low-level radioactive and mixed-waste categories are so designated because they are "suspect" wastes; that is, they have very low or undetectible levels of radioactive and/or chemical contamination. To ensure that these materials are handled safely and properly, the Laboratory treats suspect wastes as if they contained significant levels of radioactive or chemical contamination.

WASTE TREATMENT, HANDLING, AND DISPOSAL

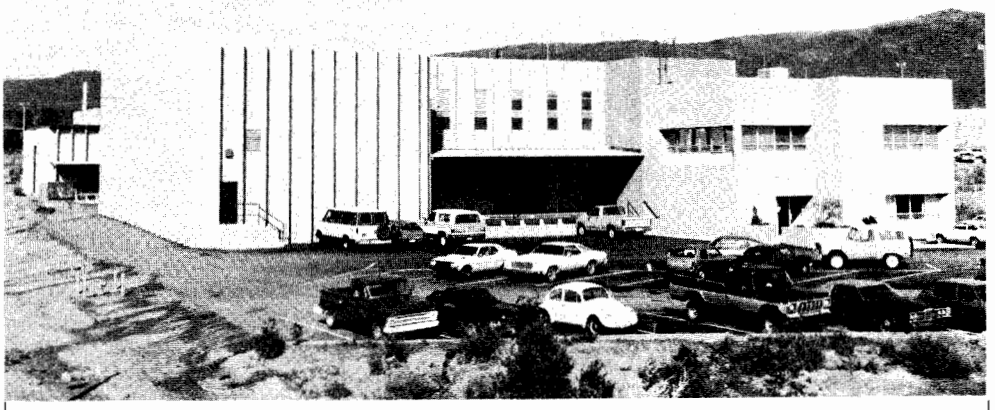
LANL will attempt to reduce the amount of radioactive and chemical wastes generated at the Laboratory through recycling and waste-minimization programs. These efforts, however, cannot totally eliminate the need to store, treat, and ultimately dispose of the remaining wastes.

TRU wastes are packaged and stored on site in such a way that they can be retrieved when an approved TRU burial facility becomes available. Low-level radioactive waste is buried in landfills on-site. Under the Laboratory's environmental monitoring program, these on-site landfills and storage areas are evaluated regularly to ensure that they are in compliance with applicable environmental regulations.

Because prudent waste management practices as well as current regulations preclude the disposal of hazardous chemical wastes in landfills, LANL now sends most of these materials to off-site commercial treatment and disposal facilities. However, no such facilities are currently available to treat radioactive and mixed wastes. Consequently, the Laboratory must store, treat, and/or dispose of these wastes on-site, as appropriate. Storing the waste without treating it, however, is not an environmentally sound long-term option, and indefinite on-site storage of untreated, unstabilized wastes could eventually pose potential hazards to the public and the environment.

Incineration is a proven technology for the treatment of chemical, radioactive, and mixed wastes. In the case of chemical wastes, high-temperature incineration eliminates the toxicity and hazardous nature of a wide range of chemical compounds because it destroys the chemical bonds. The compounds are reduced to their individual elements, which then reform into relatively innocuous substances that, once removed by pollution-control equipment, are concentrated and solidified prior to disposal. Incineration of radioactively contaminated combustible wastes, although it does not destroy the radioactivity, significantly reduces the volume of waste, typically yielding volume reductions of greater than 100 to 1. Thus the technique compares favorably with other technologies such as supercompaction, which yields volume reductions of only about 7 to 1. The net effect of reducing the volume of waste by incineration is that the useful service life of storage and disposal facilities is extended substantially, which enables us to use these limited resources more efficiently.

The leaching of soluble materials into soil and subsurface groundwater is a primary mechanism whereby wastes—chemical or radioactive—find a pathway into the environment. The incineration of plutonium-contaminated waste produces a stable, high-fired plutonium oxide that is virtually insoluble. Nearly all of the plutonium remains in the incinerator for eventual discharge with the bottom ash. When incinerator ash is further treated by cementation and then enclosed in sealed containers, the resulting waste form is stable and chemically inert.



Los Alamos Treatment Development Facility, which houses the controlled-air incinerator.

THE INCINERATOR

The Los Alamos Controlled-Air Incinerator (CAI), a highly modified commercial incinerator, was originally developed to demonstrate volume reduction of combustible, solid radioactive wastes. In service as a research incinerator since 1979, the CAI has undergone extensive modifications and testing for the treatment of both radioactive and chemical wastes, including radioactively contaminated solid and liquid wastes, liquid PCBs, and other hazardous and toxic chemicals. Used primarily to reduce the volume of combustible TRU wastes, the CAI also has a permit for PCB incineration under the Toxic Substances Control Act and currently operates under interim status for hazardous chemical waste incineration through the RCRA.

In 1986 the Laboratory conducted an incinerator trial burn performance test in accordance with RCRA regulations for issuing permits for hazardous chemical waste incinerators. This test was supervised by personnel from the New Mexico Environmental Improvement Division and the U.S. Environmental Protection Agency. Carbon tetrachloride and trichloroethylene, two chemical compounds that are difficult to incinerate, were fed to the CAI, and the incinerator effluents were sampled and analyzed to determine the destruction and removal efficiency of the incinerator and its "offgas" pollution-control equipment. (Offgas is a term used to describe the exhaust gases leaving the secondary chamber of the incinerator.) The results of this test show that the CAI meets or exceeds the performance standards for RCRA hazardous waste incinerators* and that this technology is a safe and effective means of destroying hazardous chemical compounds.

Operating personnel inspect the incinerator and waste storage areas regularly, monitoring the operation of the equipment and verifying the integrity of the waste containers. In addition, personnel from state and federal regulatory agencies periodically inspect the facility and review its operating records to ensure that it is in compliance with the conditions of the permit.

THE TECHNICAL DETAILS

The heart of the CAI is a dual-chamber controlled-air incinerator. Initial combustion takes place in the primary combustion chamber (PCC), which operates at a temperature of 1400-2000°F. The PCC can accept up to 125 pounds per hour of solid wastes, or 200 pounds per hour of liquid wastes. Solids are fed to the PCC by a ram feeder mechanism and liquids by a liquid-injection burner capable of firing on natural gas, fuel oil, or liquid waste feed blends.

*The performance standards are specified in Title 40 of the Code of Federal Regulations, Chapter 1, part 264.343.

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Offgases leaving the primary chamber pass through a connecting duct to the secondary chamber. The secondary chamber, which operates at 2000-2200°F, completes the destruction of any volatile organics leaving the primary chamber. The burner in the secondary chamber is fired on natural gas only. Temperature controllers and safety interlocks ensure that no waste is fed until the chambers have reached the proper operating temperatures.

Combustion air is supplied to each burner by dedicated forced-draft fans. Separate induced-draft fans provide negative pressure to both the combustion chambers and the process offgas treatment system. Glovebox enclosures surrounding the chambers, coupled with negative operating pressures supplied by the induced-draft fans, serve to prevent any fugitive emission of organic gases or radionuclides to either the operations area or the surrounding environment.

An extensive offgas treatment and pollution-control system removes particulates and other combustion by-products leaving the secondary chamber. This system consists of the following components:

- Water-Spray Quench Column
- High-Energy Venturi Scrubber
- Packed Column Absorber/Demister
- Offgas Superheater
- Primary High-Efficiency Particulate Air (HEPA) Filters
- Carbon Bed Adsorber
- Secondary (Final) HEPA Filters
- Scrub Solution Recycle/Cooling System

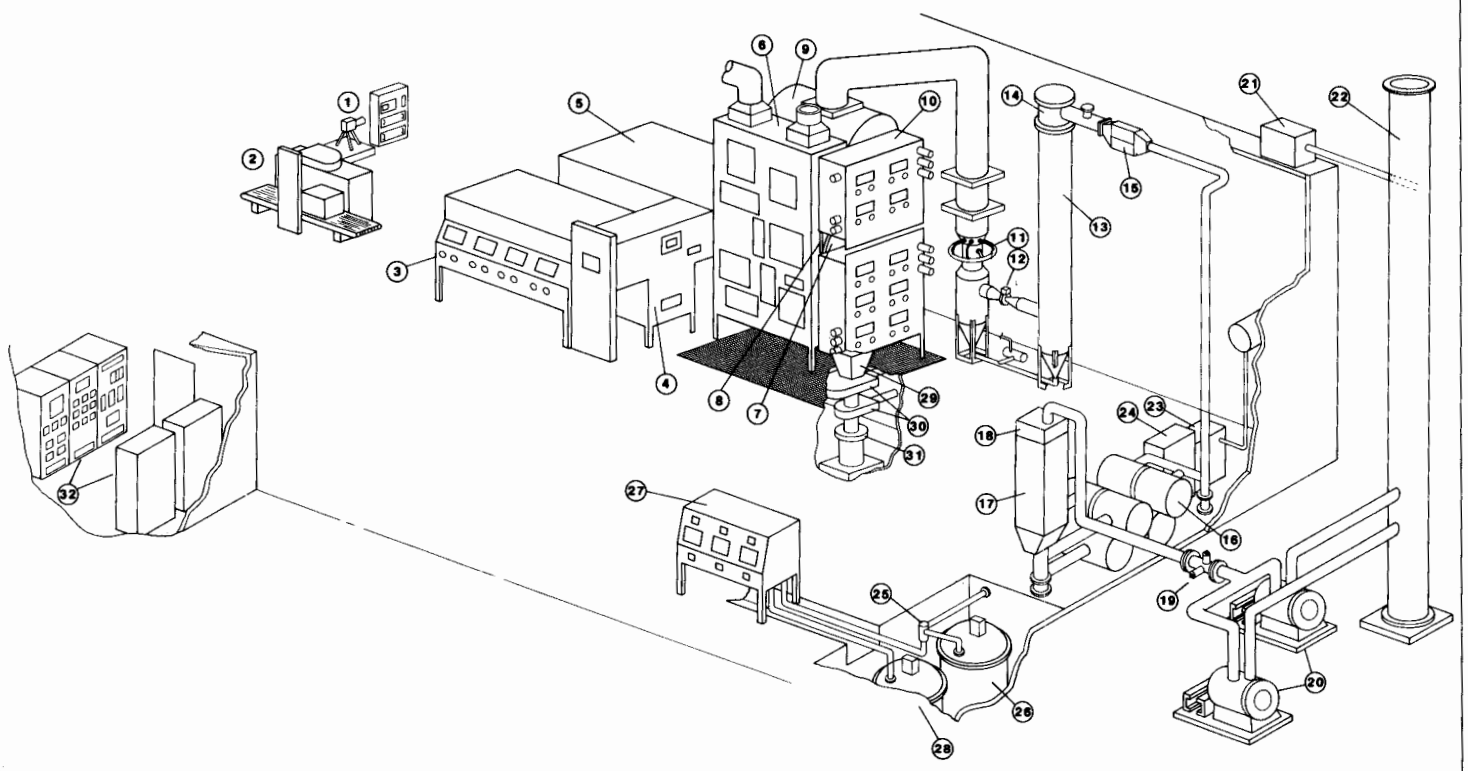
The critical components in the offgas treatment system are the HEPA filters, whose purpose is to capture radionuclide and other particulates. To ensure the integrity of the HEPA filters, and to extend their useful service life, the CAI makes use of pre-HEPA filtration offgas conditioning. This conditioning is accomplished by the quench column, venturi scrubber, packed bed absorber column and demister, offgas superheater, and roughing filters.

The quench column, through the injection of an atomized, cooled recycle scrub solution, cools the offgas from its high incinerator exit temperature (2000-2200°F) to around 160°F. Particulates in the gas leaving the quench column are removed by the high-energy variable-throat venturi scrubber, located between the quench and absorber columns. The venturi scrubber serves to remove most of the offgas particulate before the HEPA filtration step, extending the service life of the filters. Acids in the saturated gas phase leaving the venturi are removed by counter-current contact with a cooled mixture of recycled scrub solution and fresh water in the packed column absorber.

Offgas leaving the packing flows through a 6-inch-thick demister pad, which captures the entrained water mist. Cooling of the saturated offgas stream in the absorber packing through direct liquid-gas contact removes a significant portion of the water content by condensation, thereby reducing the total offgas volume. This reduction in water content and offgas volume eases the operating loads on the offgas superheater, HEPA filters, and process induced-draft fans. Further offgas conditioning is provided by the offgas reheater. Moisture-saturated exhaust gas leaving the absorber/demister is reheated to above the dew point before it enters the HEPA filters, which precludes the condensation of moisture in the filters and helps prevent the filters from clogging.

The CAI employs nuclear-grade HEPA filtration for offgas polishing downstream of the wet offgas treatment system. Although the preceding offgas treatment system effectively removes particulates from the offgas stream, radiological concerns arising from TRU incineration dictate the use of HEPA filters. Both the manufacturer and the Department of Energy test each filter to certify that it can capture a minimum of 99.97% of all particulate of 0.3 microns (one micron is one millionth of a meter). Capture efficiencies are greater for particles larger or smaller than this size.

The HEPA filtration system is made up of eight individual HEPA filter enclosures forming four separate filter modules. Each module consists of a prefilter and a primary and secondary HEPA filter in series. Two of these modules (a total of four filters) are operated in parallel at all times. Thus, the offgas flow is split between two modules (banks) of four filters. The remaining two modules serve as a



1. Multiple Energy Gamma Assay System (MEGAS)
2. Micro-dose x-ray waste package scanner
3. Waste receiving glovebox with air-lock entry
4. Side ram feeder
5. Main ram feeder
6. Combustion fuel/air supply glovebox
7. Incinerator ignition (primary) chamber
8. Inter chamber
9. Incinerator combustion (secondary) chamber
10. Incinerator chamber access gloveboxes
11. Quench column
12. High-energy venturi scrubber
13. Packed column scrubber
14. Off-gas demister
15. Off-gas superheater
16. HEPA filters (first and second stages)
17. Activated carbon adsorber
18. HEPA filter (third stage)
19. Off-gas monitoring (CO, CO_2, H_2O) station
20. Process exhaust blowers
21. Continuous stack sample system
22. Facility and process vent stack
23. Scrub-water primary coolant heat exchanger
24. Isolated secondary coolant loop heat exchanger
25. Scrub-water hydrocyclone particulate separator
26. Scrub-water recirculating sump tank
27. Scrub-water blowdown filters
28. Facility liquid sump tank and transfer system
29. Gravity ash-removal hopper
30. Ash-removal valves
31. Ash-removal drum system
32. Process instrumentation and control panels

Transuranic and chemical waste incineration process.

backup for use during filter changeouts. The system is configured so that any two of the modules can be used at any given time to provide adequate filtration capacity.

The activated carbon bed adsorber, although originally intended for capture of fission activation products (primarily iodine-131) during an incineration research project, has remained in the system and serves as a final removal system for trace organic compounds. The housing for the activated carbon bed includes a downstream HEPA filter bank. This final bank of HEPA filters acts as a backup for the primary HEPA filters and also removes any entrained carbon fines from the offgas stream. Thus, the offgas from the incinerator receives triple HEPA filtration, in series, before it is released to the facility's exhaust stack. These filters alone remove more than 99.99999999% of all particulates in the offgas stream and provide positive assurance that no significant amount of particulates is vented in the stack gas.

The scrub solution recycle/cooling system provides cooled, filtered scrubbing solution to the quench, venturi, and packed bed absorber. The scrub solution leaving the process sump tank enters a hydrocyclone, which removes gross particulates, before the solution is cooled and recirculated to the offgas treatment system. The particulate-laden slurry produced by the hydrocyclone is filtered through polypropylene felt bag filters. The filtered solution is discharged, as necessary, to the on-site industrial waste treatment plant. The treatment plant accepts and treats radioactive liquid wastes from a variety of Laboratory sources.

The remaining residue of ash is discharged from the primary chamber of the incinerator through a gravity drop-out system, consisting of a hopper and two knife gate

valves, into 55-gallon drums. The ash is assayed to determine its radionuclide content and is chemically analyzed to determine the appropriate handling and disposal procedures. Finally, the ash is solidified in a drum cementation process and is stored on-site pending its ultimate disposal.

SAFETY FEATURES

To ensure that the system operates properly, the CAI design incorporates numerous backup systems and automatic safeguards. Critical process parameters affecting the system's performance are continuously monitored and recorded. In the event of a process upset or failure, the waste feed shuts off automatically. Incinerator releases are monitored both at the stack and in the environment to confirm that the incinerator is performing as designed.

The primary function of the waste feed cut-off interlocks is to prevent the feeding of wastes under incineration conditions that are inadequate to ensure that the materials will be destroyed. During the startup and shutdown of the incinerator or during process upsets, the interlock system automatically stops all waste feed systems and prevents them from restarting until the incinerator is in proper operating condition.

The process parameters specified in the permit are based on operating conditions demonstrated during the RCRA trial burn and are tied into an alarm panel. If any parameter is exceeded, a block valve in the waste liquid feed line to the liquid burner will automatically close, and the initiation signal to the solid waste feeding mechanism will be automatically deactivated. Under any of these conditions, waste feed will be locked out until the problem is identified and corrected, and until all alarm conditions and process limits are satisfied.

In addition to these process safeguards, a number of safety systems are employed to provide backup process utilities and to ensure that the incinerator operates safely in the event of a process failure. An uninterruptable power supply and a diesel-powered generator will feed backup electrical power to the process and control panels if line power is lost. A pressurized water tank backs up the municipal water supply, providing an emergency water spray to the quench column. Should a primary pump fail, a secondary backup pump will supply scrub solution to the quench, venturi, and packed column absorber. A completely independent set of process HEPA filters is available for use when the primary filters are being replaced. In addition, in the event of a HEPA filter failure, the offgas flow is automatically rerouted through the HEPA filter system for the building, ensuring HEPA filtration of the offgas at all times.

POTENTIAL EFFECTS OF TRU AND MIXED-WASTE INCINERATION

Although the RCRA permit regulates only hazardous chemical waste operations, any potential release of radioactivity quite naturally raises legitimate concerns on the part of the public. For that reason, we briefly address that question here.

Thousands of materials, both natural and man-made, have been implicated as possible carcinogens. Some of the known sources of carcinogens are wine, many vegetables and spices, wood smoke, and naturally occurring radon as well as the more familiar tobacco smoke, gasoline, and vehicle exhaust. The important issue to be addressed when we are evaluating a potential hazard is not the type of material to which we might be exposed but the relative risks associated with the potential level of exposure.

The highly efficient control equipment employed in the controlled-air incinerator ensures that virtually all plutonium or uranium entering the CAI remains in the system. This strict control over emissions of radioactive substances precludes all but extremely low radiation doses. Estimates of potential radiation exposure from CAI emissions are based on the maximum level of anticipated waste-feed contamination and the maximum number of hours per year that the incinerator would be in operation. These estimates project the highest, worst-case overall radiation dose to any member of the public from incinerator operations at Los Alamos at less than 0.001 mrem/year. This dose is substantially below the limit of 25 mrem/year (for whole-body doses) established by the Environmental Protection Agency for doses from airborne emissions other than natural background radiation. As a matter of fact, the projected dose from CAI incineration of radioactive materials is so small that it cannot be measured in the environment—it must be estimated from calculations and modeling.

For some perspective on the relative risks associated with that very small exposure level, consider the following:

- The natural background radiation an individual receives merely from living in northern New Mexico averages 325 mrem/year.
- Naturally occurring background radiation levels increase with elevation because at higher altitudes there is less air to shield us from cosmic radiation. Thus, Santa Feans receive about 15 mrem/year more background radiation than do Albuquerque residents simply because of the difference in altitude. This 15-mrem/year difference is more than 15,000 times greater than the highest individual dose of 0.001 mrem/year that could be attributed to the operation of the incinerator.
- In about 20 seconds on an airplane, a traveler receives a 0.001-mrem radiation dose—the equivalent of the maximum dose potential from CAI operations during an entire year.

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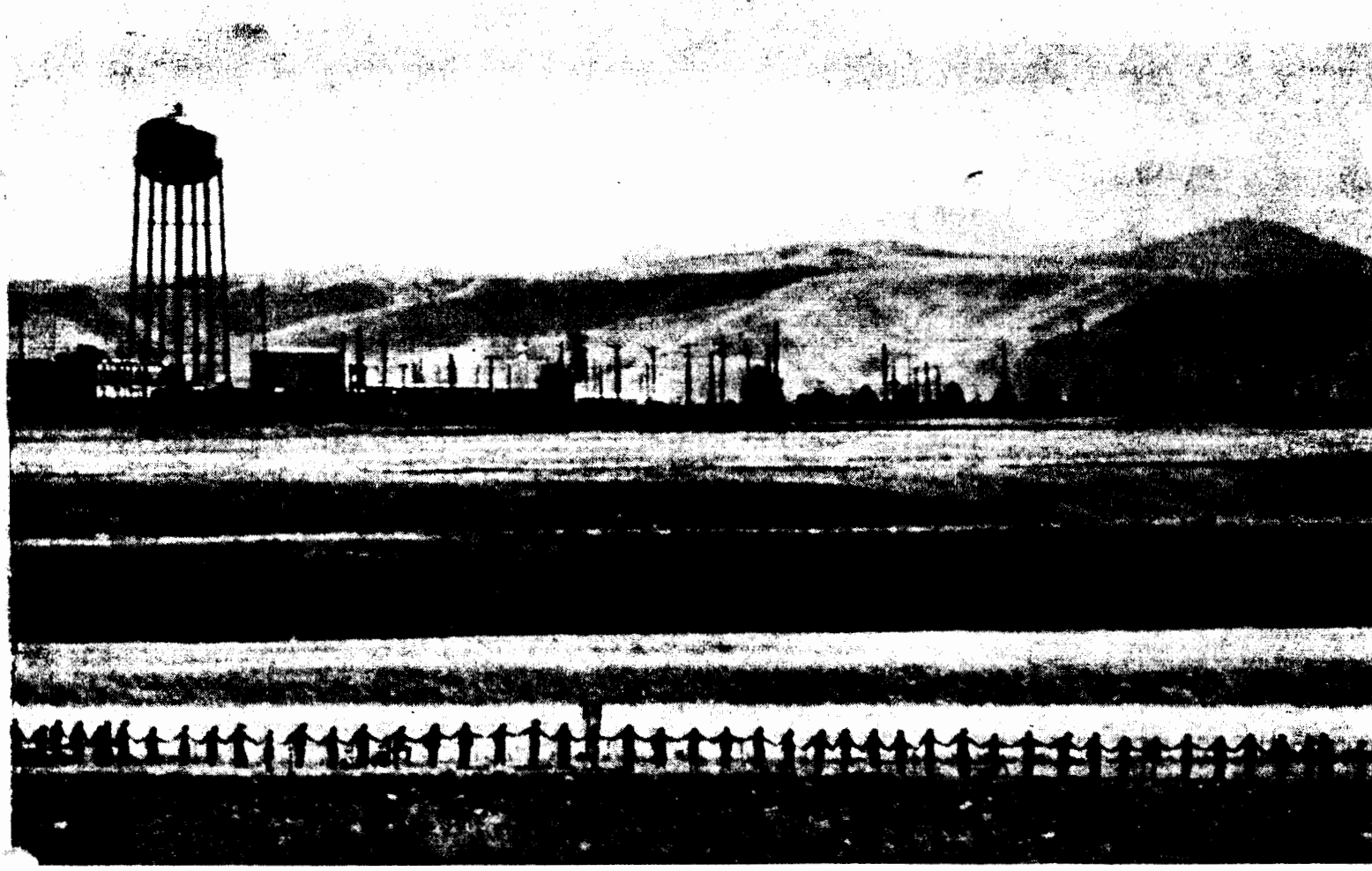
A Citizen's Guide to Rocky Flats

$1.00

Environmental and Safety Issues At the Nuclear Weapons Plant

By Marcia Klotz



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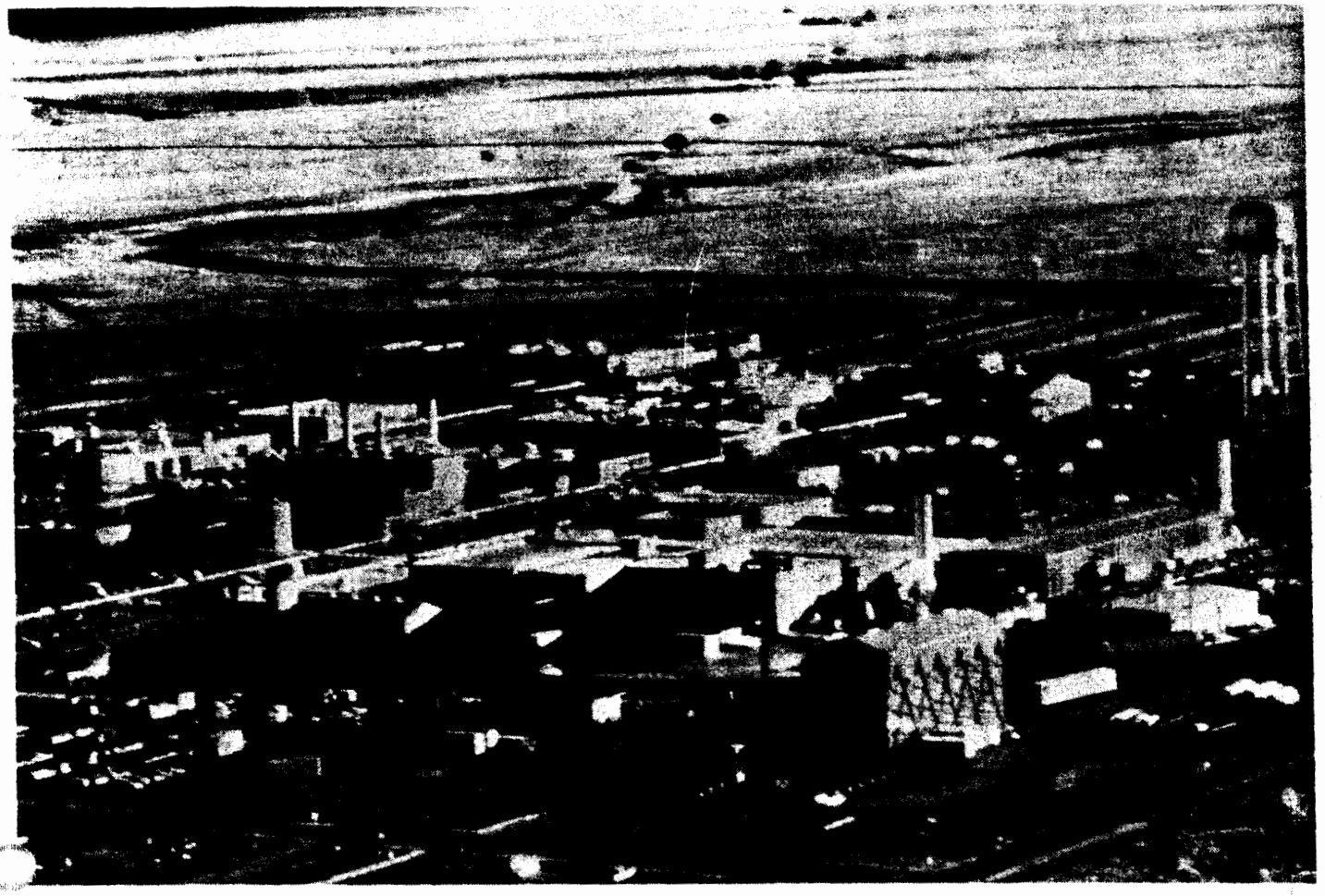

Aerial view of Rocky Flats

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Additional copies of this pamphlet and information about political action concerning Rocky Flats are available from the Rocky Mountain Peace Center.

A Citizen's Guide to Rocky Flats

"There's Good News Today. U.S. To Build $45 Million A-Plant Near Denver." This *Denver Post* headline of March 23, 1951, announced the birth of what was to become the only plant in the United States to manufacture plutonium triggers for hydrogen bombs. It also marked the beginning of a highly complex, forced relationship between a U.S. nuclear facility, the workers who staff it, and more than a million residents of the nearby metropolitan area.

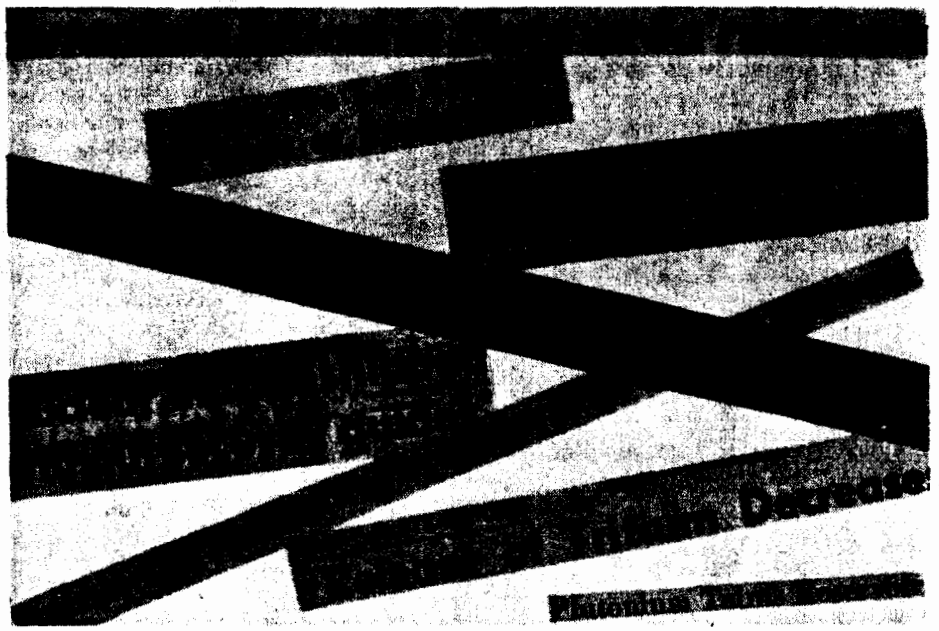
Mass production of nuclear weapons was a new concept in 1951. The Los Alamos facility had served both the research and production needs of U.S. nuclear development up to that time. In order to allow Los Alamos to concentrate strictly on research, the Atomic Energy Commission (AEC) was developing a complex of facilities across the nation to build nuclear weapons.

The AEC's criteria for choosing a site included a western location; a dry, moderate climate; a dependable power source; the proximity of a population of 25,000 or more; and an attractive environment. Rocky Flats was chosen over 35 other sites.

To avoid a public health risk resulting from a nuclear accident, the AEC needed a location downwind of any dense population. The Rocky Flats site seemed safe because wind measurements at Stapleton International Airport showed prevailing air currents blowing from the south, from Denver towards Rocky Flats. These initial readings were incorrect. Winds coming from the mountain canyons to the west of the plant do not follow the same patterns as those at the airport. In general, air currents leaving Rocky Flats blow to the east or southeast — often towards downtown Denver.

The AEC originally contracted with the Dow Chemical Company to operate Rocky Flats. The facility's contract passed from Dow to Rockwell International in July 1975. That same year, administrative authority also shifted from the AEC to the Energy Research and Development Administration (ERDA). The Department of Energy (DOE) replaced ERDA in 1977 and has regulated the plant since then.

Rocky Flats has grown significantly since it began full-scale operations in 1953. The original $45 million price tag mushroomed into construction expenditures of $250 million. U.S. taxpayers now pay $450 million each year to operate the plant. Rockwell International's work force has grown to over 5200 (as of February 1988) from Dow's initial payroll of 200. And more than 100 buildings now occupy a site that started out with only 20 structures.



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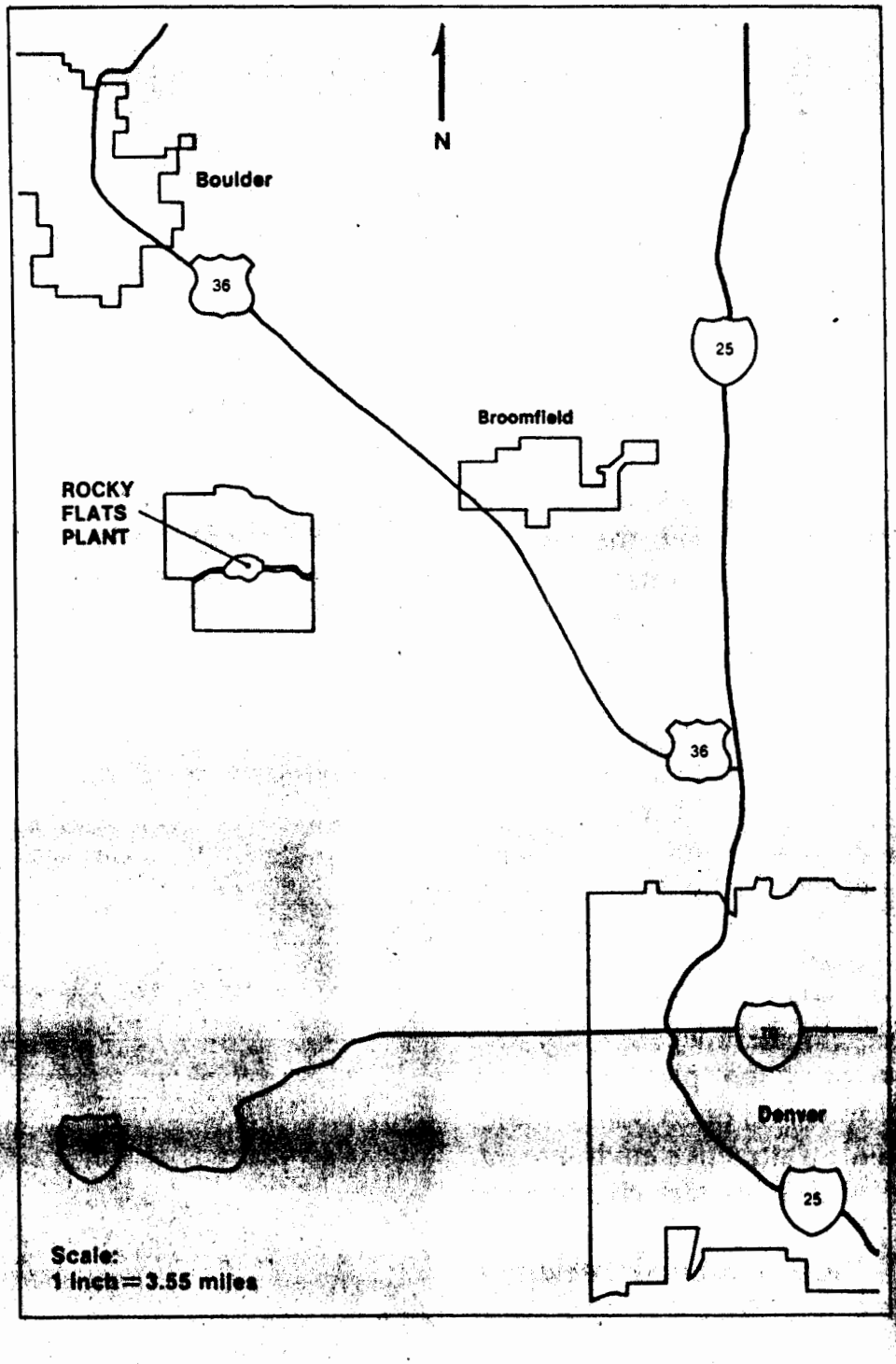


Rocky Flats Plant and Surrounding Area

Source: Final Environmental Impact Statement, Rocky Flats Plant (April 1980)

This buttton of plutonium weighs ten pounds. This is the form in which it is shipped to Rocky Flats from Hanford and Savannah River. It is then machined into triggers. More than a ton of plutonium is "missing and unaccounted for" according to the General Accounting Office.

Rockwell International

Rocky Flats is a small part of Rockwell's total operations. With $12 billion in 1986 sales, derived mostly from aerospace, electronics and automotive businesses, Rockwell employs about 25,000 scientists, engineers and technicians, roughly 10% of whom work at Rocky Flats.

Rockwell's financial contribution to the Denver area is substantial. Not only does it pay $280 million in annual wages and benefits to Rocky Flats employees, but the corporation also spent $65 million in 1986 purchases in the Denver region.

The DOE grants Rockwell 1.5 percent profit on Rocky Flats' annual operating budget — about $ 7 million. Rockwell also acquires the rights to inventions stemming from Rocky Flats operations. In addition, the plant serves as a training ground to develop technological expertise in handling plutonium, valuable knowledge for some of the corporation's other operations. Rockwell garners additional profit from research and manufacturing done for third parties at the plant.

Stockholders at Rockwell's annual meeting in 1987 proposed a "Rocky Flats Action Plan" that called upon Rockwell to stop producing radioactive waste and to remove contamination from the surrounding land. The board of directors opposed the proposal. It was defeated, but with 8% of the votes in favor. [2]

The Two Missions of Rocky Flats

Rocky Flats is a critical link in the nuclear weapons production chain. It serves two major purposes in the fabrication line: the manufacture of nuclear components for weapons and the reprocessing of obsolete and unreliable weapons.

Trigger Production

Rocky Flats imports plutonium — a radioactive, heavy metallic element that is one of the most toxic elements known to humanity. Plutonium does not exist in nature, but is made by bombarding uranium with slow neutrons. Once created, plutonium poses an ongoing threat to the health of many generations because it has a half-life of 24,000 years.*

The Department of Energy's nuclear reactors in Hanford, Washington and Savannah River, South Carolina produce plutonium. Workers at these facilities extract plutonium from nuclear power plant fuel rods, concentrate it, form it into ten-pound buttons, and ship it to Rocky Flats. Here, the raw plutonium is machined into triggers — fission bombs used inside a hydrogen bomb to generate a sufficiently high temperature and density to set off a fusion reaction. The H-bomb itself is inherently clean; all the radioactive fallout comes from the plutonium trigger.

Rocky Flats workers ship the completed triggers by truck to the Pantex nuclear weapons facility in Amarillo, Texas, where they are assembled into finished weapons.

The process of manufacturing nuclear bombs also produces plutonium-rich residues. Since plutonium is extremely costly, Rocky Flats operators save these residues to reclaim the plutonium. Residue purification takes place in buildings 371 and 771, using dry, heated chemicals (pyrochemical reprocessing) or acids (aqueous reprocessing).[1]

Processing Retired Weapons

As nuclear bombs age, they become unreliable. Older warheads are retired after a number of years; the time depends on the type of weapon. These, along with obsolete bombs, are sent to the Pantex Plant to be dismantled. The triggers are then transported back to Rocky Flats, where workers disassemble them, remove the plutonium and purify it for reuse in new bombs. The figure on page 11 charts the progress of plutonium from its birth in the reactors of Savannah River and Hanford to the final production of nuclear weapons at Pantex.

* *All words followed by an asterisk appear in the glossary.*

Major Fires at Rocky Flats

When plutonium comes into contact with air, it ignites spontaneously, smoldering like charcoal. Because of this danger, workers manipulate plutonium with heavy rubber gloves through airtight, nitrogen-filled gloveboxes.

But sometimes gloveboxes develop leaks, allowing infiltrating air to ignite the plutonium within. This is probably what led to the explosion and fire at Rocky Flats on Sept. 11, 1957.[3]

One of the plant protection workers who discovered the fire later described what happened: "There was an explosion that nearly knocked me to the floor and blew all the doors on the west hall wide open. . . . I then heard Owen shout that it had blown up and for everyone to get out."

As firefighters tried to combat the blaze, filters over the glove box caught fire, releasing the plutonium particles lodged in them. Since these had not been changed since their installation in 1954, the filters alone may have released as much as 100 pounds of plutonium into the atmosphere on that day.

Attempts to quell the fire by turning on ventilation fans only spread the flames to more plutonium. About 40 pounds of the deadly substance burned in the blaze. When carbon dioxide also failed to extinguish the fire, plant officials decided to try water.

That decision entailed tremendous risk. It was thought that plutonium, mixed with water in a contained environment, could reach a critical mass, leading to a nuclear chain reaction known as criticality.

Though gravely dangerous, the use of water did eventually extinguish the fire some thirteen hours later. During the crisis, Rocky Flats personnel gave no warning to local schools, county commissioners, neighboring cities, or health agencies. No emergency actions were taken to protect the public.

Officials did not reactivate smokestack monitors until seven days after the accident. The first day they were turned on, the stack emissions measured were 16,000 times acceptable radiation standards.

Production resumed three days after the fire, although the destroyed filters had not yet been replaced.

In two elementary schoolyards, soil samples showed concentrations of "possible enriched uranium" about 200 times the background level in Colorado from nuclear testing fallout. In spite of such alarming preliminary findings, Rocky Flats officials only examined three soil samples from the surrounding area.

Many smaller fires and accidents at Rocky Flats have resulted in worker contamination. An explosion in 1965, for example, resulted in such severe plutonium exposure of a worker's fingers that the thumb and second finger had to be amputated.[4]

Twenty plutonium fires broke out in 1969, the largest in May, when plutonium again ignited spontaneously in a cabinet. Heat sensors did not detect the fire until it was out of control, because workers had inadvertently insulated the sensors from the area in which the fire started.

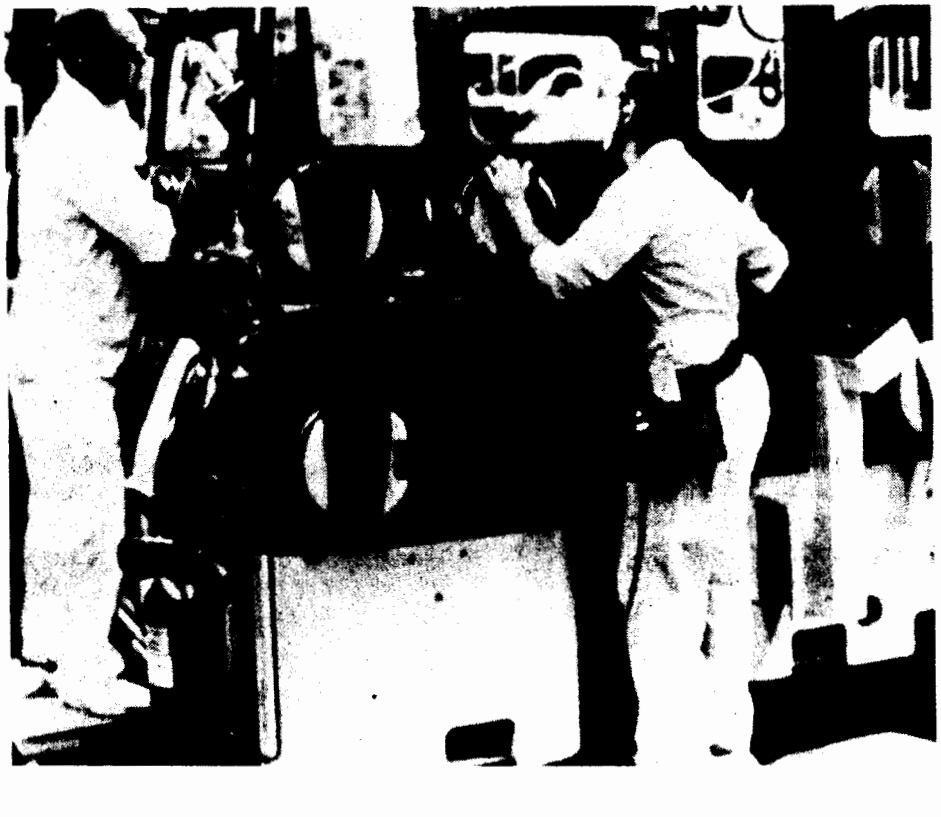
Firefighters exhausted carbon dioxide supplies in ten minutes. Water was again used to combat the blaze, and in four hours the fire was under control.

After the 1969 fire, scientists monitoring the soil around Rocky Flats found radioactive cesium-137 in samples up to 31 times background levels.[5] The presence of cesium, a fission product, indicates that the use of water on one of the two fires may have resulted in a nuclear chain reaction. Cesium might also have been released if nuclear fuel rods stored at the plant had burned in the fires.

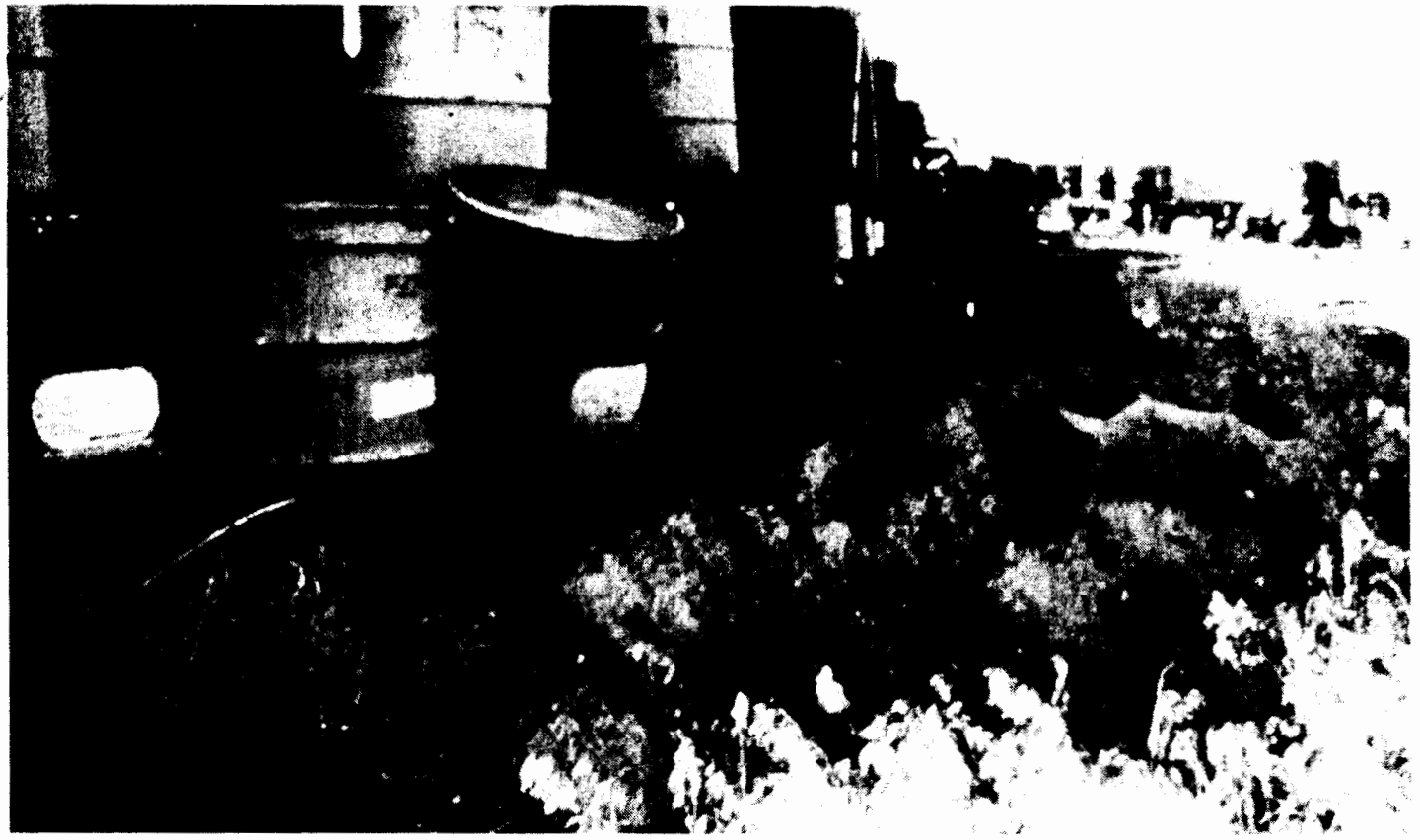
The 1969 fire won the ignominious distinction of being the most expensive U.S. industrial accident of the time, costing taxpayers $45 million. The hundreds of workers needed to clean up the mess may be paying an even higher price.

According to Mrs. June Suttie, widow of a Rocky Flats employee who worked for months cleaning up after the fire, workers wiped off contaminated floors, ceilings, walls, and pipes with rags. When one janitor refused to take part, he was fired.[4] Mrs. Suttie believes her husband's work in those years exposed him to radioactivity, which contributed to the colon cancer that claimed his life in 1986.

How many of David Suttie's co-workers from the 1969 fire cleanup have also contracted cancer? Only the DOE can say. No other agency has the authority to perform a statistical study of cancer incidence in those workers. The DOE has plenty to lose from this type of study since a high correlation could lead to a greater number of worker lawsuits and a loss in reputation. As one might expect, the DOE has not done such a study and has no plans for one in the future.



Glove boxes in which the workers are manipulating plutonium. The inside of the boxes are normally at a lower pressure than the room outside to prevent contamination of the room in case of a leak.



Waste drums containing radioactive hazardous chemicals piled haphazardly at Rocky Flats. For more than ten years waste drums leaked onto the soil and into the air. Drums were removed in 1966.

Contamination

When plutonium burns or corrodes, it combines with oxygen to form plutonium dioxide, or PuO_2. Particles of this compound are small enough to be carried by wind currents. The majority of PuO_2 particles released by the fires of 1957 and 1969 are so small they can be inhaled easily. Since plutonium dioxide particles are highly insoluble, they do not percolate into the soil with rain, but remain on the surface for many years, where wind can again whisk them up.

According to scientist Edward Martell of the National Center for Atmospheric Research (NCAR), "the resuspension of deposited PuO_2 by the action of winds, vehicular traffic, and human activity gives rise to an inhalation hazard to occupants of the contaminated and downwind areas."[6]

Resuspended particles, along with the particles released by standard operations at Rocky Flats, create a substantial plutonium concentration in the air around the plant. Between 1970 and 1977, DOE air monitors showed a higher level of plutonium at Rocky Flats than at any of the other fifty U.S. monitoring sites for every year measured.[7]

New Onsite Contamination Studies

The DOE began a Rocky Flats cleanup project in 1984 known as the Comprehensive Environmental Assessment and Response Program (CEARP) for some contaminated areas on the Rocky Flats site.[8] In the first of five phases of this program, DOE investigated eighty potential environmental problems and found the condition of three areas serious enough to qualify for the Superfund National Priorities List. Just a few of the most alarming findings are discussed below:

The 903 Drum Storage Area

Between 1954 and 1966, Dow Chemical stored over 5000 drums in an open field on the Rocky Flats site, most of which contained spent machine cutting oil contaminated with plutonium. Dow officials discovered that some of these drums were leaking in 1959, but did nothing to correct the problem for seven years."[9]

Dow removed the drums in 1966 and sent the radioactive contents offsite for disposal. Workers then gathered the underlying contaminated soil into about three acres and covered it with asphalt in 1969. This was a very temporary solution — plutonium has a half-life of more than 24,000 years, while asphalt does well to last a century.

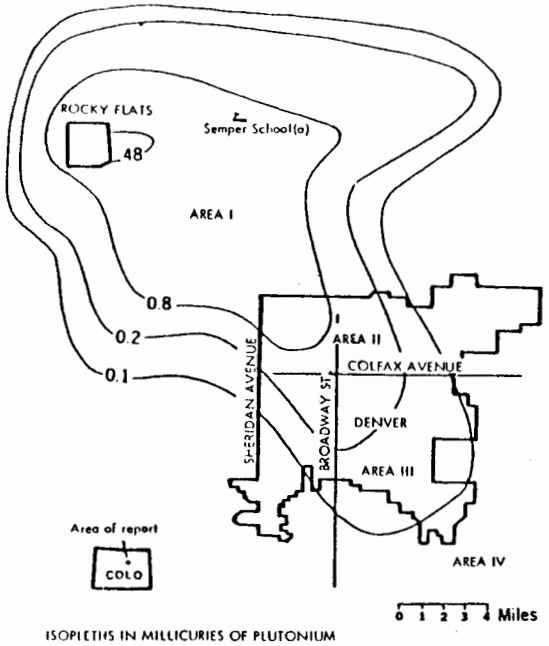
The 903 Lip Area

After the barrels were removed from the 903 Drum Storage Area, the plutonium-laced oil that had leaked into underlying soil was exposed to open air. Winds redistributed contaminated particles over what is now known as the 903 Lip Area, between the asphalt pad and the Rocky Flats boundary. Almost five million pounds of contaminated soil had to be shipped away from this area for disposal in 1978.

But plutonium particles do not stop at fences. When two NCAR scientists studied offsite soil samples in 1971, they discovered plutonium concentrations ranging from "250 times fallout at a distance of two miles east of the plant to ten times fallout in Westminster, eight miles east of the plant and to several times fallout in the eastern suburbs of Denver."[10]

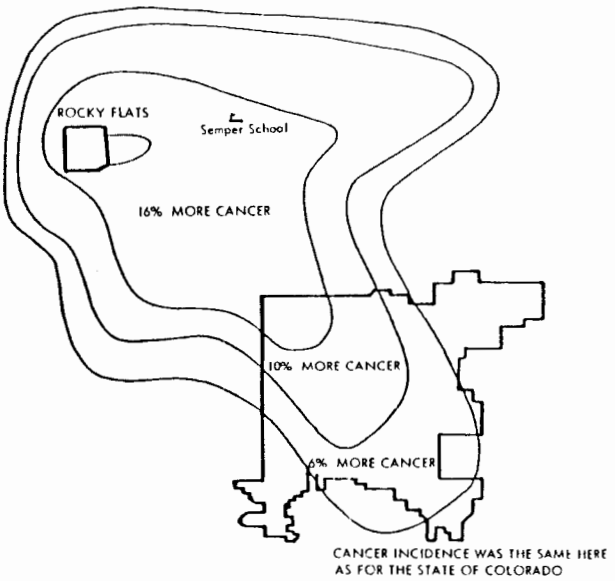
Subsequent investigations showed the plutonium had not been deposited by the two major fires, as originally assumed. Winds had carried the contamination offsite between 1967, when the oil drums were

DENVER AREA CENSUS TRACTS WITHIN ISOPLETHS FOR SOIL CONTAMINATION WITH PLUTONIUM DOWNWIND FROM THE ROCKY FLATS PLANT



ISOPLETHS IN MILLICURIES OF PLUTONIUM PER SQUARE KILOMETER

CANCER INCIDENCE IN 1969 - 1971



moved, and July of 1969, when the 903 Drum Area was paved.

If these scientists had not done independent soil samples, the public would never have learned about the leaking drums.

Uranium Incineration Pits

Oil containing uranium chips was burned in open pits in various areas on the Rocky Flats site from 1954 to 1968. This unfiltered incineration not only endangered downwind residents by spewing radioactive particles into the air but also left many contaminants in the soil. In one instance, plant personnel constructed a building over a burn pit; in others, they covered the pits with backfill.

Surface Water

Between 500 and 2000 curies* of tritium, a radioactive hydrogen isotope, were released with waste water from Rocky Flats in 1973. Plant workers were unaware that a shipment of scrap plutonium received from the Lawrence Livermore Laboratory in California also contained tritium. No attempts were made to recover the tritium from the scrap because nobody knew of its existence, so it was released into the liquid waste stream. Some of it wound up in Walnut Creek, which flows into the Great Western Reservoir, the water supply for Broomfield. State health department officials, alarmed at peaking tritium levels in the Broomfield water supply, eventually traced the contamination back to Rocky Flats.

Because of the tritium release, a task force appointed by Governor Richard Lamm and then-Representative Tim Wirth in 1975 recommended that "federal and local authorities supply an alternate source of water to Broomfield until the Great Western Reservoir is no longer subject to potential contamination from Rocky Flats."[9]

A secondary water source now exists for Broomfield, but the Great Western Reservoir still serves as the primary source. Meanwhile, the Walnut Creek drainage area has earned top ranking on the list of high-risk areas at Rocky Flats.

The Woman Creek Drainage

Woman Creek, which runs through Rocky Flats and into Standley Lake, is also in danger of serious contamination. Just two miles southeast of the plant boundary, Standley Lake supplies part of the water needs of Westminster, Northglenn, and Thornton. Hillside 881, located in the Woman Creek drainage area, is contaminated with hazardous chemical and possibly radioactive substances. In high rain seasons, pollutants from Hillside 881 could spill into Woman Creek, eventually contaminating local water supplies. Because of this risk, Rockwell has chosen Hillside 881 as the first cleanup site in the CEARP program, budgeting almost $40 million in the next two years on the hillside alone.[11]

An incomplete study of sediments in the Great Western Reservoir and Standley Lake showed levels higher than background of both plutonium and americium (a radioactive decay product of plutonium). A thorough study is yet to be done.[12]

Groundwater

A 1986 DOE study revealed high levels of volatile organic compounds in Rocky Flats groundwater. Eight onsite monitoring wells turned up four toxic chemicals in concentrations 1000 times EPA's maximum acceptable standards.[1]

As part of the CEARP cleanup program, officials have been investigating possible origins of the groundwater contamination by interviewing senior plant workers. These interviews have brought many past accidents and spills to light, including overflows of waste and holding tanks, broken sewage lines, and leaks in underground process waste tanks. Many of these spills released radioactive and hazardous chemical contaminants into the soil. In most cases, information on cleanup measures taken immediately after the accidents is incomplete. Once in the soil, little can be done to keep pollutants from percolating into the underlying aquifer.

Groundwater pollution at Rocky Flats could eventually result in the contamination of surface water and drinking supplies because the aquifer discharges to the surface in springs downstream of Rocky Flats. Rockwell, DOE, EPA, and state health department officials are currently examining the extent of the damage. Any corrective action is bound to be quite expensive. Options include:

- trying to contain the contaminated groundwater under Rocky Flats by limiting aquifer mobility;
- pumping neutralizing chemicals into the groundwater through wells; and
- pumping polluted groundwater to the surface for cleanup or storage.

Health Effects of Rocky Flats

Debate over the safety of the Rocky Flats facility and the health of the surrounding community has been raging for many years. Scientists have conducted two kinds of health studies pertaining to Rocky Flats: those examining workers at the plant and those monitoring the population of the Denver metropolitan area to see if any negative health effects, such as cancer incidence, increase with proximity to the plant. Such studies are important because they can help determine "safe" radiation exposure standards (in itself a disputed notion). Many of these studies present scientific difficulties, often generating statistical data that are difficult to interpret.

Plutonium Effects on the Human Body

Plutonium emits alpha particles, energetic particles that travel about five cell diameters in tissue. Skin effectively blocks alpha radiation from plutonium sources outside the body. But when plutonium enters the body by means of inhalation, ingestion through food or drinking water or through open wounds, the continuous emission of alpha particles can do great injury. Even though alpha particles only penetrate a small amount of tissue, they carry enough energy to kill the cells they encounter or to cause mutations that can result in cancer.

The amount of radiation given off by Rocky Flats plutonium does not remain constant, but increases with time. This is because some plutonium spontaneously disintegrates into americium, a much more active alpha particle emitter. After 70 years the radiation level will have increased by about 50 percent.

It is difficult for the human system to flush out plutonium. In fact, half of the original mass will still remain in the body a century after its entry.

When inhaled, plutonium particles are deposited in the lung. From there, they slowly migrate via the lymphatic system to the tracheobronchial lymph nodes. Over many months, plutonium is redistributed to other organs, principally the liver and bones.[13] Plutonium's tendency to concentrate in certain organs makes it more damaging than if it were evenly distributed throughout the body. Allowable exposure standards have often been set too high, assuming uniform distribution.

Chromosome Aberrations

The discovery of high levels of plutonium in the gonads has led to studies of chromosome aberrations.[14] One study shows that plutonium is ten times more effective in causing chromosome aberrations than in causing lung cancer.[15] And a study of 343 plutonium workers at Rocky Flats shows that those with plutonium deposits in body organs between one and ten nanocuries* had a chromosome aberration rate twice as high as those with less than one nanocurie of internal exposure.[16] The tendency of plutonium to concentrate in the gonads means that chromosomal damage can also be passed to the next generation.

Plutonium Releases from Rocky Flats

In the course of normal operations, Rocky Flats currently emits one or two microcuries* of plutonium per month.[17] In the entire operational history of the plant, this adds up to about one millicurie. But thousands of times more plutonium than this was released in the explosion and fire of 1957, the fire of 1969, and the leaks of the late sixties.

Plutonium from Rocky Flats has been deposited offsite in a broad tongue, sweeping to the southeast into Denver, following prevailing wind patterns. Some plutonium, traceable to Rocky Flats by its isotopic composition, has also been found as far away as Loveland, thirty miles north of the plant.

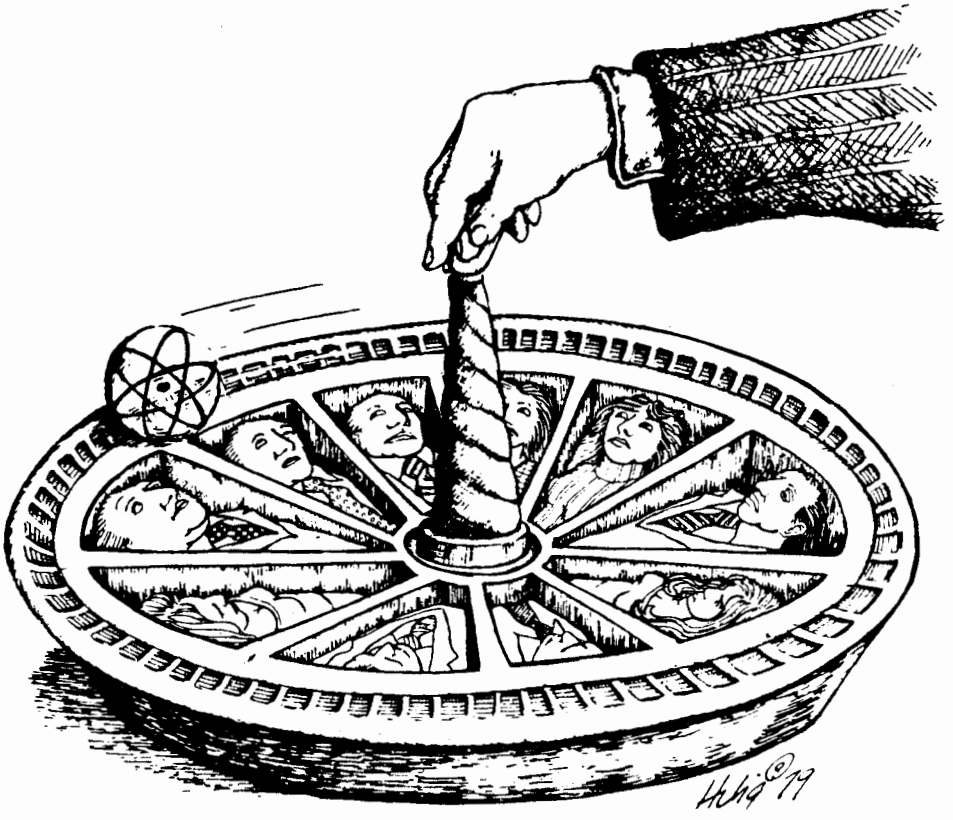
Soil studies can account for about twelve curies of plutonium released from the facility in the course of its history, about a fourth of which has been deposited on offsite land.[18] But this is only 1% of the plutonium lost in the 1957 fire alone. What happened to the rest? Dr. Edward Martell of the National Center for Atmospheric Research speculates that winds might have carried radioactive particles from the fire far to the east before dropping them on the plains of eastern Colorado and Kansas. No soil studies have been done in this area.

Public Health Studies

A controversial 1981 report by Dr. Carl Johnson, then director of the Jefferson County Health Department, brought much public attention to Rocky Flats' health impacts on the Denver area.[19] Johnson divided the region around Rocky Flats into areas of decreasing contamination, determined by previous soil studies (see figure on page 6). He then determined cancer incidence from 1969 through 1971 for these areas from federal data. Area I, the most contaminated region, showed a 24 percent higher cancer incidence in men and a 10 percent higher incidence in women over Area IV (the area of little to no contamination). Excess cancer incidence in Area II was 15 percent for men and 5 percent for women.

Johnson pointed out that most of the excess cancer cases, such as leukemia, lymph, lung, thyroid, testes and breast cancers, paralleled those of Hiroshima and Nagasaki survivors.

A 1987 study, funded by DOE, reanalyzed these data and found that "Johnson's



results were closely reproduced."[20] New data from 1979 through 1981 showed the same trend, except that the highest cancer rates now occurred in Area II. This could be explained by the large number of new residents moving into Area I, diluting the contaminated population by 50 percent.[21]

This DOE study also showed a relationship between proximity to the state capitol and an increase in cancer incidence, known as "urban effect." This finding does not negate Johnson's correlation of cancer incidence with plutonium contamination in the soil. Nevertheless, the authors state that the "study found no evidence of a relationship between the location of the Rocky Flats Plant and cancer incidence in the Denver area." This conclusion is not supported by the study's data.

Infant Deaths

Dr. Johnson also studied the health effects of Rocky Flats on children. He concluded that the infant mortality rate in Jefferson County, which had been lower than the national average before Rocky Flats began operating, rose sharply in the 1950's, peaking right around the time of the 1957 fire. Fetal death rates increased dramatically after the plant began operating, and the number of children dying of leukemia, which had been below the U.S. rate before 1953, grew to twice the national average after 1957.[22]

Worker Mortality Studies

In 1980, Johnson noticed a large number of brain tumors among Rocky Flats workers. Thirteen plant employees suffered brain tumors when only 1.6 were expected based on incidence in the general U.S. population.[23]

Johnson's findings prompted more research into worker health by a group of scientists from the Los Alamos National Laboratory, a DOE research facility. Their data confirmed a high number of brain tumors, but also noted that the overall rate of deaths observed at Rocky Flats from all causes was much lower than expected when compared with total deaths in the U.S. population.[24]

This finding can be explained by the "healthy worker effect," noted in other studies of industrial workers. The general U.S. populace is a biased comparison group because it contains many people who are unemployed for reasons of ill health. This fact, though mentioned in the study, was dismissed by a Los Alamos press release with the following headline: "Rocky Flats Mortality Study Means Less Worry for Plutonium Workers."[25] Rockwell went so far as to suggest that working at Rocky Flats was a particularly healthy activity.[26]

In 1987 the same group of Los Alamos health physicists published another study, using data on the same Rocky Flats workers but coming to the opposite conclusion.[13] Rather than comparing workers to the U.S. populace at large, this study divided workers into two groups: those exposed to less than two nanocuries of internal radiation and those exposed to two nanocuries or greater (the standard acceptable level of internal exposure at DOE facilities is forty nanocuries).

The exposed group showed a higher rate of death from all cancers, but particularly from those of the lymph system, esophagus, stomach, colon, and prostate. Cancer rates in the exposed group were higher than in the unexposed group by 1 percent after two years, 24 percent after five years, and 61 percent after ten years. Surprisingly, the cases of brain tumors, which had prompted these studies, occurred almost exclusively among the unexposed group.

Two nanocuries is the lowest amount of internal radiation that can be easily measured, given the accuracy of current instrumentation. The 1987 study shows that even at this low level, exposed workers developed cancer at a significantly higher rate than those who were not exposed — and in a much shorter period than most health physicists had previously assumed.

Radiation Standards

The task of setting limits to radiation exposure is very difficult, due to scientific and political hurdles. The Nuclear Regulatory Commission carries this responsibility, receiving recommendations from the National Council for Radiation Protection.

The fundamental limits are five rems* per year of occupational exposure and ten percent of that (1/2 rem per year) for the general public.

Just how much of a radioactive substance will result in five rems of exposure varies drastically, depending on the substance. The kind of radiation emitted, retention time and the tendency of the material to accumulate in certain parts of the body are all important factors. For example, five rems equals forty nanocuries of plutonium-239 (roughly a millionth of a gram), or 30,000 nanocuries of cesium-137, a beta emitter.*

These limits are based on scientific studies, but it often takes a long time to incorporate new data into the standards. For example, a 1978 report noted that chlorine in public drinking water changes the chemical state of plutonium, making it about 1000 times more easily absorbed into the human body. The report's authors state, "The consequence of this observation is that the present values for the maximum permissible concentration of plutonium in drinking water appear to be too high by several orders of magnitude."[27] Ten years later, the standards remain the same.

An even more serious hazard involves the dangers posed by low levels of radiation, such as those encountered by workers at a weapons plant or people in the surrounding communities. Until recently, these have been extrapolated from models of high-level radiation by examining survivors of Hiroshima and Nagasaki. The inadequacy of this kind of modelling is amply demonstrated in the above-mentioned studies of Rocky Flats workers. While the maximum permissible body burden of plutonium is forty nanocuries, excess cancers were evident in workers exposed to only two nanocuries, one twentieth of the standard. Excess chromosome aberrations were evident at a fifth the standard.

A consistent trend is apparent in health research involving low-level radiation. Whenever new information leads to new standards, these are invariably lower than the old.

The political difficulties of setting radiation standards result largely from a conflict of interest within the DOE. The primary mission of the department is to produce nuclear weapons and promote nuclear energy. In this role, the DOE routinely contests court claims for radiation injury by people living near nuclear plants or test sites. Nevertheless, DOE funds over 60 percent of all research on the health effects of radiation and helps set radiation exposure standards.[28]

Some independent observers have noticed this conflict of interest and tried to correct it. President Carter formed an Interagency Task Force on Ionizing Radiation in 1979, which recommended that DOE's research program on the health effects of radiation be transferred to a federal public health agency.[29] Similarly, a report by Governor Richard Lamm's Health Assessment Group of 1984 recommended: "[F]uture research on the health of Rocky Flats workers should involve funding *independent* of the Department of Energy," and, "... the fact that [cancer] research will be funded by DOE will constitute a concern for those who worry about the potential for conflict of interest."[30]

Rows of drums containing plutonium ingots and parts are stored in this vault at Rocky Flats. The walls are ten inches thick. A computer controlled retrieval system handles traffic.

Accident Possibilities

Risk Analysis and DOE Conflict of Interest

Accidents of all sorts are a distinct possibility at Rocky Flats. Any of these could result in a substantial release of plutonium or other toxic materials into the environment. These include operational accidents (such as the major fires and spills of the past), earthquakes, high winds, tornadoes, sabotage, terrorist attack, and aircraft crashes into the plant. There are, however, serious difficulties in determining the possibility that such accidents will occur.

According to a DOE report, the possibility of natural disaster accounts for the vast majority of risk associated with the facility. "Earthquake and high-wind events severe enough to cause substantial building damage contribute approximately 93 percent of the composite risk due to the Rocky Flats Plant," reports the Long-Range Rocky Flats Utilization Study, published in 1983.[31] Many Rocky Flats structures were constructed when building codes regarding seismic and wind force resistance were less stringent than they are today. By modifying these buildings to meet current standards, risk associated with the facility could be reduced by 97 percent at a cost of $112 million., according to the study. Rockwell has chosen to make a simpler modification, costing $7.5 million and eliminating 93 percent of the risk.

The Long-Range Utilization Study offers a false sense of security by minimizing risk resulting from operational error while maximizing risk that can be easily corrected. A quick glance at the major industrial accidents of recent history, such as Three Mile Island, Bhopal and Chernobyl, shows that operator error and equipment malfunction have indeed proven the most dangerous components in overall risk at these facilities.

Since one can never predict all possible mistakes operators can make, one cannot prepare for them. Reinforced buildings will not eliminate the danger at Rocky Flats. Indeed, none of the major disasters at Rocky Flats has involved natural catastrophes, terrorists or aircraft.

This same DOE study estimates that each of the 1.8 million people living within a 50-mile radius of Rocky Flats faces only a 1-in-900 million chance of dying prematurely from a Rocky Flats accident. The study compares this risk with a Coloradan's 1-in-4000 chance of dying in a car accident or a 1-in-550 chance of dying of cancer, concluding that public risk associated with Rocky Flats operations is relatively insignificant.

This kind of risk assessment relies on an estimate of probability that has no historical basis. The study also ignores other possible hazards, such as the dangers of transporting plutonium to and from Rocky Flats or health hazards other than cancer. This is typical of DOE risk assessment studies, according to a 1981 General Accounting Office (GAO) report, which concluded that many DOE studies of nuclear facilities across the nation do not examine all potential risks.[32]

The DOE's primary objective is to promote, operate and regulate the nuclear bomb industry. So long as the department also sponsors these studies, one can expect risk estimates to be minimized, due to an obvious conflict of interest.

When the GAO reviewed a number of safety-related DOE reports in 1987, it concluded that "all safety analysis reports were being reviewed and approved internally within the DOE, which does not represent an independent review process." GAO recommended "an arrangement so that DOE's safety analysis reports receive outside, independent reviews." DOE disagreed with this recommendation.[33]

Advice to Homeowners

By no means do the realtors and developers of the Denver metro area share a unified position on Rocky Flats. Some developers have moral scruples about building on tracts near the plant, but others object even to warning prospective homeowners about the soil contamination around Rocky Flats.

In 1978 the EPA suggested that the Department of Housing and Urban Development (HUD) warn potential homeowners about the possibility of an accidental release of plutonium from Rocky Flats. HUD initially rejected the suggestion, stating that Rocky Flats operations "present no more hazard than many ordinary occurrences in daily life."[40] In March of 1979, however, HUD issued the Rocky Flats Advisory Notice, notifying prospective tenants and buyers of the existence of "varying levels of plutonium contamination of the soil." The advisory notice also mentioned an "Emergency Response Plan," which specified protective actions in case of an accidental release of radioactivity from the plant. Anyone applying for federal mortgage insurance for land within ten miles of Rocky Flats was required to read this notice.[41]

In January of 1981, under the new Reagan administration, the advisory notice was discontinued in favor of a Colorado state brochure, "Information regarding the Rocky Flats Radiological Emergency Response Plan." A year later this program was also abandoned. Today, prospective homeowners receive no advice or warning regarding the dangers of living near Rocky Flats.

...uclear Liability

The Price-Anderson Act

What would happen if a major fire, accompanied by a nuclear chain reaction at Rocky Flats, contaminated surrounding homes and property with radioactive fallout, spreading death and disease? Who would pay for such a disaster?

Not the nuclear contractor. Rockwell would not have to pay, even if such an accident resulted from gross negligence.

Taxpayers would have to pick up most of the tab, because the DOE is responsible for up to $7 billion for nuclear accidents. But it is quite likely that damages would greatly exceed this amount, in which case homeowners would simply be unable to collect. Concerned property owners cannot prepare for such a contingency beforehand by buying nuclear insurance, because no insurance agencies sell it.

Nuclear contractors maintain a unique position of immunity from the ominous financial risks of operating their facilities because of the 1957 Price-Anderson Act. This legislation was originally intended to ...mote the "peaceful atom" by helping the ...nt nuclear power industry get on its feet. For a decade, the government agreed to assume liability for nuclear power plant accidents. After that time, bill supporters expected the nuclear industry to be financially capable of carrying its own insurance. But instead of expiring in 1967, the act was renewed for another decade and expanded to cover nuclear weapons factories like Rocky Flats.

Congress renewed the Price-Anderson Act again in 1977. When it expired in 1987, some legislators tried to amend it to increase contractor responsibility for safety at nuclear facilities. In the Senate Energy Committee, Sen. Howard Metzenbaum, D-Ohio, proposed an amendment that would allow full recovery of damages for accidents resulting from the contractor's gross negligence. The amendment was narrowly defeated in committee, with Sen. Tim Wirth voting in favor of the amendment.

When the committeesettled on a compromise to fine contractors $30 million for willful safety violations resulting in an accident, DOE fought back. It called a meeting of its twelve largest contractors, who sent letters to the committee, threatening to stop operating their plants unless penalty provisions were removed.

Rockwell's letter to the committee states: "The broad scope of [Price-Anderson] indemnity provisions, which cover any public liability that could arise from a nuclear incident, has been a key factor in Rockwell's interest in serving as the management contractor for the Rocky Flats Plant.... Terms such as 'gross negligence' or 'willful misconduct' . . . would inject great and unacceptable uncertainty into indemnity coverage."[34]

Fearing a lengthy floor debate, the Senate postponed the decision to extend the Price-Anderson Act, effectively allowing indemnity coverage to expire in August 1987, when the act ran out. Despite nuclear contractors' threats to halt production, those contracts that expired after that date were renewed under a different piece of legislation, Public Law 805804. This law guarantees limited indemnity coverage, excluding cases of intentional misconduct or bad faith on the contractor's part.

The Rocky Flats contract expires on December 31, 1988. By that time, Washington analysts expect the Price-Anderson Act will have been renewed, either in its present or in an amended form. A similar bill containing no indemnity exclusions has already passed the House floor.

As it now stands, the Price-Anderson Act places nuclear contractors in a unique position in the industrial world. If any other corporation operates in an unsafe, irresponsible manner, its insurance premiums rise. Federal nuclear contractors are shielded from this risk-minimizing mechanism. Regardless of the type of mistakes these contractors make, taxpayers and homeowners will pay for the damage.

Worker Safety

In the private sector, the Nuclear Regulatory Commission (NRC) has authority over radiological matters, and the Occupational Safety and Health Administration (OSHA) regulates workers' non-radiological health and safety concerns. But in nuclear weapons factories the DOE must both meet production quotas and hear worker complaints. The conflict between these two tasks has resulted in an ambivalent attitude on the part of DOE in enforcing safety regulations on the contractors. Some examples include:

—June 9, 1980: A Rocky Flats employee reported an improperly installed glove box filter to his supervisor, For three days authorities refused to investigate the issue, and employees were exposed to radiation. On June 12 the area around the glove box was checked and found to be contaminated. The glove box was shut down, and respirator protection prescribed.

Three weeks later, the worker who had filed the complaint was told that DOE could not substantiate the alleged delay and that safety was the responsibility of Rockwell, not DOE.

—August 5, 1980: DOE received results of another complaint, alleging that workers in a glove box operation were routinely exposed to contaminated air that exceeded allowable radiation levels. DOE had recently received a Rockwell investigation which documented fourteen incidents of contaminated air in that specific area. Nevertheless, DOE informed the worker that, although there were some deficiencies, the containment system and procedures were adequate to ensure the safety and health of employees.[32]

Pat Kelly, a spokesperson for the Steelworkers Local 8031, which represents about half the Rocky Flats work force, says that safety has always been a major focus of the union. Kelly says there have been hundreds of incidents in the course of operations that have resulted in worker contamination.

One of the most common types of exposure results when plutonium punctures the rubber gloves, worn by workers while handling the metal, cutting and exposing fingers.

The number of such incidents has risen substantially since 1981 as a result of a major increase in production, Kelly says. Employee complaints regarding unsafe working conditions have risen steadily during each year of the Reagan Administration, from 40 cases in 1980 to 200 in 1986.[35]

Kelly also complains that Rocky Flats management has been negligent in supplying workers with prompt and accurate information regarding exposure to radiation. After an unusual occurrence, workers send a urine and fecal sample to the lab to be tested for internal contamination. An increasing number of these samples have been lost in transit or contaminated during analysis. Management has also been delinquent in informing workers of the results of these tests. In some cases employees have been informed months later that a test was invalid. It is questionable whether a second test at that time would accurately reveal the extent of internal exposure.

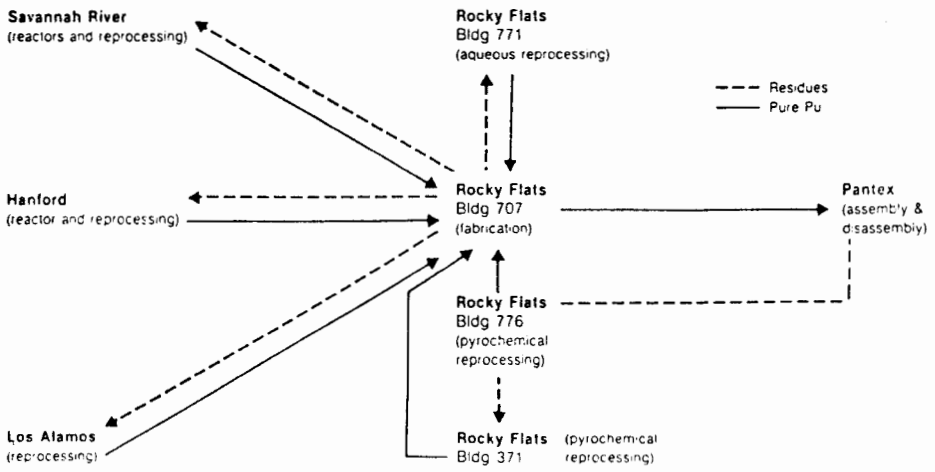
Kelly stresses that he has faith in the abilities and integrity of the technicians working in the laboratory, some of whom are members of the union. The lab technicians only analyze the samples, however, and then pass the data to Rockwell authorities, who give workers their test results. Kelly contends that health information is bottlenecked by management after it leaves the lab. Because of these allegations, the Steelworkers have requested that urine and fecal samples following a nuclear incident be tested by both the onsite lab and an independent testing facility.

Worker Suits

Rocky Flats workers who contract cancer after being exposed to radiation on the job have a hard time winning compensation for themselves or their families. This is due to Colorado worker compensation laws, which stipulate that a plaintiff must prove that the injury or death was work-related in order to receive compensation.

For cancer victims, the burden of proof is far more problematic then for workers involved in other industrial accidents. The latency period for cancer, which can be as long as 30 years, means that workers often have to rely on very old records to prove exposure. They then have to take on the formidable debate over whether exposure to low-level radiation causes cancer. Plaintiffs often find themselves relying on evidence from laboratories owned and managed by the defendant — the DOE.

Bruce DeBoskey, a Denver attorney who has represented a number of worker's compensation cases against Rocky Flats operators, has shown that these obstacles can be overcome. In two landmark cases, Deboskey won compensation for the families of two plant employees who had died of cancer. He has also lost two cases but expects a third victory soon. Five other cases are pending (as of August 1987).



The Compliance Agreement

Litigation in 1984 ended the Department of Energy's self-regulation over mixed waste, transferring this authority to the Environmental Protection Agency (EPA). Mixed waste includes hazardous substances contaminated with small amounts of radioactive substances. Purely radioactive waste remains under the jurisdiction of the DOE.

In Colorado, the EPA agreed to work in conjunction with the Colorado Department of Health (CDH) to investigate mixed waste at Rocky Flats. Together, the two agencies would attempt to bring transportation, storage, and disposal practices at the plant into compliance with the law.

DOE and Rockwell tested the new laws, refusing to recognize the jurisdiction of the EPA or the health department. In November 1985, Rocky Flats operators notified CDH that they were handling certain wastes, but they did not mention any radioactive mixed waste streams, claiming the health department had no jurisdiction over these.

State health officials called the bluff. A month later CDH issued a notice of intent to deny Rockwell a permit application, effectively threatening to close Rocky Flats' waste management operations. If the plant could not process waste, it could not function long. This was a precedent-setting move — by far the most aggressive stance ever taken by a state health agency toward a federal nuclear bomb factory.

The dispute seemed destined to turn into a major court battle. But DOE proved eager to settle out of court. An internal memo, intended to brief the DOE official who was negotiating an agreement with CDH and EPA,[36] clarifies DOE's willingness to compromise.

This memo states: "The compliance posture of the Rocky Flats facility makes it a poor candidate for testing fine points of the law. . . . We have basically no RCRA groundwater monitoring wells, our permit applications are grossly deficient (some of the waste facilities there are patently 'illegal'). We have serious contamination, and we have extremely limited environmental and waste characterization data for a site of this complexity."[37] Fearing that court proceedings might publicize the the appalling conditions at the site, DOE decided to negotiate.

By signing the Compliance Agreement, DOE recognized the jurisdiction of both EPA and CDH over mixed wastes at Rocky Flats. In return, the two monitoring agencies agreed to waive all civil penalties

against DOE or Rockwell for any mixed waste violations that had take place prior to [illegible] 31, 1986, when the agreement was [illegible]ed.

DOE officials apparently decided that maintaining a positive public image was more important than the right to self-regulation. The memo points out that "Failure to bring the [Compliance Agreement] to fruition would set back, if not destroy, the credibility of the Secretary [of Energy]'s environmental program." Additionally, the agreement provided a "sufficient degree of vagueness and ambiguity" to ensure that EPA would not be able to issue "orders" to the Rocky Flats facility, according to the memo.

Both the EPA and CDH maintain the right to sue DOE for violations after the agreement takes effect. Private citizens can also use the agreement as a basis for suits. This danger is recognized in the DOE memo: "... from the legal side there are the risks associated with the theoretical success of a citizen suit based on the agreement."

This fear turned out to be well founded. Within a year, The Sierra Club and the Citizens Against Rocky Flats Contamination had filed a suit against DOE and Rockwell International because of a proposal to [illegible]inerate radioactive mixed waste at the [illegible]nt.[38]

Incineration at Rocky Flats

While the lawsuit over the mixed waste incinerator brings a new twist into the debate over Rocky Flats, incineration at the plant has a long history. It began in the 1950's when the plant burned depleted uranium chips in open pits. Since then incineration has served two purposes: to recover reusable plutonium, and to dispose of non-reusable wastes.

The recovery incinerator, located in building 771, is permitted to burn as much as 168 tons per year. The waste disposal incinerator, located in building 776, is not being used currently, but according to a new proposal it could start burning 200 tons of liquid and solid waste per year. Built in 1978, it was operated for three years, shut down, and then used again in 1985. Rockwell initially claimed the incinerator had never been used but later admitted it had [illegible]n working for a three-year period.[39]

In 1986, because of the Compliance Agreement, the type of wastes to be burned in the new incinerator fell under the regulation of CDH. The health department voluntarily held public hearings as part of the permit-granting process. This brought on a wave of controversy; there followed more than 2000 letters from the public, many questions to Rockwell from the EPA, CDH, Senator Tim Wirth and Representative David Skaggs, and the establishment of two scientific panels to study the incineration. The controversy culminated in the Sierra Club lawsuit against DOE and Rockwell.

As part of the permit application process, Rocky Flats operators had planned a trial burn for the mixed waste incinerator, during which the system would be tested before beginning full-scale operations. But questions about the safety and integrity of the trial burn led to several postponements in early 1987, the last one for an indefinite period.

Mixed Waste Disposal

The waste incinerator would burn a mixture of low-level radioactive material, such as plutonium and uranium, and hazardous chemicals, mostly oils and organic solvents. Only low-level wastes are allowed, which means the wastes must contain less than 100 nanocuries of radioactivity per gram.

These wastes — often mixed with more radioactive substances — had previously been buried onsite or at the Idaho National Engineering Laboratory (INEL) near Idaho Falls. Liquid mixed wastes were solidified and shipped to the Nevada Test Site near Las Vegas. Due to new interpretations of disposal laws, low-level wastes must now be separated from the more radioactive, or transuranic wastes. Transuranics are being sent to a repository at INEL for eventual disposal in New Mexico, but there are no facilities to dispose of low-level mixed wastes. The Nevada Test Site does not have a permit to receive them, and the Department of Transportation has no authorized container to ship them in liquid form. For these reasons, Rocky Flats has chosen onsite incineration as the preferred method of disposal.

Burning the wastes would reduce the volume by about 95% while eliminating the chemical toxicity by oxidation. Converting them to ash and cementing them into blocks would make them easier to handle.

The Mixed Waste Incinerator

The incinerator consists of a feed screw and two combustion chambers. The first chamber, starved of oxygen, burns mostly chlorine and sulfur compounds, while the oxygen-rich afterburner burns organic and hydrogenated compounds. The temperature of the chambers is about 1000° F — low enough that combustion is flameless. A catalyst in the combustion chambers neutralizes hydrochloric acid. Temperature and

Time stopped by Atom Bomb. The Hiroshima explosion recorded at 8:15 a.m., August 6, 1945 on the remains of a wrist watch found in the ruins in this 1945 United Nations photo. The shadow of the small hand on the 8 of the watch was burned in from the blast, making it appear to be the big hand.

pressure monitors are set to shut off the feed screw automatically if they detect conditions outside the proper operating range. The output of the incinerator is mostly water vapor, carbon dioxide, other gases and solid ash.

During the proposed trial burn of the incinerator, Rockwell would first burn non-hazardous wastes, followed by hazardous wastes, and finally materials spiked with a maximum of 0.04 ounces of plutonium per ton. The process would be interrupted at any of these stages if the incinerator did not function properly. If the trial burn demonstrates that the incinerator can operate safely, it will be used to dispose of backlogged mixed waste. According to Rockwell reports, the actual wastes to be burned are typically only one percent as radioactive as those proposed for the trial burn.

What would happen to plutonium in the incinerator? Burning in the combustion chamber, it would form small plutonium oxide particles, some of which would be carried away by gases; others would be trapped with the ash. Two high-efficiency particulate air (HEPA) filters, located at the output of the incinerator, would trap most of these particles. The gases exiting the incinerator would then pass through four more HEPA filters before leaving the building. Each of these six filters removes more than 99.9% of the particles from the gases passing through.

Opposition to the Mixed Waste Incinerator

Some opponents of incineration fear any increase in plutonium releases from the plant, no matter how small. Others are particularly concerned about accidents, especially those that might breach the HEPA filters, releasing many respirable plutonium oxide particles into the air. They point to shortcomings in the monitoring system, which might not detect an accident until too late.

For example, the monitor for radioactive emissions, located in the incinerator's stack, has a response time of one hour. If levels are too high, it sounds an alarm in the control room. An investigation then takes place before the incinerator is turned off.[39]

In the event of a fire, the operator is supposed to push a stop button and telephone the fire department. Meanwhile, high temperatures could destroy the filtering system (the 1957 fire blew out all 600 HEPA filters). Although temperature monitors would probably shut off the waste fed into the first combustion chamber, all the material already in the incinerator could continue to burn, sending unfiltered gases into the environment.

The Sierra Club and Citizens Against Rocky Flats Contamination have charged that plant officials have not examined alternatives to onsite incineration, and that an adequate assessment of the environmental consequences of the burn has not been done. Both of these are required, according to their suit, under the National Environmental Policy Act.

This suit could set an important precedent. Such cases pressure DOE and its contractors to take health and environmental concerns seriously. The opportunity to subpoena relevant information for such a suit can yield valuable information about the plant, which might not otherwise be obtainable.

For example, most of the information now known about the 1957 fire was revealed in the course of a suit brought by landowners against Rocky Flats operators. Claiming the fire had severely contaminated their property, the plaintiffs were able to subpoena documents and worker testimony about the accident. At the end of the trial, the DOE tried to retrieve all documents related to the fire for shredding. Luckily, some documents escaped this fate.

Oversight at DOE's Nuclear Facilities

Everybody knows what happens when a teacher asks students to grade their own papers. The same is true for government agencies. The position of DOE as a self-regulator has resulted in a very grave situation that is by no means limited to Rocky Flats. A 1981 General Accounting Office report asked and answered the following questions about DOE's nuclear weapons facilities:

Is DOE's program adequate to assure the employees at DOE's nuclear facilities are provided with safe and healthful working conditions?

— The short answer is "No."

Is DOE providing adequate emergency preparedness . . . assuring that DOE facilities are prepared to respond to nuclear accidents?

— The short answer is "No."

How does DOE assure itself that information concerning radiological releases from DOE's nuclear facilities is accurate and reliable?

—GAO's answer is that DOE has little assurance.[42]

The report concluded that a separate high-level office was needed within DOE to oversee safety and health. Although DOE disagreed with this recommendation, such an office was established in 1985, but its budget is controlled by the weapons production office.[43]

Believing internal oversight to be inherently inadequate, the GAO also recommended outside, independent reviews,[33] to which DOE responded: " . . . an additional level of oversight . . . would not provide any additional assurance of the safe operation of DOE facilities . . . "[44]

The DOE's recalcitrance has prompted some legislators to propose direct oversight of various DOE activities. One important area of study has been health research on the effects of radiation. In 1985, then-Representative Tim Wirth introduced a bill to transfer authority to conduct such research from DOE to the Department of Health and Human Services. Wirth stated, " . . . the federal agency performing the bulk of this research is the same agency which has responsibility for operating and promoting nuclear weapons facilities . . . .This conflict of interest casts doubt on the objectivity of the Department's research and on its interest in worker safety and health."[28]

In 1988 Senator Glenn introduced a much broader oversight bill, S 1085.[45] This bill would:

—establish an independent Nuclear Safety Board. This would have access to DOE facilities and records as well as authority to require DOE to address the board's findings and recommendations;

—give the EPA regulatory authority over mixed wastes (both hazardous and radioactive);

—apply the standards of the Occupational Safety and Health Administration (OSHA) to workers at DOE plants. DOE is currently exempt from regulation by both OSHA and the Nuclear Regulatory Commission; and

—establish an independent research board to review all research on the effects of radiation on the human body.

The third provision has been most actively contested by the DOE but finds strong support among local Steelworkers Union members. If enacted, it would grant OSHA officials the specific "right of entry for unannounced inspections without probable cause" and the authority to receive complaints from individuals. This stipulation would protect workers filing complaints from retribution.

At this time (Feb 1988) S 1085 has not yet come before the Senate.

Police jump from a train carrying radioactive materials into Rocky Flats to arrest demonstraters sitting on the track. (Robert Godfrey)

Protest at Rocky Flats

For the first twenty years of its history, Rocky Flats operated in relative obscurity, with the surrounding community taking little notice. Most people living near Rocky Flats knew very little about the plant or the hazards associated with it. In fact, Denver residents did not learn that Rocky Flats was manufacturing nuclear triggers until three years after it became operational.

Opposition to the plant began to grow in the early seventies. Citizens Concerned about Radiation Pollution (CCARP), a group that had been protesting underground nuclear testing in Colorado, took soil samples from the Rocky Flats perimeter in 1970, which they presented to local politi- candidates for analysis. Other groups ok up the cause, and within five years the Denver community was becoming familiar with the Rocky Flats issue.

Local religious groups, such as the American Friends Service Committee and the Catholic Peace and Justice Office, joined the campaign in the mid-seventies, holding vigils and demonstrations. In 1974 a coalition of these and other groups formed the Rocky Flats Action Group. This coalition educated area residents by sponsoring community meetings and workshops, organized rallies and published "Local Hazard/Global Threat," an educational pamphlet.

Opposition to Rocky Flats intensified dramatically in 1978. The "year of disobedience," as it was later called, began with a demonstration of 5000 in April. A symbolic blockade at the end of the demonstration developed into a campaign of civil disobedience that lasted a full year. Protesters set up a camp on the railroad tracks leading into Rocky Flats, blockading train traffic. Within a year, over 500 arrests had been made at this blockade. When the costs of arrest, incarceration, and prosecution rose to more than $150,000, Jefferson County officials attempted to collect $5 million in property taxes from Rockwell to cover expenses. Rockwell refused to pay.[46]

Demonstrations against nuclear weapons became a familiar sight in the coming years, as the freeze movement grew into a huge national campaign. Locally, this movement culminated on June 9, 1982, when 30,000 people turned out at the state Capitol to rally for nuclear disarmament with singers Jimmy Buffet, Judy Collins and John Denver.

The largest onsite demonstration in Rocky Flats history occurred on October 15, 1983, as protesters gathered in an attempt to encircle the entire facility by linking arms. About 20,000 people lined the 17 mile perimeter of Rocky Flats, holding hands and singing.

Not all Rocky Flats demonstrations have been anti-nuclear. Supporters of nuclear weapons and nuclear power gathered in large numbers in August 1979 to wave U.S. flags and cheer patriotic speakers. Some Rocky Flats workers joined with the

Citizens for Energy and Freedom to sponsor the event, which drew about 10,000 people. The Boulder *Daily Camera* described the rally as having "the air of a large Fourth of July picnic."[47]

Since the train blockade of 1978, numerous campaigns of Civil Disobedience have augmented more legal forms of opposition to Rocky Flats. The most recent of these actions took place on Nagasaki Day, August 9, 1987. Protesters attempted to blockade the plant, resulting in 316 arrests.

Most of those arrested over the years at Rocky Flats have been released with fines or suspended sentences, but some have also served time. Roman Catholic nuns Patricia Mahonie and Ann Marie Nord, for example, served six months of a five year sentence for using fake I.D.s to enter Rocky Flats in 1982. After driving past the guards, the two women hoisted a flag over the main complex that read, "Death Factory."

Nord explained the concept of civil disobedience to the judge after being sentenced: "Clearly, the common good is at stake here, and if the law is not for the common good of the people, then you must break it. I'm not one bit sorry."[48] Mahonie was just as unrepentant. She returned to Rocky Flats to trespass in 1984 and served another six months in jail for that offense.

Demonstrations and civil disobedience are not the only methods citizens have to challenge the continuation of Rocky Flats operations. Lobbying campaigns to legislative representatives, educational programs for local residents, and outreach to Rocky Flats workers have all played an important role in citizen opposition to the plant. And in 1982 activists brought a ballot initiative to Colorado voters that would have established a fund to study conversion options for Rocky Flats. The initiative was defeated, but 38 percent voted in favor.[49]

Perhaps the most persevering opponents of Rocky Flats are those who wage the battle on a spiritual level. Every Sunday afternoon since 1978, the west gate of the plant has served as an interdenominational meeting place for a prayer vigil — through snowstorms, heat waves and heavy rains.

The Future of Rocky Flats

Many people now agree that it was a mistake to locate Rocky Flats near such a large metropolitan community in the first place. But as aging plant buildings deteriorate, officials must now decide on the plants' future. Should they spend money to upgrade the facility as it is or invest in relocation alternatives instead? Whichever path is chosen, a lively stream of government studies is sure to follow. The GAO has issued more than fifty reports on various safety aspects of DOE's nuclear weapons facilities — seven of which were specifically related to Rocky Flats.

Options for the future include:

Business as usual

The continuation of Rocky Flats operations will probably augment the current contamination and its associated health risks. Plant operators have a history of disposing of wastes in the cheapest way available. This, along with a series of accidents, has resulted in considerable offsite soil contamination. Groundwater pollution, though currently confined to the site, also presents a serious environmental hazard that will be difficult and expensive to remedy. Although DOE and Rockwell face growing pressure to clean up the site, their past denials of contamination and its dangers inspire little confidence.

Taxpayers must also question whether programs to upgrade deteriorating buildings are financially efficient. The history of building 371, designed to modernize plutonium processing at Rocky Flats, is illustrative. It was expected to cost $113 million and be done in four years, but took twice as long and cost twice as much. It has operated at only 7 percent capacity since it came on line in 1981. And now DOE plans to spend another $300 million on a seven-year campaign to bring the building up to 45 percent operating capacity.[1]

Relocation

In 1975 the Lamm-Wirth Task Force recommended that Congress and the President consider " . . . phasing out [Rocky Flats'] present operation, . . . decontaminating and converting the Plant's facilities to a less hazardous energy-related industry, . . . [and maintaining] the economic integrity of the Plant, its employees, and the surrounding community."[9]

Twelve years later, the General Accounting Office again examined the costs of relocating all or part of the plutonium operations from Rocky Flats to some other DOE facility. Relying on DOE studies, the GAO reported that total relocation would cost $4 billion and take 24 years. It would cost about $300 million just to decontaminate the Rocky Flats site.[1]

The GAO report also noted that the socioeconomic impact of relocation on the Denver area would be small. Because relocation would take a long time, the work force would be dismantled at a slow, steady rate, making it easier for workers to find reemployment.

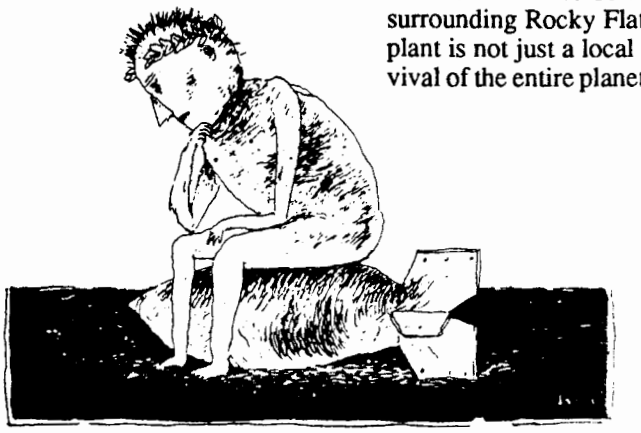
Senator Tim Wirth, who commissioned the 1987 GAO report, favors a partial relocation option. Wirth would like to see plutonium manufacturing operations remain at Rocky Flats, but plutonium recovery moved to another DOE facility. This $500 million plan would take about nine years and cut the accident risk and the amount of waste generated by half.

Relocation schemes promise less worry to Denver metro residents. But they also bring new headaches to the neighbors of whichever facility adopts the plutonium operations. From this perspective, relocation only means dumping a local problem in somebody else's backyard.

Shutdown/Conversion

Without a nuclear trigger factory, the arms race cannot continue. But even a nuclear freeze would not eliminate the need for Rocky Flats because aging, unreliable bombs would need to be rebuilt. Disarmament is the only alternative that would put an end to the operations that now take place at the plant.

Disarmament is not only a way to stop Rocky Flats from poisoning the Denver area, but also an important goal in its own right. The plutonium triggers produced at the plant are far more threatening than the plant itself. If they are ever used, the destruction will not be limited to the area surrounding Rocky Flats. The fate of the plant is not just a local concern. The survival of the entire planet may depend on it.



References

1 General Accounting Office "Nuclear materials: alternatives for relocating Rocky Flats Plant's plutonium operations," (RCED-87-93) Apr 1987.

2 Rockwell International, Minutes of the 1987 Stockholders Meeting.

3 Johnson, C.J. "A case history of a disaster at the plant which could serve as a model for a future disaster emergency response plan exercise," Memorandum to: Agencies and local governments participating in the Rocky Flats emergency response plan exercise; 17 Sept 1980; 78 pp. The subsequent discussion of the 1957 fire is from this source. See also transcripts of civil actions Nos. 75-M-1111, 75-M-1296, U.S. District Court (Colorado).

4 Rapoport, Roger, *The Great American Bomb Machine*, Chapter 3 (New York: E.P. Dutton) 1971.

5 *Rocky Mountain News* 6 Apr 1977, p. 5; and Murri, R.L. "Gamma analysis of plutonium contaminated soil at Rocky Flats," Rockwell publication ES-376-77-197, 10 Jan 1977.

6 Martell, E.A. "Actinides in the environment and their uptake by man," National Center for Atmospheric Research, technical note STR-110, May 1975.

7 Boulder *Daily Camera*, 1 Nov 1979.

8 Department of Energy; Albuquerque Operations Office; Environment, Safety, and Health Division "Comprehensive environmental assessment and response program, phase 1: installation assessment, Rocky Flats Plant," April 1986.

9 The Lamm-Wirth Task Force on Rocky Flats, Final Report, Oct 1975.

10 Poet, S.E. and E.A. Martell "Plutonium-239 and Americium-241 contamination in the Denver area," *Health Physics* 23, 537-548 (1972).

11 Boulder *Daily Camera* 26 Aug 1987.

12 Thomas, C.W. and D.E. Robertson "Radionuclide concentrations in reservoirs, streams, and domestic waters near the Rocky Flats installation," Pacific-Northwest Library, Richland Washington, PNL-2119, UC-11, Apr 1981; quoted in ref. 8.

13 Wilkinson, G.S. *et al.* "Mortality among plutonium and other radiation workers at a plutonium weapons facility, *Am. J. Epidemiology* 125, 231-250 (1987).

14 Takizawa, Y. *Acta Medica et Biologica* 20, 147-161 (1973), quoted in Schonbeck N. "Plutonium Hazards and the proposed Rocky Flats Incinerator" (1987)

15 DuFrain, R.J. *et al.* "Human cytogenetic dosimetry: a dose-response relationship for alpha particle radiation from 241Am," *Health Physics* 37, 279-289 (1979).

16 Brandom, W.R., *et al.* "Chromosome changes in somatic cells of workers with internal depositions of plutonium" in: *Biological Implications of Radionuclides Released from Nuclear Industries*, International Atomic Energy Agency Symposium, Vienna, 26-30 March 1979 (IAEA-STI/PUB/5222 Vol. II, p. 195, 1979).

17 Rockwell International, Monthly Environmental Monitoring Report (EAC-420110-152).

18 Krey, P.W. "Remote Plutonium Contamination and Total Inventories from Rocky Flats," *Health Physics* 30, 209-214 (1976).

19 Johnson, C.J. "Cancer incidence in an area contaminated with radionuclides near a nuclear installation," *Ambio* 10, 176-182 (1981).

20 Crump, K.S., T-H. Ng, and R.G. Cuddihy "Statistical analyses of cancer incidence patterns in the Denver metropolitan area in relation to the Rocky Flats Plant," *Am. J. Epidemiology* 126, 127-135 (1987).

21 Johnson, C.J. Re: "Cancer incidence patterns in the Denver area in relation to the Rocky Flats Plant," *Am. J. Epidemiology (letters)* 126, 153-155 (1987).

22 Johnson, C.J. "Some studies of low level radiation and cancer in the United States," presented at the University of Basel, 9 June 1987.

23 Johnson, C.J. "An investigation of brain cancer, melanoma and other neoplasms in employees of the Rocky Flats nuclear weapons plant in Jefferson County, Colorado," presented to a session sponsored by the Occupational Health and Safety, Environment and Radiological Health Sections of the American Public Health Association at the 109th annual meeting, November 3, 1981.

24 Voelz, G.L. *et al.* "An update of epidemiological studies of plutonium workers," proceedings of the International Meeting on the Radiobiology of Radium and the Actinides in Man, Lake Geneva Wisconsin, 11-16 Oct 1981, *Health Physics Supplement* 44, 493-503 (1983).

25 Los Alamos National Laboratory, "Rocky Flats mortality study results mean less worry for plutonium workers," Public Affairs Office, 15 Oct 1981.

26 Rockwell International, "Rocky Flats population healthier than national average," *Rockwell News* Vol. VII, No. 14, 24 Oct 1981.

27 Larsen, R.P. and R.D. Oldham, "Plutonium in drinking water: effects of chlorination on its maximum permissible concentration," *Science* 201, 1008-1009 (1978).

28 Speech by Representative Tim Wirth, *Congressional Record* , 26 Feb 1985.

29 Alvarez, R., Statement of Robert Alvarez before the House Energy and Commerce Comittee on Health and the Environment regarding H.R. 1287 - etc. (Washington: Environmental Policy Institute) 13 Nov 1985.

30 Governor's Science and Technological Advisory Council Report of the Rocky Flats Employees Health Assessment Group, Final report, 21 Mar 1984, Colorado government document: GOV 21.2/R59/1984.

31 Department of Energy, Albuquerque Operations Office "Long-range Rocky Flats utilization study," ALO-1983, Feb 1983.

32 General Accounting Office "Better oversight needed for safety and health activities at DOE's nuclear facilities" (EMD-81-108) Aug 1981.

33 General Accounting Office "Nuclear safety: safety analysis reviews for DOE's defense facilities can be improved" (RCED-86-175) June 1986.

34 Rockwell International, Letter from Charles H. Harff to Senator J. Bennett Johnston, 5 May 1987.

35 *Rocky Mountain News* 15 Mar 1987, p. 1.

36 Environmental Protection Agency and Colorado Department of Health, RCRA VIII-86-06, CERCLA VIII-86-08 in the matter of Department of Energy, Rocky Flats Plant, Golden CO, respondent; Compliance Agreement, 1 Aug 1986.

37 Department of Energy, memorandum EH-1 "Status of Rocky Flats agreement negotiations" from Mary L. Walker, 14 July 1986 and undated reply.

38 Civil Action No. 87-706 in U.S. District Court (Colorado).

39 Rockwell International, Rocky Flats Plant "Composite of technical comments received during comment period" July 1987. Voluminous source material on the incinerator is on file at the Boulder Public Library.

40 *Denver Post* 25 Sept 1978, p. 3.

41 Department of Housing and Urban Development "Rocky Flats advisory notice" 8RF-1; and HUD certifications 8RF-2 and 8RF-3, 1 Mar 1979.

42 General Accounting Office "Better oversight needed for safety and health activities at DOE's nuclear facilities" (EMD-81-108S) Apr 1982.

43 Alvarez, Robert and Velma Smith "Cut-rate cleanup: how the DOE budget gambles with the environment" (Washington: Environmental Policy Institute) 1987.

44 General Accounting Office "Key elements of effective independent oversight of DOE's nuclear facilities" (T-RCED-87-32) June 1987.

45 Bill S. 1085, *Congressional Record* 23 Apr 1987.

46 Daniel, Joseph and Keith Pope, *A Year of Disobedience* (Boulder: Daniel Productions) 1979.

47 Boulder *Daily Camera* 27 Aug 1979.

48 Boulder *Daily Camera* 25 Nov 1982.

49 Boulder *Daily Camera* 29 Nov 1982.

Most of the source material for this pamphlet is available at the Boulder Public Library.

Chronology of Events at Rocky Flats

1945 World's first nuclear war culminates with the explosion of the first plutonium bomb over Nagasaki, August 9.

1951 Rocky Flats established by the Atomic energy commission to build plutonium "triggers" for nuclear bombs.

1953 Bomb production begins at Rocky Flats under contract with Dow Chemical Company.

1957 Fire and explosion in building 771 burns more than 100 curies (35 lbs) of plutonium and all protective filters. No one knows where the plutonium went.

1954 Waste drums leak radioactive waste onto open field for the next twelve years. Leakage discovered in 1959 and admitted in 1970. Winds redistribute contaminated soil particles throughout the Denver metro area.

1964 Employee's fingers amputated because of exposure to plutonium chips.

1966 Drums which leaked radioactive waste and contaminated soil particles throughout the Denver metro area are finally removed.

1969 Plutonium fire in building 776 causes $45 million damage.

About 1000 curies of tritium released to the Broomfield water supply.

1975 Rockwell replaces Dow as operator of Rocky Flats. Lamm-Wirth task force report suggests relocating Rocky Flats operations.

1975 Landowners sue Rocky Flats for property contamination; suit settled in 1984 for $9 million.

1978 Civil disobedience campaign blocks trains into Rocky Flats. 500 arrested.

1979 Johnson's study fins excess cancer in Denver area residents related to Rocky Flats.

1981 Voelz mortality study finds healthy work force at Rocky Flats. Johnson's mortality study suggests otherwise.

1986 Crump study of cancer in Denver area resident corroborates Johnson's 1979 data but concludes that Rocky Flats is not the cause.

1986 Compliance agreement between DOE,EPA, and CDH regulates disposal of mixed hazardous and radioactive wastes. Phase I of DOE cleanup program begins.

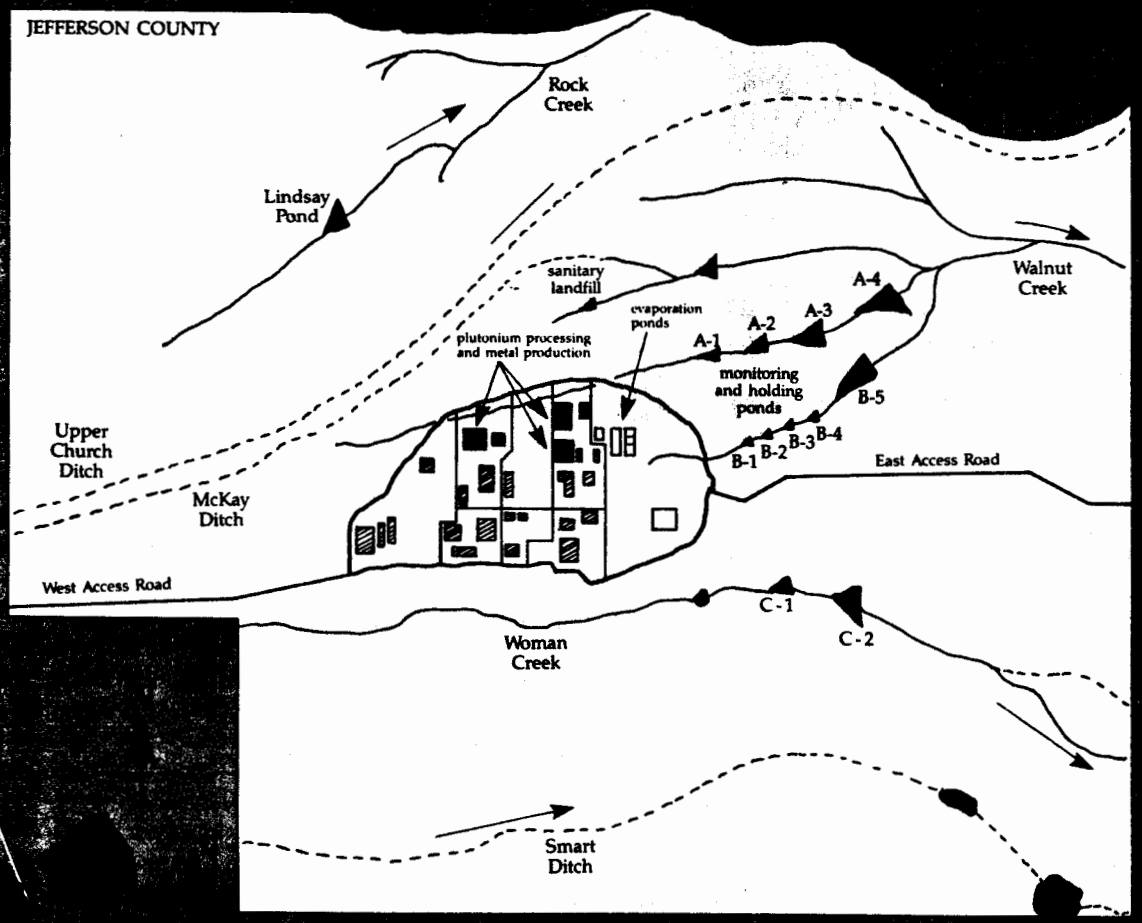
1987 Wilkinson's mortality study finds excess cancers among Rocky Flats workers exposed to only 5% of the radiation protection standard.

1987 Incineration of radioactive mixed waste delayed more than a year by combination of public protest, equipment problems, Health department vigilance, legislative concern, and citizens' suit.

ROCKY MOUNTAIN PEACE CENTER
P.O. Box 1156
Boulder, Colorado 80306-1156

Created in a spirit of unconditional nonviolence, the Rocky Mountain Peace Center is dedicated to research, education, and action in nonviolence as a means of personal and social change and to the achievement of justice by nonviolent means.

Rocky Flats Plant



Site Size

Though all major structures are within a security area of 384 acres, the entire site encompasses 6550 acres. As of 1986 there were 134 structures on site containing 2.7 million square feet of floor space.

Age

The site was chosen in 1951 and operations began in 1952.

Contractor

Rockwell International (since 1975). Before that Dow Chemical was the prime contractor.

Budget

$410 million (fiscal year 1987)

Employees

5600 (in 1987)

STRONG
EXHIBIT
NO. 3

Location and Setting

The Rocky Flats Plant is in northern Jefferson County, 16 miles northwest of Denver and 9 to 12 miles from Boulder, Golden, and Arvada. Nearly 10,000 people live within 5 miles of the site, over 300,000 live within ten miles. Several new housing developments are being built within a few miles of the plant.

The Standley Lake park and recreation area is about 5 miles from the Rocky Flats. Golden Gate Canyon State Park is 15 miles to the southwest, providing 8,400 acres of camping and other outdoor recreation.

The Sierra Elementary School is 6 miles southwest of the plant and various industrial facilities are located within 5 miles of the site.

Sand, clay and gravel mines have operated near the site. A uranium mine 4 miles southwest of the Rocky Flats Plant is the sixth largest vein-type producer of uranium ore in the U.S.

The front range of the Rocky Mountains is immediately west of the site. Elevation is 6000 feet.

The winds at Rocky Flats are variable, and sometimes intense, with velocities reaching 30 miles per hour. Winds as high as 125 miles per hour have been recorded. Winds are predominantly westerly, but do occasionally blow south-easterly towards Denver, as well as north-westerly towards Boulder.

Geology and Hydrology

The Rocky Flats Plant is located on a mesa-like surface of Rocky Flats alluvium. A thin gravel topsoil lies over 20 to 50 feet of thick, coarse, clay gravel. Under this gravel is bedrock. The thin gravel alluvium is highly permeable.

Surface and groundwater flow generally west to east, beginning at the Front Range Mountains. Water retention in the soil is poor; vegetation sparse. Groundwater surfaces at streams and seeps within the site. The major groundwater system is in the alluvium; recharge from stream flow is rapid. Discharge from the alluvium into surface water and retention ponds takes place off-site. Small areas around springs and seeps on-site appear to qualify as wetlands.

Five streams occur near the site. Three of them drain the area into water supplies of neighboring communities. Water runoff is from west to east.

Average annual precipitation is a little over 15 inches.

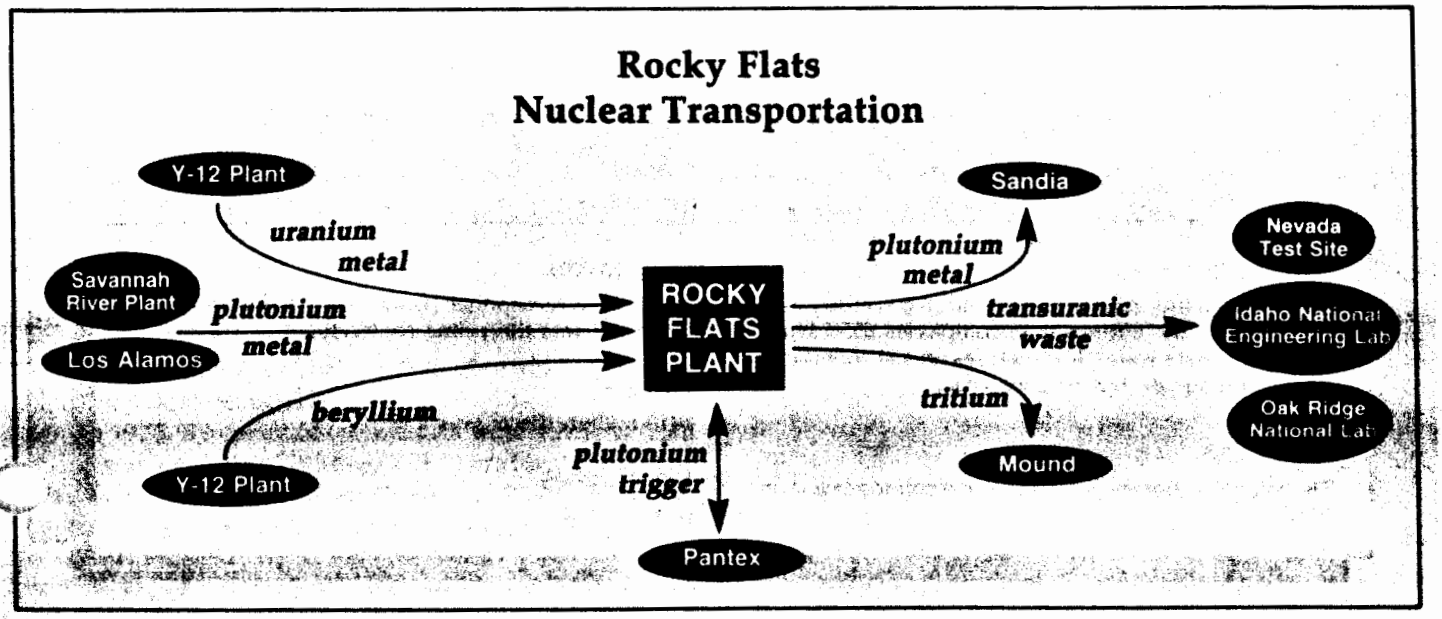
Estimates of potential seismic activity at Rocky Flats vary. A 1980 environmental impact statement predicted an earthquake of 5.6 every 33 years at a distance of 16 miles from the site.

Function

The Rocky Flats Plant produces components for nuclear weapons, notably plutonium "triggers." The plant also recovers plutonium from outdated weapons. Various specific functions include

- fabrication and assembly of plutonium, beryllium, uranium and stainless steel into weapons components
- plutonium and americium recovery
- americium separation
- production-related research and development.

With the cessation of plutonium production at the N-reactor in Hanford, Washington, and the reduction in power levels at the South Carolina Savannah River reactors since the Chernobyl accident, recycling of nuclear warheads has become the major means of providing plutonium for new warheads. Thus, the Rocky Flats Plant has assumed major importance in the Energy Department's weapons program. Simultaneously, citizen opposition to a



plant; alpha activity sludge was dumped into the site from 1968 to 1970; other isotopes have also been detected according to the 1980 Final Environmental Impact Statement, "there are certain places on the plant site that have been used as disposal sites, covered by two to three feet of soil... [which] may contain low levels of plutonium." These sites contain an estimated 6.4 million cubic feet of contaminated soil. The soil is mostly contaminated with uranium, and has an average plutonium concentration of 0.01 nanocuries per gram.

There are many other radioactively contaminated sites at Rocky Flats: contaminated process tanks, subsoil contamination from various liquid tank waste overflows and leaks, from valve vault overflows, sewer line breakage, from spills, from severed discharge lines, etc. There are numerous other sites contaminated with hazardous wastes, as well.

Pathways By Which Radioactivity Is Escaping

Releases of plutonium and americium in the air from the plutonium facilities ranged in the late-1950's and early-1960's from 1600 microcuries in 1957 to 5300 microcuries in 1965. These releases into the atmosphere were from "normal" operations. It is important to contrast these releases with the dose likely to produce lung cancer: 0.014 microcuries for smokers, and 200 times greater for non-smokers.

Since 1965 the releases have been substantially reduced, but not eliminated.

There have also been numerous fires at Rocky Flats. During these fires, radioactive airborne contaminants, sometimes in massive quantities, have been released. Independent evaluations have claimed still higher releases than those given by the Energy Department.

In addition to these releases of plutonium and americium, there have been, and continue to be, other radioactive releases. Uranium-235, uranium-238 and other uranium isotopes are released into the air. There have also been airborne releases of tritium. In 1968, several hundred curies of tritium were mistakenly released. And in 1973, several hundred (perhaps over a thousand) curies were released, again as a result of an error.

In the past, the ponds on the site held radioactive effluents, decontaminated process and laundry waste, blowdown and steam condensate, and filter backwash water. "Blowdown" and "backwash" are waste streams obtained by reverse cycling and thereby cleaning the cooling and process streams. The ponds discharge into South and North Walnut Creek and into Woman Creek. Walnut Creek in turn empties into the Great Western Reservoir, while Woman Creek empties into Standley Lake. Great Western Reservoir supplies water to the city of Broomfield, and Standley Lake to Westminster.

Plutonium-239 and americium have accumulated in the Great Western Reservoir's sediment; there are also measurable amounts of americium in the reservoir. Elevated levels of plutonium and americium-241 have also been found in Standley Lake. Stream sediments have also been contaminated. According to a 1980 report, "... radionuclides in Rocky Flats waterborne effluents may be present in community drinking water obtained from these two reservoirs."

Monitoring of groundwater from 35 test wells at the site has shown some radioactive contamination. One plutonium concentration was 2.7 picocuries per liter. Background is 0.02 to 0.1 picocuries per liter.

A recent study by the General Accounting Office cites elevated levels of plutonium both on and off the site. Elevated levels were found around the facility's boundary, on land adjacent to the plant, and in sediments from the nearby reservoirs. The General Accounting Office suggests that levels in some cases are more than 50 times background level.

Volatile organic compounds, elevated nitrate levels, and elevated total absorbed solids have also been found in the shallow aquifer. Further, plutonium has been found in the groundwater in low concentrations.

Buildups of plutonium in sediments in Walnut Creek at Indiana Street were above 10 picocuries per gram as early as 1972. Americium above background also has been detected. One well test showed uranium levels at 156 picocuries per liter (average in the area is 5 to 15 picocuries per liter). Uranium readings were generally higher east of the solar ponds, although water from a well on the southern border had some of the highest figures.

Another area of radioactive contamination is a sanitary landfill located 1000 feet north of the plant. As already mentioned, over a ton of sanitary sludge containing alpha emitters was buried in the landfill. Measurements at two seepage ponds by the landfill show elevated levels of tritium as well as long-lived alpha radiation. Seepage from the landfill is collected in one pond, and then sometimes emptied onto the ground north. The other pond collects water during high precipitation. This pond in turn empties into the North Walnut Creek.

Cracks have been detected in the asphalt lining of one of the evaporation ponds. Significant contamination took place as the result of the seepage of high-nitrate solutions to the groundwater. Such cracks also contribute to soil and groundwater radioactive contamination.

There are also high plutonium levels from drums that leaked contaminated oil in the 1959-69 period. Some of the soil has been covered with asphalt, in part to prevent resuspension of the plutonium. Another 43,000 cubic feet of the soil have been dug up, packaged, and sent off-site for storage. An estimated 86 grams of plutonium were lost from the leakage.

It is estimated that there are some 1000 acres outside the Rocky Flats Plant boundary that have radioactivity levels above the state guideline of about 1 picocurie per gram, and another 2000 acres at the plant itself. Cesium contamination has also been reported 2 miles east of the plant.

The 1986 Environmental Monitoring Report lists two

proposed radioactive waste incinerator has focused new attention on Rocky Flats operations. Test burns involving plutonium have been postponed a year due to citizen opposition, and because of two fires during non-radioactive testing. As a byproduct of plutonium recycling, americium-241 (from the decay of plutonium-241) has been recovered for sale by Oak Ridge.

Radioactive Waste

Types of Waste Produced

Most of the activities at the plant involve plutonium, and as a consequence, so does most of the waste.

Currently all radioactive wastes are processed and shipped offsite. However, as mentioned, the facility plans to use a new incinerator for much of its plutonium waste.

Waste Management

Airborne wastes, principally plutonium and tritium, come from plutonium oxide powder formed during machining or incinerating, and from chemical recovery processes. Filters are used to trap the effluents. Nonetheless, due to accidents and normal operations, radioactive materials are released to the air.

The liquid wastes at Rocky Flats are collected, neutralized or made basic, processed using precipitators, sometimes run through evaporators, sometimes solidified, and then shipped off to other Department of Energy sites (primarily Idaho National Engineering Lab) for storage. In the past, asphalt-lined solar evaporation ponds were used for some of the wastes. Also, wastes with lower activity levels (below 1.7 picocuries per liter of alpha radiation) were released into unlined storage ponds. As a result of these practices there has been both ground and groundwater contamination.

Solid radioactive waste collection at Rocky Flats is a major undertaking. In 1986, the Department of Energy estimated that 130,000 cubic feet of transuranic waste were being generated annually. This and other waste is shipped to Hanford and the Idaho lab for storage. In the past, some wastes were stored in drums (which leaked) or buried in trenches, while contaminated oil was burned.

What Is Buried on Site

There are many areas with contaminated soil at and around the Rocky Flats site. A recent environmental assessment identified five sites that qualify for the Superfund priorities list, another 31 sites requiring further evaluation, and another 21 sites where past cleanup needs verification. Interviews with employees have revealed that most buildings that contain radioactive elements probably have contamination beneath them, and many may have contamination in the footing drains as well.

Perhaps the most contaminated area is one created by leakage from steel drums that had been stored outside. The drums contained cutting oil contaminated with plutonium and other radionuclides. The Department of Energy estimates that 11 curies of plutonium leaked from the drums in the period from 1959 to 1969, with an off-site release of about 3 curies. Contaminated soil on-site contains over 8 curies. The highest levels of contamination from the leakage are just inside the eastern security fence, approximately 1.5 miles from the plant boundary. Part of the contaminated area has been covered with asphalt, creating a pad to prevent resuspension. About 1.7 curies of plutonium are underneath the pad. Soil under and adjoining the pad, and soil extending southeast of the pad, have plutonium contamination readings at or above 230 picocuries per gram of soil. Of course, the asphalt pad will crack and require repair thousands of times during plutonium's 24,000-year half-life.

Another area with similar or higher contamination readings is a former waste storage site at the northeast corner of the plant security area. This area contains a number of trenches:

- Trench 1 contains 125 drums of depleted uranium and oil;
- Trench 2 (50 by 300 feet) contains flattened drums of uranium and plutonium as well as sewage sludge;
- Trench 3 (50 by 300 feet);
- Trenches 4 to 11 (30 by 300 feet) used for flattened drums of uranium and plutonium (activity is 360 to 3600 picocuries/gram), also contain some uranium-plutonium contaminated asphalt planking.

Three cooling water ponds, which have been covered with fill, were used to bury depleted uranium as well as lithium metal. The amount of contaminant is unknown. The Mound area located at the eastern part of the plant contains contaminated soil from another barrel storage spill.

Other contaminated areas with elevated levels of plutonium are the sediments in the bottom of two holding ponds. In 1980, the ponds contained several curies of plutonium as well as other radionuclides.

The Solar Evaporation Ponds are also contaminated. These asphalt-lined ponds have leaked into groundwater.

Other contaminated sites include:

- plutonium-contaminated soil from around several buildings, resulting from past leaks, contamination incidents and burial
- the original waste line piping system that was left in place when abandoned in the late 1970's may contain various radionuclides as well as hazardous wastes
- pits on the eastern edge of the plant that were used to burn uranium contaminated-oil, as well as an incinerator to the west which burned uranium chips
- the original landfill located on-site south of the security fenced area contains 44 pounds of depleted uranium ash and may be the site of an old graphite dump, with a volume of 2,000,000 cubic feet
- the present sanitary landfill located 1000 feet north of the

perimeter monitoring samples with higher than normal plutonium concentrations. The report attributes one to "agricultural plowing activities performed just east of the sampler." Another elevated level in September 1986 is attributed to road construction. Both are clear evidence of the extent to which soil disruption leads to resuspension. These samples also raise questions as to whether or not there were proper warnings given to those doing the plowing and the roadwork.

In 1986, 69 new wells were drilled for groundwater monitoring. It is interesting to note that the 1986 environmental monitoring report states that many of the previous wells were deemed unacceptable. This calls into question previous monitoring data. Data from the new wells show contamination in both bedrock and surficial groundwater. One reading was 32 picocuries per liter for plutonium and 4.4 picocuries per liter for americium.

The 1986 monitoring also shows elevated levels of total strontium in some wells. The 1986 monitoring report indicates that future sampling will show strontium-90 concentrations.

Dangers

Who Is at Risk

The Rocky Flats Plant is located only a few miles from Denver, Boulder, and other large population centers. Half the population of Colorado (1.7 million people) lives within 30 miles of the plant. One of the greatest dangers to the inhabitants of these areas is the possibility plutonium now sitting in the soils at and around the site might be airborne.

The winds in the area around the plant occasionally reach speeds above 100 mph. A definite possibility exists that these winds will resuspend plutonium in the soil, exposing the general population to the possibility of breathing particles into their lungs. The problem is compounded by construction activities at the plant which stir up considerable dust.

The area in general is growing. There is a proposed beltway to the east of the plant where there is extensive contamination. There is also new development to the northeast. Disturbance of plutonium is a real possibility.

Another major risk comes from possible wind damage to buildings, such damage leading to the release of plutonium and other contaminants.

Still another possibility of plutonium being suspended in the air comes from the risk of earthquakes. According to a recent General Accounting Office report, revised Department of Energy safety analyses show that of all potential risks to the public, seismic risks dominate. Several of the buildings are now considered at risk, and the department is working on upgrading some of the structures.

Another risk exists for those populations using the water from the Great Western Reservoir (Broomfield) and Standley Lake (Westminster). Storms and other occurrences could stir up the radioactive sediments and expose the populations using these water sources to increased radioactivity. Those using the nearby reservoirs for recreation, like fishing and swimming, are also subject to such risks. In the event of major storms it is also likely that more radioactivity will wash from the contaminated creek sediments, from the contaminated landfill, and from other areas, into the reservoirs.

Another threat is fire. There have already been major fires at the site, and others would similarly release radioactivity into the atmosphere. The possibility of an explosion, for example at the proposed fluid bed incinerator, also exists. Either fire or explosion could cause significant loss of life at either Denver or Boulder, depending on wind conditions and radionuclide release.

As noted in the Geology and Hydrology section above, winds in the area sometimes blow in the direction of Denver. Thus a statement in the recent environmental report that "a release to the atmosphere under 'worst case' dispersion conditions would not be expected to move directly over Denver" is misleading and incorrect.

Major Accidents

There have been over 200 fires at Rocky Flats since its start-up.

In 1957, there was a major fire in the plutonium production building, releasing, according to the Department of Energy, 26,000 millicuries of alpha radiation into the atmosphere.

In 1962, the prefilters were installed backwards in Building 71, releasing plutonium and other radionuclides. The prefilters were also destroyed by fire once in September and twice in December.

In 1964, a chemical explosion in a glove-box, an enclosed unit containing special gloves installed in wall sockets, released 10 microcuries.

In 1965, a glove-box drain plug fire released 1200 microcuries of plutonium.

In 1969, a plutonium glove-box and building fire released 860 microcuries.

Other types of serious accidents have taken place as well.

From 1959 to 1969, an estimated 11 or more curies of plutonium were released as a result of leaking oil drums.

In 1970, there was a spill from cleaning a plugged drain.

In 1971, there was a reduction furnace explosion. The same year there was also a plutonium can explosion and another spill from a barrel leak.

In 1972, there was an incinerator glove-box explosion and fire as well as contamination from an incinerator fire.

In 1974, there was a control valve failure that released over 900 microcuries of plutonium.

Fortunately, during 1975-77 there were no recorded releases to the air due to accidents.

In 1987, three fires at the proposed fluid bed incinerator lead to a postponement of further testing.

Primary References

C[illegible] *rehensive Environmental Assessment and Response Program Phase 1 Installation Assessment Rocky Flats Plant*, Albuquerque Operations Office Environment, Safety, and Health Division Environmental Programs Branch, April 1986.

Environmental Issues at DOE's Nuclear Defense Facilities, General Accounting Office, Washington, DC, Sept. 1986 (GAO/RCED-86-192).

Rocky Flats Plant Site, Final Environmental Impact Statement, Department of Energy, Washington, DC, April 1980 (DOE/EIS-0064).

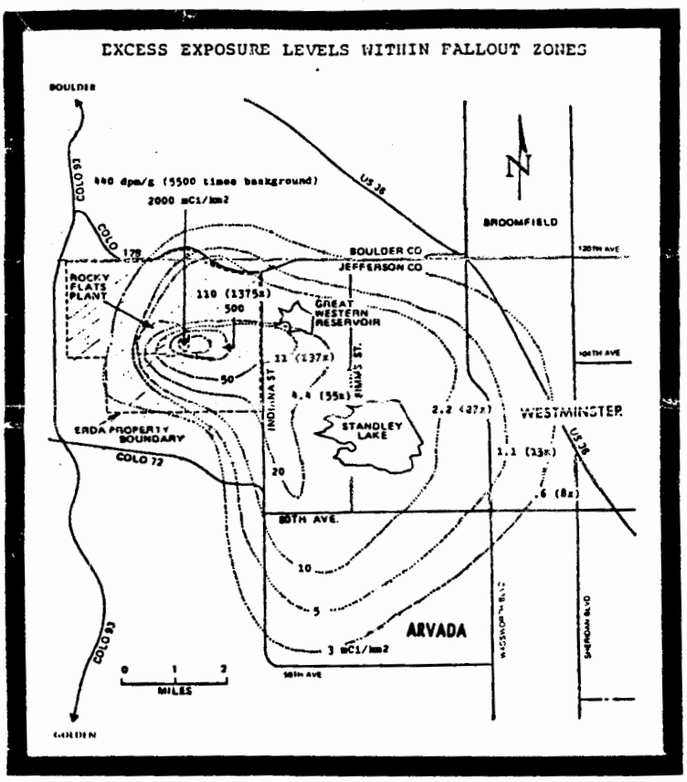
Rocky Flats Fluid Bed Incinerator, J. Goldfield, Niels Schonbeck, Gale Biggs, Boulder, Sept. 1987.

Review and Comments on CERAP Phase 1, Jan Pilcher, Denver, September 1987.

Annual Environmental Monitoring Report, Rockwell International, Golden, CO, April 1987 (RFP-Env-86).

Monthly Environmental Monitoring Report, Rockwell International, Golden, CO, Sept. 1987.

PLUTONIUM-239 ACCUMULATION IN SOILS AROUND ROCKY FLATS AND DENVER



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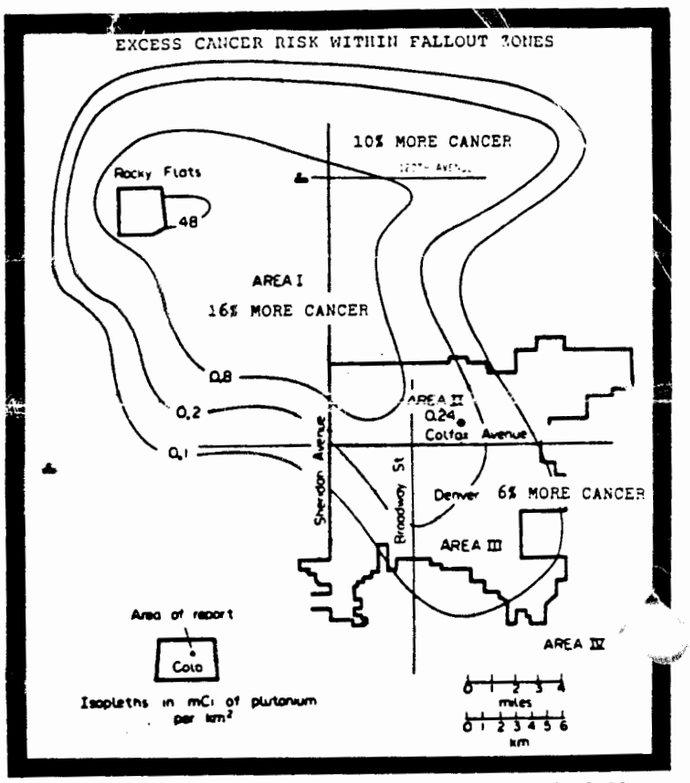

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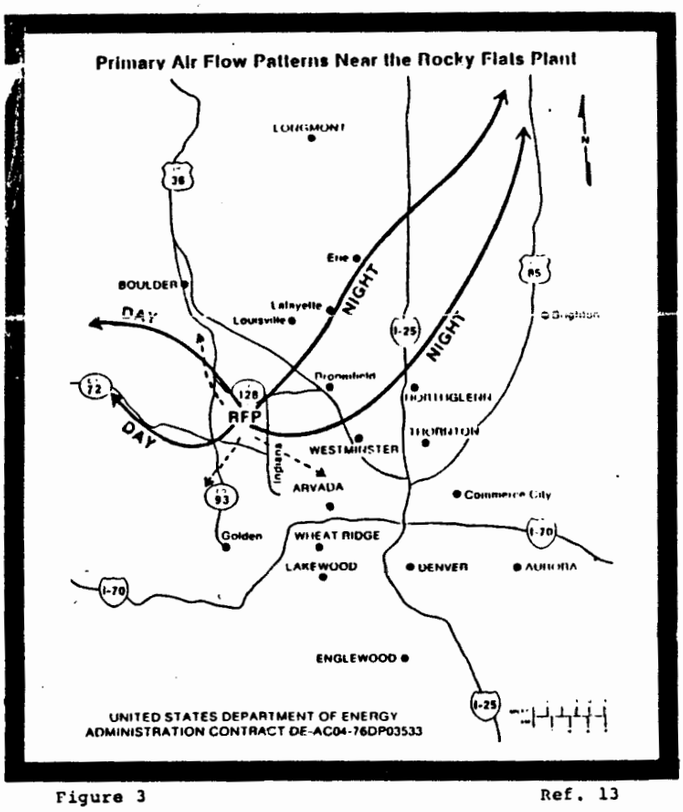

Figure 3 Ref. 13

References

1. Annual Environmental Monitoring Reports, U.S.Department of Energy, Rocky Flats Plant, Jan.-Dec. (1970-86)
2. C.J.Johnson, H.R.Tidball, R.C.Severson; Plutonium Hazard in Respirable Dust on the surface of soil, Science, 193, pp 488 (1976)
3. C.J.Johnson; Cancer Incidence in an area contaminated with radionuclides near a nuclear installation, Royal Swedish Academy of Sciences: Ambio 1981;10:176-82 & confirmed by (Ecol. Dis. 1:135, 1982)
4. S.Chinn, H.Holme. Pretrial Statement, Cival Action Nos. 75-M-1111, 75-M-1162, 75-M-1296 (in the United States District Court for the District of Colorado, 1978)
5. S.E.Poet and E.A.Martell; Plutonium-239 and Americium-241 contamination in the Denver area, Health Physics, 23, 537 (1972) & reply - Health Physics 26: 120 (1976)
6. C.J.Johnson; Contamination of municipal water supplies in the Denver metropolitan area by the Rocky Flats Plutonium Plant, presented at 146th National Meeting of the American Association for the Advancement of Science, San Francisco, CA, January 3-8, 1980.
7. ANON: Draft Environmental Impact Statement, Rocky Flats plant site, Golden, Colorado, U.S.E.R.D.A. 1545-D (1977).
8. P.W.Krey and E.P.Hardy; Plutonium in soil around the Rocky Flats Plant, U.S.A.E.C. Report HASL-235, (1970).
9. L.M.McDowell, S.W.Whicker; Health Physics 35, 239 (1978).
10. Final Report of the Lamm-Wirth Task Force on Rocky Flats to the Colorado State Health Department, Denver, Oct.(1975)
11. C.J.Johnson; An evaluation of brain cancer, melanoma, and other neoplasms in employees of the Rocky Flats Plant in Jefferson County, Colorado, Selecta (1982).
12. John Berg; Cancer in Colorado: A New High, Incidence Data, Denver: ANC Cancer Research Center, 1982.
13. Air Flow Patterns Near the Rocky Flats Plant, U.S.D.O.E., February 1985.
14. W.V.Brandon, G.Saccomanno, P.G.Archer,et al; Somatic cell chromosome and sputum cell cytology changes in humans exposed to 222 radon and 239 plutonium. Progress Report, D.O.E. contrct E 2902-3649, Rockwell, Health Sciences Group, 1976.

Resolve

Denver Area residents should not have to bear an increased burden to their health and environment by being subjected to further exposure to radioactive emissions from Rocky Flats.

Our goal should be to effectively inform: Denver Area Residents; prospective Businesses & Home Buyers thinking about relocating to the Metro North Area; Tourists & Conventioners; and the major/national Newspapers & Broadcasters - regarding our environmental dilemma of living within and downwind of a radioactive fallout zone.

This communication effort should continue until our elected officials A) have successfully halted all burning & releases of radioactive & toxic waste at Rocky Flats, and B) have commenced the massive cleanup of the contaminated soil and water both on-site and off-site.

By KIM H. GRICE, 10161 WOLFF STREET, WESTMINSTER, COLORADO, 80030

CONTAMINATING A COMMUNITY WITH RADIATION

The Denver area population is constantly being exposed to Plutonium and other radionuclides from 43 ventilation stacks at Rocky Flats; and from the resuspension of radioactive surface dust. (1,2)

There has been an estimated dispersion of over 250 kg (15,000 curies) of Plutonium and other radionuclides throughout the Denver area from Rocky Flats - (a fallout equivalent to 10 Nagasaki type bombs). (3,4)

Most of the off-site Plutonium contamination east of Rocky Flats is concentrated at the soil surface and can be subjected to the wind and resuspended. Elsewhere in the urban areas the Plutonium particles deposited on paved surfaces can be readily resuspended by vehicular traffic and human activity. (5)

Airborne Plutonium from Rocky Flats is almost always transported within the lower atmosphere as 'dry fallout'. (5,figure 2 & 3)

Plutonium is a man-made element and is a very potent carcinogen! Alpha emitters like Plutonium and Uranium add very little to the whole body dose, but can cause significant internal exposures when these radionuclides are inhaled or ingested. Plutonium has a very slow rate of excretion and is thus retained in the body for many years. (3) Plutonium induces chromosome injury in man at extremely small doses. Rocky Flats workers had a 30 per cent increase in the rate of chromosome aberrations with body burdens of only .4 to 4 nanocuries (billionth of a curie). (14) A (MPLD) of .016 uCi of Plutonium-239 involves a high cancer risk. (5)

The public water supplies of communities like Westminster, Northglenn, Thornton (Standley Lake) and Broomfield (Great Western Reservoir) and Arvada (Ralston Reservoir) and Boulder (Boulder Reservoir) have varying concentrations of Plutonium and other alpha emitting radionuclides. (1,6) The Arapahoe Aquifer that flows west to east under the Rocky Flats site, contains plutonium concentrations. (1,7)

Burning Plutonium forms submicron sized particles of Plutonium Oxide. (8) Exhaust (HEPA) filters in series (similar to those at RFP) can remove only Plutonium particles larger than .03 micrometers in diameter. (3) A study of Pu particle size in the soil, suggested that single Pu atoms and Pu particles with diameters less than the minimum detectable equivalent diameter (.09 um) accounted for the majority of Pu-239 and Pu-240 activity in Denver area soil. (9)

In Colorado the background level of Plutonium released during global atmospheric weapons testing has been estimated to be .08 dpm per gram of whole soil. The control sample was collected about 23 km south-southeast of the Rocky Flats Plant. (10) Many residential areas north and south of Standley Lake are built on radioactive contaminated soils that were 27 to 55 times normal background levels. (see figure 1)

In 3985 Rocky Flats workers still employed, retired, or deceased in 1980; it was found there was an eightfold excess of brain tumers, a three fold excess of malignant melanoma, and a 25% excess lung cancer incidence compared to all Colorado white males (1969-71). (11)

Denver area residents now have a 30% chance of getting a non-skin cancer before the age of 75. If we include skin cancers, the risk would o above 40% and probably be close to 1 in 2. (12)

STRONG EXHIBIT NO. 4

Radioactive and Hazardous Wastes to be Burned in Los Alamos Incinerators

Los Alamos National Laboratories is applying for a final permit to burn mixed hazardous and radioactive wastes. **The State of New Mexico does not have any regulations for radioactive emissions!** Since there are no restrictions on radioactive emissions, the State Environmental Improvement Division will be holding a public hearing to consider only the "hazardous waste portion" of this incinerator permit. The hearing will be held on **Tuesday, July 18**, at **9:00am** in the Runnels Building Auditorium located at the corner of St. Francis Drive and Alta Vista.

STRONG
EXHIBIT
NO. 5

THE CURRENT SITUATION AT LOS ALAMOS

There are five incinerators planned for LANL: two are in place now, and three more are proposed.

- The July 18 hearing is in regard to a radioactive-hazardous waste incinerator which was originally built for research purposes in the '70s. This incinerator has been closed for the last two years for remodeling to bring it up to full scale production capabilities. Prior to this temporary shutdown, this incinerator was used to burn radioactive-contaminated PCBs. This incinerator has been operating under interim RCRA (Resource Conservation and Recovery Act) status, **a temporary permit which currently allows LANL to burn radioactive and hazarous waste without any environmental assessment ever being done and without any opportunity for public comment**. This incinerator has operated under the auspices of this "temporary" status for nine years. Although there is a state moratorium on hazardous waste incineration, the LANL incinerator has been exempted. Transuranic waste, the same plutonium-contaminated waste that is designated for WIPP, will comprise the bulk of the waste stream destined for incineration here. THERE IS NO CURRENT ENVIRONMENTAL ASSESSMENT ON THIS INCINERATOR AVAILABLE TO THE PUBLIC.

- A second radioactive-hazardous waste incinerator is planned for LANL, this to be designated for incineration of low-level wastes. Even though this incinerator has yet to be constructed, the regional office of the EPA in Dallas has already given LANL an approval letter for incineration of radioactive materials. There was no public hearing or consideration of public comments for the construction and operation of the radioactive portion of the permit. The state moratorium does affect this incinerator, and it is currently on hold.

- A munitions incinerator is currently in operation at LANL, which is used to burn old ammunition and explosives.

- Two municipal waste incinerators have been proposed and permitted for operation at LANL as well. Due to the fact that there are no regulations governing waste incineration, construction bids were extremely high and this project has been abandoned for the time being.

INCINERATION OF RADIOACTIVE WASTE IS NOT SAFE

The operation of a radioactive-hazardous waste incinerator in Los Alamos poses a critical health threat to all of us. New Mexico has no regulations to control radioactive emissions from incinerators. Amazingly, the federal Environmental Protection Agency (EPA) has no restrictions on airborne releases of radioactivity from incinerators either. **There are no safety regulations in place on either the state or federal level to protect the public from airborne radioactive materials that are produced from incineration.**

Since there are no regulations governing incineration of radioactive materials, the July 18 hearing will ONLY address the hazardous waste portion of the permit request. **This hearing is entirely inadequate in that it does not address the primary health concern associated with the incineration of these wastes**, namely the release of plutonium and other radioactive materials into the atmosphere in easily respirable particles, as well as certain releases of dioxins, heavy metals, and various other hazardous chemicals.

No one in New Mexico State Government has conducted an assessment to determine the impact of the incineration of radioactive and chemical materials on human health. In addition, there has been no review of the control technology for the monitoring devices, which measure the emissions of toxic and radioactive particles into the air. The Los Alamos incinerator is the first of this design to go into operation; we have no way of knowing whether it is safe.

Massive atmospheric releases of plutonium and other deadly radioactive elements in recent years at DOE's Rocky Flats Plant in Colorado have proven to be the rule, not the exception. It was revealed through recent FBI investigations at Rocky Flats that illegal midnight incinerations of radioactive waste were taking place. Private hazardous waste incinerators across the country have been plagued by problems and accidents. Citizens in nearby communities complain of high cancer rates and birth defects. Many of these incinerators have so severely contaminated the environment that they are now targeted for Superfund cleanup. The track record for incineration in this country instills very little confidence in this "solution" to the waste crisis.

Incineration is the newest waste volume reduction technology favored by the DOE. The waste that would be burned in the Los Alamos incinerator is the same plutonium-contaminated mixed waste that was originally designated for deposition at the WIPP site. As a result of incineration, now a concentrated highly-toxic radioactive ash would be sent to WIPP instead. The WIPP site has been under heavy scrutiny for 10 years and still hasn't opened due to the potential for disastrous contamination at the site. Yet the very same waste that has failed to meet safety criteria for disposal at WIPP has had to go through almost no regulatory process to be burned, despite the near certainty of airborne contamination.

Incineration of hazardous and radioactive wastes is presented as state-of-the-art in waste volume reduction, yet the incineration process in fact creates even more toxic wastes which must be disposed of in turn. The process creates radioactive ash, which must be "bound" in a medium such

as concrete or asphalt for disposal, adding to the volume once again. Stack gas "scrubbers," water utilized to capture a portion of the gaseous pollutants, is contaminated in the process and must be disposed of properly. The filters in the stack must be changed periodically and since they are now radioactive, they too must be buried. This is not an efficient process.

As Greenpeace states in their material, "No reliable method exists to measure or monitor the performance of hazardous waste incinerators. As one EPA report says, 'The complexity of the incineration process; the differences in incinerator designs, and the difficulties in monitoring changing operation conditions make the accurate prediction of absolute incineration performance an essentially impossible task.'" There is no independent monitoring for the Los Alamos incinerator. The state Environmental Improvement Division has 4 people to inspect 2000 sites, and major facilities get 1 visit per year.

Incinerators are permitted on the basis of a trial burn. This is like looking at a "snapshot" of the overall efficiency of the facility. An EPA report warns, "No information is obtained about how the incinerator's performance might fluctuate with future changes in operating conditions or waste feed characteristics." A clean burn depends on three factors: time, temperature and a constant waste stream. The waste stream at LANL will be variable, which will result in products of incomplete combustion. The Dallas regional EPA oversees this incinerator which means they will not have regular inspection visits either.

REGULATIONS GOVERNING INCINERATION OF RADIOACTIVE WASTE
otherwise known as lack of adequate safeguards

1. The Atomic Energy Act (amended in 1954) gives DOE the right to essentially permit themselves for radioactive substances. These regulations are inadequate as they don't contain specific emission standards for radionuclides in regard to incinerators.

2. NESHAP (National Emission Standards for Hazardous Air Pollutants) These federal regulations under the Clean Air Act are also fairly useless in regard to incineration. This is a "fence-line" regulation which limits the amount of radioactivity crossing the LANL border to 25 mrems. How do you stop radiation from crossing a fence?

Neither of these regulations adequately protects the health and safety of the public. Meanwhile, LANL can burn highly toxic substances without answering any questions to the affected communities.

HEALTH RISKS OF INCINERATION

Greenpeace states, "Hazardous waste incineration is riddled with unknowns, but one thing is certain--the health and the environment of communities in which incinerators are sited are at risk. Incinerators release unknown quantities of unknown chemicals, presenting health threats of unknown magnitude and unknown duration to the people and ecosystems of neighboring communities."

Incineration does not destroy radionuclides, but only reduces their size, thereby making them more likely to slip through the filters and get picked up by pollen and dust particles in the air. This in turn creates the potential for inhalation of these particles. Plutonium emits alpha radiation. Because of

the low penetrating ability of alpha particles, insoluble alpha emitters do not pose a health hazard outside the body. However, when inhaled , ingested or absorbed, alpha emitters are the most dangerous of all types of radiation. A minute particle of plutonium - just one-millionth of a gram - can cause cancer. Incineration will leave plutonium in particulate form, the most dangerous for human exposure. The health risk of environmental plutonium is underestimated by current occupational standards to an unacceptable degree. There is growing evidence that low-level, long-term radiation is extremely dangerous - even more so than a one time, severe exposure. Dr. Abram Petkau of the Canadian Atomic Energy Laboratory came to this conclusion: the longer the time of radiation of exposure, the smaller the total dose needed to do the damage. This discovery effectively tossed all previous assumptions about "permissible exposure levels" out the window, and is supported by world authorities on low-level radiation, including Dr. Jay Gould, Dr. Ernest Sternglass, Dr. Thomas Mancuso, and Dr. Alice Stewart, to name just a few.

Dioxins are a toxic chemical formed from the recombination of carbon and chlorine in the incineration process. Dioxins can enter the body through the air, ingestion and absorption through the skin. This is an extremely toxic chemical; a particle the size of a grain of sand can cause cancer.

Many other hazardous substances could be released from the incinerator as well, including hydrochloric acid, sulphuric acid, cadmium, chromium, mercury, arsenic, and lead. Heavy metals are not destroyed by incineration processes. The main carcinogens would be in gaseous or particulate form.

ALTERNATIVES TO WASTE INCINERATION

Supercompaction presents a viable alternative to incineration, is less costly, and - most importantly - does not result in any airborne releases of hazardous or radioactive materials. Estimates have placed the cost of constructing and operating a compactor at one-fourth that of an incinerator. The reduction in volume of the waste is not quite as great initially, but then there are no toxic byproducts created in the process either as there are in incineration. Unfortunately, there is still the question of how to safely dispose of the compacted waste. At this time, above- ground monitored storage seems to be the most prudent and safe option.

SPEAK NOW, OR FOREVER BREATHE NUCLEAR WASTE

We all breathe the same air. Atmospheric emissions of radioactive particles - whether routine or accidental - are irreversible and deadly. There is no possible way to "clean up" an airborne release of radioactivity. Incinerators across the country have resulted in significant increases in cancers, miscarriages, deformities and sickness in nearby communities - and these incinerators were "only" burning hazardous wastes, not radioactive materials. We must learn from these mistakes.

The incineration of radioactive and hazardous wastes at Los Alamos - jeopardizing the health and safety of all in the surrounding communities - for the sake of convenience in reducing waste volume is both outrageous and unwarranted. **The incineration of these wastes and consequent, irreparable damage to our atmosphere must not be allowed.** Approval of this incinerator lacking any safety regulations whatsoever would most certainly be a fatal mistake.

For further information call *Concerned Citizens for Nuclear Safety*
986-1973

Concerned Citizens for Nuclear Safety • 712 Calle Grillo • Santa Fe • New Mexico • USA • (505) 986-1973

To: Richard Mitzelfelt, Director of the Environmental Improvement Division (E.I.D.)
1190 St. Francis Drive
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We, the undersigned concerned citizens, ask that the Environmental Improvement Division not issue a permit to Los Alamos National Laboratories for an incinerator to burn hazardous or radioactive waste until legislation passes regulations for radioactive incineration.

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TIBBETTS EXHIBIT NO. 1

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(26)

To: Richard Mitzelfelt
1190 St. Francis Drive
Santa Fe, N.M. 87503

Director of the Environmental Improvement Division (E.I.D.)

We, the undersigned concerned citizens, ask that the Environmental Improvement Division not issue a permit to Los Alamos National Laboratories for an incinerator to burn hazardous or radioactive waste until legislation passes regulations for radioactive incineration.

SIGNATURE	NAME	ADDRESS (Please print name, address, and phone no.)	PHONE NO.
Guadalupe Lamora		PO Box 1349 Taos NM	758-9324
Rose Blevins		PO Box 3216	8-1748
Libbie Martinez		PO Box 105 Ranchos de Taos, NM	8-0218
[illegible]		P.O Box 263 Ranchos De Taos NM	758-9775
Bridgette Rivera		POBox 925 Ranchos de Taos NM 87557	NO PHONE
[illegible]		P.O Box 107 Rancho de Taos NM	87557
Italia [illegible]		PO Box 217 El Prado 87529	
[illegible]		P.O. Box 2626 Taos NM	87571
Eguralia Lares		P.O. Box 2626 Taos NM	87571
[illegible]		PO Box 2611 Taos NM	87571 758-9301
[illegible]		P.O Box 105, Questa, NM	87556 586-0146
[illegible]		P.O Box 2626 Taos, NM	87571
Gloria [illegible]		P.O. Box 19 Arroyo Seco, N.M.	87512
Cora Lepp		Amalia, N.M.	87512
Robbin Gradaz		P.O. Box 134 Arroyo Seco, NM	87514
[illegible]		PO Box 6684 Taos, N.M.	87571
[illegible]		Box 762 Taos, N Mex	87571
Roberta E Mares		P.O. Box 346 Ranchos de Taos, NM	87571
Robert Carpenter		RT 1 Bx 9A TAOS	87571
Mark B. Coleau		POB 141 Eagle Nest, NM	87718
Mary [illegible]		POB 322 TAOS	87571 758-2393
[illegible]		Box 1036 Taos	
Patricia Stanford		P.O. Box 2431 Taos	776-8
[illegible]		PO Box 2315 Taos	776-8286
[illegible]		Box 513 Taos	758 1983
Anita Lafoya		Box 5004 Taos	58-256

(26)

To: Richard Mitzelfelt
1190 St. Francis Drive
Santa Fe, N.M. 87503

Director of the Environmental Improvement Division (E.I.D.)

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SIGNATURE	NAME	ADDRESS (Please print name, address, and phone no.)	PHONE NO.
Larry Nixon		Box 31 Embudo 87531	
Carolyn McEntire		105 Roberto Rd - 758-3590	
Lynn McColl		P.O. Box 472 Ranchos 87557	758-1051
Lesley Davenport		Rt 1 Box 86 Taos N.Mex	
Kim Sue		Rt 1 Box 83 Taos	758-7468
Mary Sheppard		PO 2553 Taos NM	8-4629
[illegible]		P.O. Box 1815 Taos N.M.	758-0650
Eric Ranquin		PO Box 63 Tsv NM	776-2347
Linda Lowden		PO Box 3158 Taos NM	none
Kim Love		Po Box 1582 Taos NM	NONE
David Bendiverna		Gen Del Ave Pietres NM	
Mr. Mrs. Joe Dimaly		Taos, N.M.	
MARK SAVAGE		gen del Cerrillos N.M.	
Michaelle T. Balogh		717½ Rosita St. Santa Fe, 87501 NM	
Kim Repasky		1597 Bevan Rd. Pgh Pa. 15102	(412) 881-7647 758-1938
ALFRED S. HOBBS		PO Box 1633 TAOS NM	87571
Duane E Warner		RT. BOX 56 TAOS NMex.	8757
Arlene L Smith		Po Box 138 Eagle Nest	
Carol Rough		PO Box 2283	TAOS, NM 87571
Dale M Rough		PO Box 2283	TAOS, NM 87571
Dawn Rough		PO Box C-34	El Prado N.M. 87529
Rick Bonanato		P.O. Box 2877	Taos, NM 87571
Julia Clegg Woodward		PO Box 1439	Taos NM 87571
Walter Maitland		Box 539	El Prado, N.M. 87529
Dana Middleton		PO Box 744, El Prado NM	
Lucille Lucero		Box 6353	TAOS 758-7181

(26)

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1190 St. Francis Drive
Santa Fe, N.M. 87503

Director of the Environmental Improvement Division (E.I.D.)

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SIGNATURE	NAME	ADDRESS (Please print name, address, and phone no.)	PHONE NO.
Renee Laberge	Renee Laberge	P.O. Box 3092 Taos 87571	758-2709
Katherine Peters		PO Box 2436 Taos NM 87571	
James E. Masters		P.O. Box 537 El Prado, N.M. 87529	
Dianna Tanoff		P.O. Box 2641 Taos, NM 87571	
[illegible]		P.O. Box 2641 Taos NM 87571	
David Kinkaid		555 Mar Vista Solana Beach CA 92075	(619)481-8284
Tyoti Germain		PO Box 3271, Taos, NM 87571	
Robert Acker	ROBERT ACKER	P.O Box 3271 Taos NM 87571	
Elizabeth R. Thomas	Elizabeth R. Thomas	POBox 1434 Santa Fe NM 87501	
Stephen M Campbell	Stephen M Campbell	Box 378 Taos, NM 87571	
Johnny Spicer	Johnny SPICER	Taos, N.M. 87571	
Maggie Kazel	MAGGIE KAZEL	112 Lolomita Taos, N.M. 87571	
Rosa Cooter		Box 4187 Taos NM 87571	
Bill Beyhan		7125 Sleepy Hollow Dr Tulsa Ok 74136	
Stephanie M. McIlvain		2550 E. 24th Tulsa 74114	
John T. Straus		5124 S Richmond Tulsa, OK 74135	
Samuel Roacen		Box 1223 Ranchos Taos NM 87557	
Adam Apel		Box 129 Arroyo Seco NM 87514	
Serina Brown		Box 129 Arroyo Seco NM 87514	
[illegible]	AVRIL FOGDEN	653 RANCOS NM 87557	
[illegible]		P.O. Box 393 TAOS, NM 87571	
Michael Faulk		P.O. BOX 1809 TAOS NM 87571	
Roxanne Blunck	ROXANNE BLUNCK	PO BOX 2015 TAOS, NM 87571	
Alyssa Terry		88 Beacon St. #21 Somerville, MA 02143	

(24)

VAORG4

EXHIBIT

NO. 1

VA ORG
EXHIBIT
NO. 1

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 West Chicago, IL 60185
30W101 Roosevelt Rd. U.S.A.
800/323-2784 In Illinois: 312/231-3649

PATIENT: BRENDA		AGE: 16	SEX: F
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY		ACCT: 17532	
LAB NO: 88232-0041	DATE IN: 08/19/88	DATE OUT: 08/20/88	
DATE SAMPLED: 08/12/88	SHAMPOO: COMMERCIAL	SAMPLE SIZE: .370	
CODE: A-02NO/D	HAIR COLOR: BROWN	SAMPLE TYPE: HEAD HAIR	

Nutrient Mineral Levels

		LOW ◆ REFERENCE RANGE ◆ HIGH							
		ABOVE TWO STD. DEV.	TWO STANDARD DEVIATIONS ← BELOW	ONE STANDARD DEVIATION (STD) ← BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE →	TWO STANDARD DEVIATIONS ABOVE →	ABOVE TWO STD. DEV.	
Calcium	1141				**********				255- 1178
	37			**					19- 39
	14		**********						15- 43
	3	**********							7- 16
	11			**********					9- 32
	174					**********			104- 161
	4	**********							6- 12
	.10		**********						.14- .35
	.47		**********						.61- 1.39
	.14			**********					.12- .31
	.056				*				.006- .427
	1.03					**********			.20- 1.43
	116			**********					115- 161
	.58					**********			.20- .58
	c	**********							3- 8
	.20					*********			.09- .25

ADDITIONAL MINERAL LEVELS

	41833				*******				36404-55976
	2.3					*******			.6- 4.3
	2.5					**********			.2- 2.1
Boron	1.4		**********						1.7- 3.1
Silver	.04			**********					.05- .33
Tin	c					*******			1- 17
Antimony									
Tungsten									
Zirconium	.24				****				.13- .8

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	AMOUNT FOUND (ppm)	HIGH: ONE STANDARD DEVIATION ABOVE MEAN		TWO STANDARD DEVIATIONS ABOVE MEAN →	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
	0	********	10		
Arsenic	3.1	*****	7.0		
Mercury	1.3	*******	2.5		
Beryllium	<.1	*	1.0		
Aluminum	2	**	10		
Cadmium	.6	****	2.2		
Lithium	.016	*****	.04		
TOTAL TOXICS		**********			

RACE: HISPANIC
SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS: PERM/DYE
DRINKING WATER SOURCE: WELL

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	30	7- 13
Cu/Zn	c.5	3.0- 7.0
Na/K	9.6	3.1- 7.
Ca/P	241	46- 10
Ca+Mg	0476	779- 1310
Ca/K	10.5	2.7- 6.3
Na/Ca	3.9	1.4- 3.4
Ca/Na	40	7- 16
Ca/Cu	15.3	4.0- 9.3
Na/K	2.3	1.3- 3.1
Ca/P	43	10- 23
Ca+Mg	136	40- 1000
Ca+Mg	2099	300- 3600
Cu/Zn	.4	.2- 2.0
Ca+Mg	121	100- 2400
Ca+Mg	47.5	20.0-330.0

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DOCTOR'S DATA Inc.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

MINERAL ANALYSIS REPORT

PAT [illegible] AGE: 25 SEX: F
DOCTOR: [illegible] ACCT: [illegible]
LAB NO: [illegible] DATE IN: [illegible] DATE OUT: [illegible]
DATE SAMPLED: [illegible] SHAMPOO: [illegible] SAMPLE SIZE: [illegible]
RACE CODE: [illegible] HAIR COLOR: [illegible] SAMPLE TYPE: [illegible]

Nutrient Mineral Levels

		LOW ◆ REFERENCE RANGE ◆ HIGH						
		BELOW TWO STD. DEV.	TWO STANDARD DEVIATIONS ← BELOW	ONE STANDARD DEVIATION (STD) ← BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE →	TWO STANDARD DEVIATIONS ABOVE →	ABOVE TWO STD. DEV.	
	3961								300 - 1200
	71								30 - 115
	11								17 - [illegible]
	[illegible]								[illegible]
	[illegible]								13 - [illegible]
	107								100 - 111
	[illegible]								[illegible]
	5.52								.14 - .85
	.73								.41 - 1.39
	.17								.12 - .31
	.027								.026 - .427
	[illegible]								.20 - 1.40
	147								94 - 185
	[illegible]								[illegible]
	[illegible]								[illegible]
	[illegible]								[illegible]

ADDITIONAL MINERAL LEVELS

	44.6							5400 - 5800
	1.2							.7 - 1.7
	1.7							.5 - 3.5
	1.1							1. - 4.
	[illegible]							[illegible]
Silver	.1							.10 - .[illegible]
	11							- 1[illegible]
Antimony	[illegible]							[illegible]
Tungsten	[illegible]							[illegible]
Zirconium	[illegible]							[illegible]

[illegible] EDGAR COWARD, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	RADIEK LEVEL (parts per million)	HIGH			
			ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
	[illegible]	***	10		
Aluminum	.4	*	-		
Arsenic	[illegible]	****	[illegible]		
Cadmium	[illegible]	***	1.		
Aluminum	[illegible]	*	[illegible]		
Lead	[illegible]	**	[illegible]		
Beryllium	.1	*****	[illegible]		

TOTAL TOXICS **********

RACE: [illegible] SAMPLE CONDITION: [illegible]
HAIR PREPARATIONS: [illegible]
DRINKING WATER SOURCE: [illegible]

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	[illegible]	[illegible]
Ca/Zn	[illegible]	[illegible]
[illegible]	[illegible]	2.5 - [illegible]
Cu/Fe	[illegible]	[illegible]
[illegible]	111	[illegible]
[illegible]	15.4	1.5 - [illegible]
[illegible]	[illegible]	1. - 6.
[illegible]	11	[illegible] - 11
Fe/Cu	23.0	6.0 - 12.
[illegible]	.1	1.2 - [illegible]
[illegible]	1.3	1.5 - [illegible]
[illegible]	[illegible]	[illegible] - 1[illegible]
Na/K	[illegible]	[illegible]
[illegible]	[illegible]	[illegible] - [illegible]
[illegible]	170	1[illegible] - [illegible]
[illegible]	1[illegible]	[illegible]

Lab Procedures According to ASETL Protocol

PHYSICIAN'S COPY

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

PATIENT:		AGE: 22	SEX:
DOCTOR: NEUROTHERAPEUTIC SERVICES/[illegible]		ACCT: 17532	
LAB NO: [illegible]	DATE IN: [illegible]/17/[illegible]	DATE OUT: [illegible]/1[illegible]/[illegible]	
DATE SAMPLED: [illegible]/1[illegible]/[illegible]	SHAMPOO: [illegible]	SAMPLE SIZE: .[illegible]	
[illegible]CE CODE: A-[illegible]/D	HAIR COLOR: [illegible]	SAMPLE TYPE: [illegible]	

Nutrient Mineral Levels

LOW — REFERENCE RANGE — HIGH

(Graph columns: TWO STANDARD DEVIATIONS BELOW; ONE STANDARD DEVIATION (STD) BELOW; MEAN; ONE STANDARD DEVIATION (STD) ABOVE; TWO STANDARD DEVIATIONS ABOVE; ABOVE 2 STD. DEV.)

Mineral	Patient Level	Reference Range
[illegible]	194[illegible]	21[illegible]- 7[illegible]
[illegible]	[illegible]	1[illegible]- [illegible]
[illegible]	25	17- [illegible]7
[illegible]	24	[illegible]- [illegible]
[illegible]	12	[illegible]- [illegible]
[illegible]	127	1[illegible]2- 1[illegible]1
[illegible]	1[illegible]	[illegible]- 1[illegible]
[illegible]	.6[illegible]	.1[illegible]- .7[illegible]
[illegible]	.56	.61- 1.3[illegible]
[illegible]	.11	.12- .31
[illegible]	.032	.0[illegible]- .427
[illegible]	1.1[illegible]	.2[illegible]- 1.4[illegible]
[illegible]	11[illegible]	11[illegible]- 1[illegible]7
[illegible]	2[illegible].[illegible]4	.20- .5[illegible]
[illegible]	[illegible]	[illegible]- 7
[illegible]	.12	.0[illegible]- .2[illegible]

ADDITIONAL MINERAL LEVELS

Mineral	Patient Level	Reference Range
[illegible]	[illegible]512	[illegible]4-[illegible]
[illegible]	[illegible]8.5	.4- [illegible]
[illegible]	10.7	.[illegible]- 1.1
Boron	1.2	1.7- [illegible].[illegible]
[illegible]		
Silver	.4	.[illegible]- .[illegible]
Tin	1[illegible]	[illegible]- [illegible]
Antimony		
Tungsten		
Zirconium	.[illegible]	.[illegible]- .[illegible]

[illegible] SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

HIGH — ONE STANDARD DEVIATION ABOVE MEAN; TWO STANDARD DEVIATIONS ABOVE MEAN; MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN

Toxic Mineral	Patient Level (parts per million)	One Standard Deviation Above Mean
[illegible]	< 1	1.
[illegible]	.5	7.[illegible]
Mercury	.[illegible]	.[illegible]
Cadmium	<.1	1.
Aluminum	[illegible]	[illegible]
[illegible]	.[illegible]	[illegible].
[illegible]ylium	.011	.[illegible]

TOTAL TOXICS

RACE: [illegible] SAMPLE CONDITION:

HAIR PREPARATIONS:

DRINKING WATER SOURCE: [illegible]

Mineral Ratios

Ratio	Level	Reference Range
[illegible]/Mg	2[illegible]	[illegible]- 11
Ca/Zn	1[illegible].[illegible]	1.7- [illegible].
[illegible]	17.1	1.[illegible]- [illegible].
[illegible]	1[illegible]	[illegible]-
[illegible]	[illegible]1[illegible]	[illegible]1- 1[illegible]
[illegible]	[illegible].[illegible]	1.4- [illegible].[illegible]
[illegible]	1.[illegible]	1.[illegible]- [illegible].1
[illegible]	[illegible]	[illegible]-
[illegible]	1[illegible].[illegible]	[illegible].[illegible]- 1[illegible].[illegible]
[illegible]	1.1	1.[illegible]- [illegible].
[illegible]	1[illegible]	1[illegible]- [illegible]
[illegible]	1[illegible]	[illegible]- [illegible]
[illegible]	1[illegible]	[illegible]-
[illegible]	[illegible].1	.[illegible]- .[illegible]
Ca/P[illegible]	[illegible]	1[illegible]- 1[illegible]
[illegible]	1[illegible].[illegible]	[illegible].[illegible]-[illegible].[illegible]

PHYSICIAN'S COPY

MINERAL ANALYSIS REPORT

DOCTOR'S DATA Inc.
P.O. Box 111 30W101 Roosevelt Rd. 800/323-2784
West Chicago, IL 60185 U.S.A. In Illinois: 312/231-3649

PATIENT: | AGE: 47 | SEX: F
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY | ACCT: 17532
LAB NO: 88232-0042 | DATE IN: 08/19/88 | DATE OUT: 09/20/88
DATE SAMPLED: 08/15/88 | SHAMPOO: VITAL CARE | SAMPLE SIZE: .350
CODE: A-02NO/D | HAIR COLOR: BROWN | SAMPLE TYPE: HEAD HAIR

Nutrient Mineral Levels

		LOW ◆ REFERENCE RANGE ◆ HIGH						
		ABOVE 2 STD DEV	TWO STANDARD DEVIATIONS ← BELOW	ONE STANDARD DEVIATION (STD) ← BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE →	TWO STANDARD DEVIATIONS ABOVE →	ABOVE 2 STD DEV	
[illegible]	3741				**********				309- 1203
[illegible]	131				**********				20- 115
[illegible]	6		**********						17- 87
[illegible]	3		**********						9- 39
[illegible]	8		**********						13- 50
[illegible]	156				*********				104- 181
[illegible]	8			*******					6- 17
[illegible]	.21			**********					.14- .95
[illegible]	.73			**********					.61- 1.39
[illegible]	.22				******				.12- .31
[illegible]	.068				***				.006- .427
[illegible]	1.09				**********				.20- 1.43
[illegible]	104			**********					94- 130
[illegible]	.32				**				.20- .55
[illegible]	4			********					3- [illegible]
[illegible]	.12			********					.09- .25

ADDITIONAL MINERAL LEVELS

[illegible]	43876				**			36404-55976
[illegible]	11.2				**********			.7- 6.7
[illegible]	8.2				**********			.3- 3.5
Boron	1.5		**********					1.5- 4.0
[illegible]								
Silver	.23				*			.10- .56
Tin	16				**********			- 1
Antimony								
Tungsten								
Zirconium	.57				**********			.12- .68

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (ug/g or mg/g)	ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN → HIGH	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
[illegible]	3	**** 10		
[illegible]	4.5	******** 7.0		
Mercury	1.4	******* 2.5		
Cadmium	.5	***** 1.0		
Aluminum	7	****** 15		
[illegible]	.4	** 2.2		
[illegible] Rhodium	.011	*** .04		
TOTAL TOXICS		**********		

RACE: HISPANIC | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS: PERM
DRINKING WATER SOURCE: CITY

Mineral Ratios

	LEVEL	REFERENCE RANGE
[illegible]	28	4- 20
Ca/Zn	23.9	2.5- 7.
[illegible]	35.8	2.5- 6.5
[illegible]	445	40- 90
[illegible]	17648	800- 1900
[illegible]	35.1	1.5- 6.5
[illegible]	1.8	1.5- 4.0
[illegible]	41	3- 11
[illegible]	17.8	4.0- 12.0
[illegible]	1.0	1.2- 3.5
[illegible]	39	15- 40
[illegible]	22	40- 1000
[illegible]	401	300- 3000
[illegible]	.2	.2- 6.0
[illegible]	1067	100- 2400
[illegible]	13.2	20.0-360.0

PHYSICIAN'S COPY

Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT		AGE:	SEX:
DOCTOR.			ACCT:
LAB NO:	DATE IN:	DATE OUT:	
DATE SAMPLED:	SHAMPOO:	SAMPLE SIZE:	
CE CODE:	HAIR COLOR:	SAMPLE TYPE:	

Nutrient Mineral Levels

		LOW ◆ REFERENCE RANGE ◆ HIGH						
		TWO STANDARD DEVIATIONS BELOW	ONE STANDARD DEVIATION (STD) BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE	TWO STANDARD DEVIATIONS ABOVE		

ADDITIONAL MINERAL LEVELS

Boron								
Tin								
Zirconium								

GRACE SCHAAF, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL	HIGH → ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
TOTAL TOXICS				

RACE:
SAMPLE CONDITION:
HAIR PREPARATIONS:
DRINKING WATER SOURCE:

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Zn		

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Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: BLANKET AGE: 1 SEX:
DOCTOR: [illegible] ACCT:
LAB NO: DATE IN: DATE OUT:

DATE SAMPLED: SHAMPOO: SAMPLE SIZE:
OFFICE CODE: HAIR COLOR: SAMPLE TYPE:

Nutrient Mineral Levels

		LOW ◆ REFERENCE RANGE ◆ HIGH						
		TWO STANDARD DEVIATIONS BELOW	ONE STANDARD DEVIATION (STD) BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE	TWO STANDARD DEVIATIONS ABOVE	ABOVE TWO STD DEV	[illegible]
[illegible]								
[illegible]								
[illegible]								
[illegible]								
Copper								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								

ADDITIONAL MINERAL LEVELS

[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
Tin								
[illegible]								
[illegible]								
[illegible]								

SPACE SCHAAF, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC	PATIENT LEVEL	HIGH → ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead				
[illegible]				
[illegible]				
[illegible]				
[illegible]				
[illegible]				
[illegible]				
TOTAL TOXICS				

RACE: SAMPLE CONDITION:
HAIR PREPARATIONS:
DRINKING WATER SOURCE:

Mineral Ratios

	LEVEL	REFERENCE RANGE
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		

Lab Procedures According to ASETL Protocol
Laboratory Work Performed By Doctor's Data Laboratories, Inc. CDC License No. 12104 IL License No. 13789

PHYSICIAN'S COPY

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 West Chicago, IL 60185
30W101 Roosevelt Rd. U.S.A.
800/323-2784 In Illinois: 312/231-3649

PATIENT: DAVID (BODY HAIR) AGE: 23 SEX: M
DOCTOR: NEURO-HEADBUTTS SERVICES/MOREY ACCT: 17332
LAB NO: [illegible] DATE IN: 08/05/82 DATE OUT: 08/10/82

DATE SAMPLED: 07/28/82 SHAMPOO: SAMPLE SIZE: .370
ICE CODE: A-[illegible] HAIR COLOR: BROWN SAMPLE TYPE: HEAD HAIR

Nutrient Mineral Levels

NUTRIENT	PATIENT LEVEL (parts per million)	LOW: BELOW 2 STD. DEV.	LOW: TWO STANDARD DEVIATIONS BELOW	LOW: ONE STANDARD DEVIATION (STD) BELOW	MEAN	HIGH: ONE STANDARD DEVIATION (STD) ABOVE	HIGH: TWO STANDARD DEVIATIONS ABOVE	HIGH: ABOVE 2 STD. DEV.	NUMERICAL VALUE OF REFERENCE RANGE
Calcium	338				********				212- 724
Magnesium	227				**********	**********			16- 97
Sodium	22			**********					17- 37
Potassium	20				***				3- 7
Copper	7		**********						3- 12
Zinc	139			**********					132- 191
Iron	78				**********	**********			5- 14
Manganese	.64				**********				.12- .70
Chromium	.96				***				.61- 1.39
Cobalt	.11		**********						.12- .31
Phosphorus	.140				*********				.086- .437
Selenium	.97				*********				.20- 1.43
Phosphorus	164				**********				118- 157
Molybdenum	.03				**********				.20- .55
Silicon	7				**********				3- 7
Vanadium	.05				**********	**********			.01- .22

ADDITIONAL MINERAL LEVELS

Boron	3.14			**********					364-4-35.78
Germanium	3.4					**********	**********		.4- 4.3
Nickel	2.4					**********	**********		.2- 1.1
Arsenic	1.7		**********						1.7- 2.5
Lead									
Silver	.21					*********			.15- .31
Tin	0					*****			1-
Antimony									
Tungsten									
Zirconium	3.15					**********	**********		.01- .37

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	HIGH: ONE STANDARD DEVIATION ABOVE MEAN	HIGH: TWO STANDARD DEVIATIONS ABOVE MEAN	HIGH: MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	4	***** 10		
Aluminum	2.6	***** 7.0		
Mercury	1.2	******* 2.5		
Cadmium	.3	**** 1.0		
Antimony	61	********** 15	**********	**********
Nickel	1.6	****** 2.2		
Beryllium	.016	***** .04		
TOTAL TOXICS		**********	**********	**********

RACE: [illegible] SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: NOT SPECIFIED

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	2	4- 11
Ca/Zn	2.1	1.7- 4.
Na/K	3.2	1.8- 4.
Ca/P	2	2.8- 3.
Na/Li	237	491- 1,2
Zn/Cu	11.3	1.4- 3.4
Fe/Cu	1.1	1.7- 3.1
Ca/K	5	4- 5
Zn/Cu	19.1	4.6- 10.7
Fe/Zn	.1	1.2- 2.
Ca/Fe	119	14- 3.
Ca/Cd	33	33- 330
Zn/Cd	414	300- 820
Se/Hg	.4	.6- 2.0
Ca/Pb	139	100- 190
Ca/Be	2.6	25.0-350.

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DOCTOR'S DATA INC
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: MOREY DEBRIE AGE: 29 SEX: F
DOCTOR: SCULLY TERESITA AFF ACCT: 10294
LAB NO: 88053-0078 DATE IN: 02/22/88 DATE OUT: 02/24/88
DATE SAMPLED: 02/18/88 SHAMPOO: BROONERS SAMPLE SIZE: .380
ICE CODE: A-01NO/M HAIR COLOR: BROWN SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

NUTRIENT MINERAL	PATIENT LEVEL (parts per million)	LOW ◆ REFERENCE RANGE ● HIGH (BELOW 2 STD DEV ← TWO STANDARD DEVIATIONS BELOW ← ONE STANDARD DEVIATION (STD) BELOW — MEAN — ONE STANDARD DEVIATION (STD) ABOVE → TWO STANDARD DEVIATIONS ABOVE → ABOVE 2 STD DEV)	NUMERICAL VALUE OF REFERENCE ◇ RANGE ○
Calcium	3529	********** ◇ ********** ●	393- 1163
Magnesium	227	********** ◇ ********** ●	39- 148
Sodium	155	********** ◇ ********** ●	19- 135
Potassium	3	********** ◇	9- 60
Copper	8	********** ◇	13- 50
Zinc	106	********** ◇ ********** ●	126- 194
Iron	5	********** ◇	6- 17
Manganese	.29	********** ◇	.30- 1.65
Chromium	.52	********** ◇	.61- 1.35
Cobalt	.08	********** ◇	.12- .31
Lithium	.047	* ◇	.006- .427
Molybdenum	1.11	********** ◇ ********** ●	.19- 1.35
Phosphorus	105	********** ◇ **********	94- 180
Selenium	.22	********** ◇ **********	.16- .82
Silicon	2	********** ◇	4- 10
Vanadium	.09	********** ◇	.09- .26

ADDITIONAL MINERAL LEVELS

Sulfur	41759	*** ◇ ********** ●	32762-51193
Strontium	25.5	********** ◇ ********** ●	.7- 10.4
Barium	6.8	********** ◇ ********** ●	.3- 3.5
Boron	1.0	********** ◇ **********	.9- 2.6
Gold	.02	********** ◇	.06- .47
Silver	.04	********** ◇	.10- .56
Tin	5	** ◇	2- 16
Antimony		◇	
Tungsten		◇	
Zirconium	.13	********** ◇	.12- .66

JOHN P. BEDERKA JR., PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN →	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN (HIGH)
Lead	< 1	* 15		
Arsenic	.5	* 7.0		
Mercury	.3	** 2.5		
Cadmium	<.1	* 1.0		
Aluminum	2	* 30		
Nickel	.4	*** 2.2		
Beryllium	.010	* .1		
TOTAL TOXICS		*******		

RACE: CAUCASIAN SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: CITY

Lab Procedures According to ASETL Protocol
Laboratory Work Performed By Doctor's Data Laboratories, Inc.

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	15	6- 17
Ca/Zn	33.2	2.5- 7.5
Ca/P	33.5	2.7- 9.2
Ca/Fe	565	33- 145
Ca/Mn	11885	470- 2440
Mg/K	27.1	.9- 10.0
Na/K	18.5	1.4- 5.7
Zn/K	12	3- 12
Zn/Cu	12.7	4.1- 10.0
Cu/Fe	1.3	.9- 5.7
Fe/Mn	21	6- 35
Cu/Cd	95	78- 348
Zn/Cd	1219	37- 201
Se/Hg	.6	.2- 1.1
Ca/Pb	6292	26- 78
P/Al	37.4	10.0-150.0

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

PATIENT: SHARE JED | AGE: 33 | SEX: M
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY | ACCT: 17532
LAB NO: 89082-003 | DATE IN: 03/23/89 | DATE OUT: 03/24/89
DATE SAMPLED: 03/16/89 | SHAMPOO: KISS MY FACE | SAMPLE SIZE: .360
FICE CODE: A-02N07D | HAIR COLOR: BROWN | SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

Nutrient Mineral		LOW ◆ REFERENCE RANGE ◆ HIGH						NUMERICAL VALUE OF REFERENCE RANGE
		TWO STANDARD DEVIATIONS BELOW	ONE STANDARD DEVIATION (STD) BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE	TWO STANDARD DEVIATIONS ABOVE	ABOVE STD. DEV.	
Calcium	1478				**********			325- 934
Magnesium	91				**********			20- 115
Sodium	21		**********					17- 87
Potassium	6	**********						9- 39
Copper	47				**********			9- 32
Zinc	171				**********			103- 183
Iron	8			**				5- 14
Manganese	.50				*******			.19- .72
Chromium	.50	**********						.61- 1.39
Cobalt	.08	**********						.12- .31
Lithium	.045			**				.006- .427
Molybdenum	1.11				**********			.20- 1.43
Phosphorus	150				******			108- 178
Selenium	.55				**********			.20- .58
Silicon	6				*******			3- 8
Vanadium	.27				**********			.08- .25

ADDITIONAL MINERAL LEVELS

Aluminum	43946				**			38404-55976
Strontium	7.0				**********			.4- 4.8
Barium	2.3				**********			.2- 1.8
Boron	1.1	**********						1.8- 4.0
Gold								
Mercury	.15			*****				.05- .42
Tin	THIS ELEMENT TEMPORARILY UNREADABLE						******	1- 9
Antimony								
Tungsten								
Zirconium	.05	**********						.09- .47

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

Toxic Mineral		HIGH			
			ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Arsenic	4	*****	10		
Cadmium	.5	*	7.0		
Mercury	.3	**	2.5		
Cadmium	<.1	*	1.0		
Aluminum	1.	**********	15		
Nickel	.9	***	2.2		
Beryllium	.011	***	.04		
TOTAL TOXICS		**********			

RACE: CAUCASIAN | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS: HENNA
DRINKING WATER SOURCE: BOTTLED/SPRING

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	16	4- 20
Ca/K	8.8	2.5- 7.0
Na/K	9.8	2.6- 6.1
Ca+Mg/K+Na	170	40- 90
Ca+Mg+K+Na	2939	800- 1900
Ca/P	13.7	1.5- 6.0
Ca/Na	3.2	1.5- 4.0
Mg/K	25	3- 11
Mg/Na	3.5	3.0- 12.0
K/Na	5.4	1.2- 3.5
Ca+Mg/P	17	15- 40
Ca+Mg+K+Na/P	561	300- 700
Ca+Mg+K+Na/Zn	2014	300- 3500
Fe/Cu	1.5	.2- 2.0
Ca+Mg+K+Na/Fe	356	100- 1900
Ca/Fe	9.5	20.0-300.0

Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

PATIENT: LAUBER SHARON | AGE: 44 | SEX: F
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY | ACCT: 17532
LAB NO: 89082-0032 | DATE IN: 03/23/89 | DATE OUT: 03/24/89
DATE SAMPLED: 03/17/89 | SHAMPOO: SHACKLEE | SAMPLE SIZE: .430
OFFICE CODE: A-02NO/D | HAIR COLOR: BROWN | SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

NUTRIENT	LEVEL (mg% or mg/gm)	LOW: TWO STANDARD DEVIATIONS BELOW	LOW: ONE STANDARD DEVIATION (STD) BELOW	MEAN	HIGH: ONE STANDARD DEVIATION (STD) ABOVE	HIGH: TWO STANDARD DEVIATIONS ABOVE	ABOVE 2 STD. DEV.	NUMERICAL VALUES OF REFERENCE RANGE
Calcium	1928			**********				309- 1203
Magnesium	78			**********				20- 115
Sodium	15	**********		*				17- 87
Potassium	5	**********		*				9- 39
Copper	10	**********		*				13- 50
Zinc	134			**				104- 191
Iron	6		**********	*				6- 17
Manganese	.10	**********		*				.14- .95
Chromium	.42	**********		*				.61- 1.39
Cobalt	.07	**********		*				.12- .31
Lithium	.089			******				.006- .427
Molybdenum	.93			*********				.20- 1.43
Phosphorus	114		*******	*				94- 180
Selenium	.34			*				.20- .58
Nickel	5			****				3- 8
Vanadium	.27			**********				.09- .26

ADDITIONAL MINERAL LEVELS

Aluminum	43031			****				36404-55976
Strontium	14.1			**********				.7- 6.7
Barium	2.6			**********				.3- 3.5
Boron	.9	**********		*				1.8- 4.0
Gold								
Silver	.25			*				.10- .56
Tin	THIS ELEMENT TEMPORARILY UNREADABLE					******		2- 16
Antimony								
Tungsten								
Zirconium	.16		**********					.12- .66

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	LEVEL (mg% or mg/gm)	ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	1	* 10		
Arsenic	.4	* 7.0		
Mercury	.3	* 2.5		
Cadmium	.1	** 1.0		
Aluminum	4	*** 15		
Nickel	.5	*** 2.2		
Beryllium	.015	***** .04		
TOTAL TOXICS		**********		

RACE: CAUCASIAN | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: PURIFIED

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	24	4- 20
Ca/P	14.3	2.5- 7.0
Ca/K	13.8	2.5- 6.5
Na/K	293	40- 90
Ca+Mg/P+K	19265	800- 1900
Ca/P	14.8	1.5- 6.0
Na/K	2.9	1.5- 4.0
Zn/Cu	25	3- 11
Ca/Na	13.3	4.0- 12.0
Fe/Cu	1.5	1.2- 3.5
Ca/Fe	65	15- 40
Zn/Fe	55	40- 1000
Ca/Mn	743	300- 3600
Fe/Mn	1.1	.2- 2.0
Ca/Cr	1735	100- 2400
Ca/Co	27.8	20.0-350.0

Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

PATIENT: | AGE: 33 SEX: M
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY ACCT: 17532
LAB NO: 89082-003 DATE IN: 03/23/89 DATE OUT: 03/24/89
DATE SAMPLED: 03/16/89 SHAMPOO: KISS MY FACE SAMPLE SIZE: .360
OFFICE CODE: A-02NO7D HAIR COLOR: BROWN SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

NUTRIENT MINERAL	LEVEL	LOW ◆ REFERENCE RANGE ◆ HIGH					NUMERICAL VALUE OF REFERENCE RANGE
		TWO STANDARD DEVIATIONS BELOW	ONE STANDARD DEVIATION (STD) BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE	TWO STANDARD DEVIATIONS ABOVE	
Calcium	1478				**********	**********	325- 934
Magnesium	91				**********		20- 115
Sodium	21		**********				17- 87
Potassium	6	**********	**********				9- 39
Copper	47				**********	**********	9- 32
Zinc	171				**********		103- 183
Iron	8			**			5- 14
Manganese	.50			*******			.19- .72
Chromium	.50	**********	**********				.61- 1.39
Cobalt	.08	**********	**********				.12- .31
Lithium	.045			**			.006- .427
Molybdenum	1.11				**********		.20- 1.43
Phosphorus	150				******		108- 176
Selenium	.55				**********		.20- .58
Silicon	6				*******		3- 5
Vanadium	.27				**********	**********	.08- .25

ADDITIVE MINERAL LEVELS

Aluminum	43946			**			36404-55976
Strontium	7.0				**********	**********	.4- 4.8
Barium	2.3				**********	**********	.2- 1.3
Boron	1.1	**********	**********				1.8- 4.0
Gold							
Silver	.15			*****			.03- .42
Tin	THIS ELEMENT TEMPORARILY UNREADABLE					******	1- 9
Antimony							
Tungsten							
Zirconium	.05	**********	**********				.09- .47

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	LEVEL	HIGH →			
			ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	4	*****	10		
Arsenic	.5	*	7.0		
Mercury	.3	**	2.5		
Cadmium	<.1	*	1.0		
Aluminum	15	**********	15		
Nickel	.5	***	2.2		
Beryllium	.011	***	.04		
TOTAL TOXICS		**********			

RACE: CAUCASIAN | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS: HENNA
DRINKING WATER SOURCE: BOTTLED/SPRING

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/K	16	4- 20
Ca/Mg	8.3	2.5- 7.0
Na/K	9.3	2.8- 5.1
Zn/Cu	170	40- 90
Ca+Mg/Na+K	293	800- 1900
Ca/P	13.7	1.5- 6.0
Ca/Na	3.2	1.5- 4.0
Ca/K	25	3- 11
Mg/K	3.5	3.0- 12.0
Na/Mg	5.4	1.2- 3.5
Ca/Mg	17	15- 40
Ca+Mg/K+Na	565	300- 700
Ca+Mg+Na+K	2014	300- 3600
Ca/Cu	1.3	.2- 2.0
Ca+Mg/P	356	100- 1900
Na/K	9.3	20.0-360.0

Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA Inc.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: AGE: SEX:
DOCTOR: ACCT:
LAB NO: DATE IN: DATE OUT:

DATE SAMPLED: SHAMPOO: SAMPLE SIZE:
ICE CODE: HAIR COLOR: SAMPLE TYPE:

PHYSICIAN'S COPY

Nutrient Mineral Levels

		LOW ◆ REFERENCE RANGE ● HIGH	NUMERICAL VALUE OF REFERENCE ◆ RANGE ●
		BELOW 2 STD. DEV. / TWO STANDARD DEVIATIONS BELOW / ONE STANDARD DEVIATION (STD) BELOW / MEAN / ONE STANDARD DEVIATION (STD) ABOVE / TWO STANDARD DEVIATIONS ABOVE / ABOVE 2 STD DEV.	
	1		0 - 1
	33		20 - 115
	1		17 - 37
	4		3 - 30
			13 - 50
	354		104 - 131
	3		6 - 17
	.0		.14 - .35
	.5		.1 - 1.3
	.17		.1 - .31
	.06		.006 - .427
	.00		.20 - 1.43
	13		9 - 15
	.32		.2 - .5
			-
	.6		.39 - .2

ADDITIONAL MINERAL LEVELS

				4 - 55
	1.			.7 - 4.7
	.			. - 3.
	.			1. - 4.
	.1			.10 - .56
	THIS ELEMENT TEMPORARILY UNAVAILABLE		******	2 - 1
	.			.1 - .5

SPACE SCHAFER, PH.D., DIRECTOR

Toxic Mineral Levels

		HIGH		
		ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
	1			
	1.			
	.			
	.1			
	.			
	.01			
TOTAL TOXICS				

RACE: SAUCASIAN SAMPLE CONDITION:
HAIR PREPARATIONS:
DRINKING WATER SOURCE:

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg		-
Ca/Zn	1	2. - 7.
	1 .	2.5 - 4.5
Ca/Fe		4 -
Ca/Mn		-
Mg/K		. - .
Na/K	.	. - .
Zn/K	1	3 - 11
Zn/Cu		4. - 12.
Zn/Fe	1.	1. - 3.
Fe/Mn		1 - 4
Cu/Cd		3 -
Zn/Cd	1	300 -
Ca/Mg	1.	. - 2.
Cu/Pb		1 -
P/Al	.	. - .

Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: [illegible] AGE: [illegible] SEX: [illegible]
DOCTOR: [illegible] ACCT: [illegible]
LAB NO: [illegible] DATE IN: [illegible] DATE OUT: [illegible]
DATE SAMPLED: [illegible] SHAMPOO: [illegible] SAMPLE SIZE: [illegible]
ICE CODE: [illegible] HAIR COLOR: [illegible] SAMPLE TYPE: [illegible]

Nutrient Mineral Levels

	LOW ◆ REFERENCE RANGE ◆ HIGH						NUMERICAL VALUE OF REFERENCE RANGE
	BELOW 2 STD. DEV	TWO STANDARD DEVIATIONS BELOW	ONE STANDARD DEVIATION (STD) BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE	TWO STANDARD DEVIATIONS ABOVE	ABOVE 2 STD. DEV
Calcium							
Magnesium							
Sodium							
Potassium							
Copper							
Zinc							
Iron							
Manganese							
Chromium							
Cobalt							
Lithium							
Molybdenum							
Phosphorus							
Selenium							
Silicon							
Vanadium							

ADDITIONAL MINERAL LEVELS

Antimony							
Beryllium							
Barium							
Boron							
Gold							
Silver							
Tin							
Strontium							
Tungsten							
Zirconium							

GRACE OCHOA, PH.D. DIRECTOR

Toxic Mineral Levels

	HIGH		
	ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Aluminum			
Arsenic			
Mercury			
Nickel			
Platinum			
Lead			
Beryllium			

TOTAL TOXICS
RACE: [illegible] SAMPLE CONDITION:
HAIR PREPARATIONS:
DRINKING WATER SOURCE:

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg		
Ca/Mn		
Ca/P		
Ca/Fe		
Ca/Mn		
Mg/K		
Na/K		
Zn/K		
Zn/Cu		
Cu/Fe		
Fe/Mn		
Ca/Cd		
Zn/Cd		
Se/Hg		
Ca/Pb		
Pb/Al		

Lab Procedures According to ASETL Protocol

PHYSICIAN'S COPY

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

MINERAL ANALYSIS REPORT

PATIENT: DOMINGUEZ CARMEN | AGE: 33 | SEX: F
DOCTOR: NEUROTHERAPEUTIC SERVICES/MOREY | ACCT: 17530
LAB NO: 88159-003 | DATE IN: 06/07/88 | DATE OUT: 06/11/88
DATE SAMPLED: 06/01/88 | SHAMPOO: AVON | SAMPLE SIZE: .500
OFFICE CODE: A-02NO/D | HAIR COLOR: BLACK | SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

NUTRIENT MINERAL	PATIENT LEVEL (parts per million)	LOW ◆ REFERENCE RANGE ◆ HIGH	NUMERICAL VALUE OF REFERENCE RANGE
Calcium	845		309- 1203
Magnesium	25		80- 115
Sodium	22		17- 87
Copper	10		13- 53
Zinc	161		104- 191
Iron	3		6- 17
Manganese	.08		.14- .95
Chromium	.34		.61- 1.39
Cobalt	.06		.12- .31
Lithium	.009		.006- .427
Molybdenum	.83		.20- 1.43
Phosphorus	122		94- 180
Selenium	.27		.20- .53
Silicon	2		3- 9
Vanadium	.06		.09- .26

ADDITIONAL MINERAL LEVELS

Sulfur	41621		35404-55976
Strontium	4.2		.7- 6.7
Barium	2.9		.3- 3.5
Boron	2.1		1.8- 4.0
Gold			
Silver	.17		.10- .56
Tin	5		2- 16
Antimony			
Tungsten			
Zirconium	.05		.12- .66

JOHN P. BEDERKA JR., PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	HIGH → ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	2	10		
Arsenic	3.4	7.0		
Mercury	.2	2.5		
Cadmium	.4	1.0		
Aluminum	3	15		
Nickel	.3	2.2		
Beryllium	.007	.04		
TOTAL TOXICS				

RACE: HISPANIC | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: WELL

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	33	6- 15
Ca/Zn	4.6	3.1- 7.4
Ca/P	6.8	3.3- 7.6
Ca/Fe	95	39- 91
Ca/Mn	10469	823- 1922
Mg/K	4.8	1.6- 3.7
Zn/K	4.2	1.2- 2.9
Fe/K	34	3- 8
Zn/Cu	17.5	2.7- 6.2
Cu/Fe	1.1	1.6- 3.8
Fe/Mn	109	12- 29
Cu/Cd	22	19- 100
Zn/Cd	402	85- 1000
Se/Hg	1.1	- 10.0
Ca/Pb	377	45- 1000
P/Al	32.3	5.5-100.0

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

PATIENT: | AGE: 50 | SEX: F
DOCTOR: NEUROTHRAPEUTIC SERVICES/MCREY | ACCT: 17532
LAB NO: 88156-0024 | DATE IN: 06/04/88 | DATE OUT: 06/10/88
DATE SAMPLED: | SHAMPOO: FINESSE | SAMPLE SIZE: .500
CE CODE: A-02NO/D | HAIR COLOR: BLACK | SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

NUTRIENT MINERAL	PATIENT LEVEL (parts per million)	LOW ◆ REFERENCE RANGE ◆ HIGH	NUMERICAL VALUE OF REFERENCE RANGE
[illegible]	1413	MEAN ********** ABOVE **********	309- 1203
Magnesium	53	MEAN *** ABOVE	20- 115
Sodium	16	TWO STANDARD DEVIATIONS BELOW **********	17- 87
[illegible]	6	TWO STANDARD DEVIATIONS BELOW **********	9- 39
Copper	14	ONE STANDARD DEVIATION (STD) BELOW **********	13- 50
Zinc	184	MEAN ********** ABOVE **********	104- 181
Iron	6	ONE STANDARD DEVIATION (STD) BELOW **********	6- 17
Manganese	.07	TWO STANDARD DEVIATIONS BELOW **********	.14- .95
[illegible]	.35	TWO STANDARD DEVIATIONS BELOW **********	.61- 1.39
[illegible]	.06	TWO STANDARD DEVIATIONS BELOW **********	.12- .31
Lithium	.010	ONE STANDARD DEVIATION (STD) BELOW **********	.006- .427
Molybdenum	.86	MEAN ********* ABOVE	.20- 1.43
Phosphorus	101	ONE STANDARD DEVIATION (STD) BELOW **********	94- 180
Selenium	.26	ONE STANDARD DEVIATION (STD) BELOW ********	.20- .58
Silicon	4	ONE STANDARD DEVIATION (STD) BELOW *****	3- 6
[illegible]	.06	TWO STANDARD DEVIATIONS BELOW **********	.09- .26

ADDITIONAL MINERAL LEVELS

[illegible]fur	42284	ONE STANDARD DEVIATION (STD) BELOW *****	36404-55976
Strontium	3.4	MEAN ******* ABOVE	.7- 6.7
Barium	1.6	MEAN ******* ABOVE	.3- 3.5
Boron	2.4	ONE STANDARD DEVIATION (STD) BELOW *****	1.8- 4.0
Gold			
Silver	.03	TWO STANDARD DEVIATIONS BELOW **********	.10- .56
Tin	4	ONE STANDARD DEVIATION (STD) BELOW *****	2- 16
Antimony			
Tungsten			
Zirconium	.05	TWO STANDARD DEVIATIONS BELOW **********	.12- .66

JOHN P. BEDERKA JR., PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	→ HIGH: ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN →	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	< 1	* 10		
Arsenic	.4	* 7.0		
Mercury	.2	* 2.5		
Cadmium	<.1	* 1.0		
Aluminum	3	*** 15		
[illegible]ckel	.3	** 2.2		
[illegible]ryllium	.008	** .04		
TOTAL TOXICS		*******		

RACE: HISPANIC | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: CITY

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	26	6- 15
Ca/Zn	7.6	3.1- 7.4
Ca/P	13.9	3.3- 7.6
Ca/Fe	230	39- 91
Ca/Mn	8592	823- 1922
Mg/K	8.7	1.6- 3.7
Na/K	2.6	1.2- 2.9
Zn/K	30	3- 8
Ca/Cu	12.7	2.7- 6.2
Ca/Fe	2.3	1.6- 3.8
Fe/Mn	80	12- 29
Cu/Cd	240	19- 100
Zn/Cd	3079	85- 1000
Na/Mg	1.0	- 10.0
Ca/Pb	2509	45- 1000
P/Al	30.0	5.5-100.0

Lab Procedures According to ASETL Protocol

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

PATIENT: [illegible] AGE: [illegible] SEX: [illegible]
DOCTOR: [illegible] ACCT: [illegible]
LAB NO: [illegible] DATE IN: [illegible] DATE OUT: [illegible]

DATE SAMPLED: [illegible] SHAMPOO: [illegible] SAMPLE SIZE: [illegible]
ICE CODE: [illegible] HAIR COLOR: [illegible] SAMPLE TYPE: [illegible]

Nutrient Mineral Levels

NUTRIENT MINERAL	PATIENT LEVEL (parts per million)	LOW ◆ REFERENCE RANGE ◆ HIGH	NUMERICAL VALUE OF REFERENCE RANGE
		BELOW 2 STD DEV · TWO STANDARD DEVIATIONS BELOW · ONE STANDARD DEVIATION (STD) BELOW · MEAN · ONE STANDARD DEVIATION (STD) ABOVE · TWO STANDARD DEVIATIONS ABOVE · ABOVE 2 STD DEV	
Calcium	[illegible]	[illegible]	[illegible]
Magnesium	[illegible]	[illegible]	[illegible]
Sodium	[illegible]	[illegible]	[illegible]
Potassium	[illegible]	[illegible]	[illegible]
Copper	[illegible]	PERM [illegible]	[illegible]
Zinc	[illegible]	[illegible]	[illegible]
Iron	[illegible]	[illegible]	[illegible]
Manganese	[illegible]	[illegible]	[illegible]
Chromium	[illegible]	[illegible]	[illegible]
Cobalt	[illegible]	[illegible]	[illegible]
Lithium	[illegible]	[illegible]	[illegible]
Molybdenum	[illegible]	[illegible]	[illegible]
Phosphorus	[illegible]	[illegible]	[illegible]
Selenium	[illegible]	[illegible]	[illegible]
Silicon	[illegible]	[illegible]	[illegible]
Vanadium	[illegible]	[illegible]	[illegible]

ADDITIONAL MINERAL LEVELS

ur	[illegible]	[illegible]	[illegible]
Strontium	[illegible]	[illegible]	[illegible]
Barium	[illegible]	[illegible]	[illegible]
Boron	[illegible]	[illegible]	[illegible]
Gold			
Silver	[illegible]	[illegible]	[illegible]
Tin		[illegible]	[illegible]
Antimony			
Tungsten			
Zirconium	[illegible]	[illegible]	[illegible]

SPACE SCHAAP, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	HIGH: ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	[illegible]	[illegible]		
Arsenic	[illegible]	[illegible]		
Mercury	[illegible]	[illegible]		
Cadmium	[illegible]	[illegible]		
Aluminum	[illegible]	[illegible]		
Nickel	[illegible]	[illegible]		
yllium	[illegible]	[illegible]		
TOTAL TOXICS		[illegible]		

RACE: [illegible] SAMPLE CONDITION: [illegible]
HAIR PREPARATIONS: [illegible]
DRINKING WATER SOURCE: [illegible]

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	[illegible]	[illegible]
Ca/Zn	11.1	[illegible]
Ca/P	[illegible]	[illegible]
Ca/Fe	[illegible]	[illegible]
Ca/Mn	[illegible]	[illegible]
Mg/K	[illegible]	[illegible]
Na/K	[illegible]	[illegible]
Zn/K	[illegible]	[illegible]
Zn/Cu	[illegible]	[illegible]
Zn/Fe	[illegible]	[illegible]
Fe/Mn	[illegible]	[illegible]
Ca/Cd	[illegible]	[illegible]
Se/Cd	[illegible]	[illegible]
Se/Hg	[illegible]	[illegible]
Ca/Pb	[illegible]	[illegible]
P/Al	[illegible]	[illegible]

Lab Procedures According to ASETL Protocol

PHYSICIAN'S COPY

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: [illegible] AGE: [illegible] SEX: [illegible]
DOCTOR: [illegible] ACCT: [illegible]
LAB NO: [illegible] DATE IN: [illegible] DATE OUT: [illegible]

DATE SAMPLED: [illegible] SHAMPOO: [illegible] SAMPLE SIZE: [illegible]
CE CODE: [illegible] HAIR COLOR: [illegible] SAMPLE TYPE: [illegible]

Nutrient Mineral Levels

			LOW ◆ REFERENCE RANGE ● HIGH						NUMERICAL VALUE OF REFERENCE RANGE
			BELOW 2 STD. DEV.	TWO STANDARD DEVIATIONS BELOW	ONE STANDARD DEVIATION (STD) BELOW	MEAN	ONE STANDARD DEVIATION (STD) ABOVE	TWO STANDARD DEVIATIONS ABOVE	ABOVE 2 STD. DEV.
Calcium	11								117 - 327
Magnesium	1								1 - 3
Sodium	1								30 - 70
Potassium									11 - 3
Copper	31								5 - 14
Zinc	112								20 - 151
Iron	1								1 - 21
Manganese	.21								.15 - .5
Chromium	.3								.11 - 1.30
Cobalt	.02								.12 - .31
Lithium	.11								.2 - .427
Molybdenum	.								.3 - 1.4
Phosphorus									11 - 14
Selenium	.								.20 - .5
Silicon									- 6
Vanadium	.								. - .

ADDITIONAL MINERAL LEVELS

Nickel									[illegible]
Strontium	.								. - 1.
Tin									. - .
Boron	.								. - 4.
Gold									
Silver	.								. - .
Tin	TOO LOW TO DETECT								-
Antimony									
Tungsten									
Zirconium	.								.1 - .4

[illegible]

Toxic Mineral Levels

TOXIC MINERAL	[illegible]		HIGH		
			ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead					
Arsenic	1.				
Mercury	.				
Cadmium	.				
Aluminum	1.				
Nickel	.				
Beryllium	.				

TOTAL TOXICS

RACE: [illegible] SAMPLE CONDITION: [illegible]
HAIR PREPARATIONS: [illegible]
DRINKING WATER SOURCE: [illegible]

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	2	5 - 12
Fe/Zn	.	1.1 - .
Ca/P	5.	1. - 2.5
Cu/Fe		1. - 1.
Ca/Mn	1	21 - 7
Na/K	1.	. - 1.
Na/K	1.	1.1 - 2.
Zn/K	11	- 4
Zn/Cu	2.	5. - 15.
Cu/Fe	.	. - .
Fe/Mn		2 - 5
Ca/Cd	1.	3 - 70
Zn/Cd		-
Se/Hg	.	. - .
Cu/Pb	2	1 - 1
P/Al	.	. - .

Lab Procedures According to ASETL Protocol

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West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

MINERAL ANALYSIS REPORT

PATIENT: [illegible] **AGE:** 4[illegible] **SEX:** M
DOCTOR: [illegible]/[illegible] **ACCT:** 175[illegible]
LAB NO: [illegible]-[illegible]1 **DATE IN:** 04/[illegible]/[illegible] **DATE OUT:** 04/[illegible]/[illegible]
DATE SAMPLED: 04/[illegible]1/[illegible] **SHAMPOO:** [illegible] CLEAN **SAMPLE SIZE:** .[illegible]
[illegible]CE CODE: A[illegible]/[illegible] **HAIR COLOR:** [illegible] **SAMPLE TYPE:** HEAD HAIR

Nutrient Mineral Levels

LOW ◆ REFERENCE RANGE ● HIGH

(Chart columns: Below 2 Std. Dev. · Two Standard Deviations Below · One Standard Deviation (STD) Below · Mean · One Standard Deviation (STD) Above · Two Standard Deviations Above · Above 2 Std. Dev.)

Nutrient Mineral	Level	Numerical Value of Reference Range ◆ Range ●
Calcium	1[illegible]12	[illegible]–[illegible]34
Magnesium	4[illegible]	2[illegible]–115
Sodium	1[illegible]	17–[illegible]7
Potassium	1[illegible]	9–[illegible]
Copper	1	[illegible]–3[illegible]
Zinc	[illegible]	10[illegible]–1[illegible]
Iron	[illegible]	[illegible]–14
Manganese	.1	.1[illegible]–.7[illegible]
Chromium	.[illegible]	.[illegible]1–1.3[illegible]
Cobalt	.[illegible]1	.1[illegible]–.31
Lithium	.[illegible]	.0[illegible]–.[illegible]2[illegible]
Molybdenum	.[illegible]	.[illegible]–1.4[illegible]
Phosphorus	1[illegible]	10[illegible]–17[illegible]
Selenium	.[illegible]	.[illegible]–.5
Silicon	[illegible]	[illegible]–[illegible]
Vanadium	.[illegible]	.[illegible]–.2[illegible]

ADDITIONAL MINERAL LEVELS

Mineral	Level	Numerical Value of Reference Range
Sulfur	1[illegible]	[illegible]540[illegible]–5[illegible]776
Strontium	.[illegible]	.[illegible]–4.
Barium	1.	.[illegible]–1.[illegible]
Boron	.	1.[illegible]–4.0
Gold		
Silver	.	.0[illegible]–.[illegible]
Tin	THIS ELEMENT TEMPORARILY UNAVAILABLE	1–9
Antimony		
Tungsten		
Zirconium	.[illegible]	.[illegible]–.47

GRACE SCHAAP, PH.D. DIRECTOR

Toxic Mineral Levels

Toxic Mineral	Level		One Standard Deviation Above Mean	Two Standard Deviations Above Mean	More Than Two Standard Deviations Above Mean
Lead	[illegible]		1		
Arsenic	1.		[illegible].		
Mercury	.		.		
Cadmium	.		1.		
Aluminum	[illegible]				
Nickel	.		.		
Beryllium	.		.		

TOTAL TOXICS

RACE: [illegible] SAMPLE CONDITION: [illegible]
HAIR PREPARATIONS: [illegible]
DRINKING WATER SOURCE: [illegible]

Mineral Ratios

Ratio	Level	Reference Range
Ca/Mg	41	[illegible]–2[illegible]
[illegible]/Zn	12.4	2.[illegible]–7.[illegible]
[illegible]	1[illegible].[illegible]	2.6–[illegible].1
[illegible]/Fe	[illegible]11	[illegible]–[illegible]0
Ca/Mn	11[illegible]	80–1[illegible]0[illegible]
[illegible]/K	[illegible].5	1.5–[illegible].0
Na/K	1.4	1.–4.[illegible]
[illegible]/K	1	[illegible]–11
[illegible]/Cu	[illegible].1	4.[illegible]–12.[illegible]
[illegible]	.	1.2–3.5
[illegible]/Mn	[illegible]	15–4[illegible]
[illegible]/Cd	[illegible]	[illegible]–200
Zn/Cd	[illegible]	[illegible]–[illegible]
[illegible]/Hg	[illegible].[illegible]	.[illegible]–[illegible].[illegible]
[illegible]/Pb	1[illegible]	10–1[illegible]
[illegible]/Al	[illegible].[illegible]	[illegible].[illegible]–[illegible].[illegible]

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois: 312/231-3649

MINERAL ANALYSIS REPORT

PATIENT: _____ AGE: 36 SEX: M
DOCTOR: NEUROTHERAP UTIC SERVICES/MOREY ACCT: 17532
LAB NO: 89006-0033 DATE IN: 01/06/89 DATE OUT: 01/18/89
DATE SAMPLED: 12/30/88 SHAMPOO: GENERIC SAMPLE SIZE: .500
CE CODE: A-02N07D HAIR COLOR: GRAY SAMPLE TYPE: HEAD HAIR

PHYSICIAN'S COPY

Nutrient Mineral Levels

NUTRIENT MINERAL	LEVEL	LOW: ABOVE 2 STD. DEV.	LOW: TWO STANDARD DEVIATIONS BELOW	LOW: ONE STANDARD DEVIATION (STD) BELOW	MEAN	HIGH: ONE STANDARD DEVIATION (STD) ABOVE	HIGH: TWO STANDARD DEVIATIONS ABOVE	HIGH: ABOVE 2 STD. DEV.	CLINICAL VALUE OF REFERENCE RANGE
Calcium	819				**	**********			325- 954
Magnesium	30			********	*				20- 115
Sodium	44				**	**			17- 87
Potassium	2	*	********	**********	*				9- 39
Copper	15			***	*				9- 32
Zinc	157				**	*******			103- 183
Iron	3		****	**********	*				5- 14
Manganese	.08	*	********	**********	*				.19- .72
Chromium	.36	*	********	**********	*				.61- 1.39
Cobalt	.06	*	********	**********	*				.12- .31
Lithium	.010			**********	*				.006- .427
Molybdenum	.00				**	*****			.20- 1.43
Phosphorus	143				**	*			108- 173
Selenium	.26			*******	*				.20- .58
Silicon	2		**********		*				3- 8
Vanadium	.02		**********						.08- .25

ADDITIONAL MINERAL LEVELS

	LEVEL								
Air	40670			*******	*				36404-55976
Strontium	2.1				**	*****			.4- 4.8
Barium	2.4				**	**********	*****		.2- 1.8
Boron	.9	*	**********	**********	*				1.2- 4.0
Gold									
Silver	.03	*	********	**********	*				.08- .42
Tin	7				**	********			1- 9
Antimony									
Tungsten									
Zirconium	.04	*	********	**********	*				.08- .47

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	LEVEL		ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN → HIGH	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	< 1	*	10		
Arsenic	.7	*	7.0		
Mercury	.2	*	2.5		
Cadmium	.4	*****	1.0		
Aluminum	< 1	*	15		
Nickel	.2	**	2.2		
Beryllium	.008	**	.04		
TOTAL TOXICS		*********			

RACE: CAUCASIAN SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: BOTTLED/SPRING

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	26	4- 20
Ca/K	5.1	2.5- 7.0
Na/K	5.	2.6- 6.1
Ca+Mg/K+Na	153	40- 90
Ca*Mg/K*Na	9635	800- 1900
Ca/P	10.8	1.5- 6.0
Mg/P	15.8	1.5- 4.0
Ca+Mg/P	55	3- 11
Na/P	10.1	4.0- 12.0
K/P	2.9	1.2- 3.5
Ca+Mg+Na+K/P	62	15- 40
Ca*Mg*Na*K/P	35	30- 700
Ca+Mg+Na+K	362	300- 3500
Na/K	1.0	.2- 2.0
Ca*Mg	2047	100- 1900
Ca+Mg	67.4	20.0-360.0

Lab Procedures According to ASETL Protocol
Laboratory Work Performed By Doctor's Data Laboratories, Inc. CDC License No. 12104 IL License No. 13789

MINERAL ANALYSIS REPORT

DOCTOR'S DATA INC.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: | AGE: 33 | SEX: F
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY | ACCT: 17532
LAB NO: 88137-0101 | DATE IN: 05/16/88 | DATE OUT: 05/23/88
DATE SAMPLED: 05/11/88 | SHAMPOO: SHACKLEY PROTEIN | SAMPLE SIZE: .500
ICE CODE: A-02NO/D | HAIR COLOR: BROWN | SAMPLE TYPE: HEAD HAIR

Nutrient Mineral Levels

NUTRIENT MINERAL	PATIENT LEVEL (parts per million)	LOW ◆ REFERENCE RANGE ◆ HIGH	NUMERICAL VALUE OF REFERENCE RANGE
Calcium	2353	**********	309- 1203
Magnesium	37	*****	20- 115
Sodium	16	**********	17- 87
Potassium	6	**********	9- 39
Copper	10	**********	13- 50
Zinc	135	**	104- 181
Iron	6	**********	6- 17
Manganese	.11	**********	.14- .95
Chromium	.76	********	.61- 1.39
Cobalt	.13	**********	.12- .31
Lithium	.074	****	.006- .427
Molybdenum	.83	*******	.20- 1.43
Phosphorus	108	**********	94- 180
Selenium	2.73	**********	.20- .58
Silicon	1	**********	3- 8
Vanadium	.23	**********	.09- .26

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ADDITIONAL MINERAL LEVELS

Sulfur	36056	**********	36404-55976
Strontium	5.0	**********	.7- 6.7
Barium	8.2	**********	.3- 3.5
Boron	.8	**********	1.8- 4.0
Gold			
Silver	.03	**********	.10- .56
Tin	10	*********	2- 16
Antimony			
Tungsten			
Zirconium	.46	**********	.12- .66

JOHN P. BEDERKA JR., PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN (HIGH)
Lead	2	*** 10		
Arsenic	1.3	** 7.0		
Mercury	.7	*** 2.5		
Cadmium	<.1	* 1.0		
Aluminum	6	***** 15		
Nickel	.7	**** 2.2		
Beryllium	.016	***** .04		
TOTAL TOXICS		**********		

RACE: CAUCASIAN | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS:
DRINKING WATER SOURCE: BOTTLED/SPRING

Mineral Ratios

	LEVEL	REFERENCE RANGE
Ca/Mg	62	6- 15
Ca/K	17.3	3.1- 7.4
Ca/P	21.6	3.3- 7.6
Ca/Fe	350	39- 91
Ca/Na	20285	823- 1922
Na/K	6.2	1.6- 3.7
Na/P	2.6	1.2- 2.9
Na/Fe	22	3- 8
K/Mg	13.5	2.7- 6.2
K/P	1.4	1.6- 3.8
K/Fe	57	12- 29
Zn/Cu	108	19- 100
Zn/Cd	1476	85- 1000
Cu/Mg	3.8	- 10.0
Cu/Fe	949	45- 1000
P/N	16.8	5.5-100.0

Procedures According to ASETL Protocol
Laboratory Work Performed By Doctor's Data Laboratories, Inc. CDC License No. 12104 IL License No. 13789

MINERAL ANALYSIS REPORT

DOCTOR'S DATA Inc.
P.O. Box 111 30W101 Roosevelt Rd.
West Chicago, IL 60185 U.S.A.
800/323-2784
In Illinois:
312/231-3649

PATIENT: | AGE: 32 | SEX: F
DOCTOR: NEUROTHRAPEUTIC SERVICES/MOREY | ACCT: 17532
LAB NO: 83165-009 | DATE IN: 06/13/88 | DATE OUT: 06/20/88

DATE SAMPLED: 06/08/88 | SHAMPOO: | SAMPLE SIZE: .400
CE CODE: AR02NO/D | HAIR COLOR: BROWN | SAMPLE TYPE: PUBIC HAIR

Nutrient Mineral Levels

NUTRIENT MINERAL	PATIENT LEVEL (parts per million)	LOW ◆ REFERENCE RANGE ◆ HIGH	NUMERICAL VALUE OF REFERENCE RANGE
		TWO STANDARD DEVIATIONS BELOW ← | ONE STANDARD DEVIATION (STD) BELOW ← | MEAN | ONE STANDARD DEVIATION (STD) ABOVE → | TWO STANDARD DEVIATIONS ABOVE →	
Calcium	977	**********	309- 1203
Magnesium	74	********	20- 115
Sodium	115	**********	17- 87
Potassium	30	*********	9- 39
Copper	8	**********	1?- 50
Zinc	137	*	104- 181
Iron	7	********	6- 17
Manganese	.22	*********	.14- .95
Chromium	.45	**********	.61- 1.39
Cobalt	.07	**********	.12- .31
Lithium	.025	*******	.006- .427
Molybdenum	1.00	*********	.20- 1.43
Phosphorus	220	**********	94- 180
Selenium	.40	******	.20- .59
Silicon	3	*********	3- 8
Vanadium	.08	**********	.09- .26

ADDITIONAL MINERAL LEVELS

[illegible]	36875	**********	36404-55976
Strontium	8.0	**********	.7- 6.7
Barium	7.2	**********	.3- 3.5
Boron	5.8	**********	1.8- 4.0
Gold			
Silver	.04	**********	.10- .56
Tin	< 1	**********	2- 16
Antimony			
Tungsten			
Zirconium	.05	**********	.12- .66

GRACE SCHAAR, PH.D. DIRECTOR

Toxic Mineral Levels

TOXIC MINERAL	PATIENT LEVEL (parts per million)	HIGH →	ONE STANDARD DEVIATION ABOVE MEAN	TWO STANDARD DEVIATIONS ABOVE MEAN →	MORE THAN TWO STANDARD DEVIATIONS ABOVE MEAN
Lead	< 1	*	10		
Arsenic	.5	*	7.0		
Mercury	.3	**	2.5		
Cadmium	<.1	*	1.0		
Aluminum	6	*****	15		
Nickel	.3	**	2.2		
[illegible]ilium	.010	***	.04		
TOTAL TOXICS		**********			

RACE: HISPANIC | SAMPLE CONDITION: NOT SPECIFIED
HAIR PREPARATIONS: PERM
DRINKING WATER SOURCE: DISTILLED

Mineral Ratios

	LEVEL	REFERENCE RANGE
[illegible]	13	6- 15
[illegible]/Zn	7.1	3.1- 7.4
[illegible]	4.4	3.3- 7.6
[illegible]	123	39- 91
[illegible]	4342	823- 1922
[illegible]	2.4	1.6- 3.7
[illegible]	3.7	1.2- 2.9
[illegible]	4	3- 8
[illegible]	17.0	2.7- 6.2
[illegible]	1.0	1.6- 3.8
[illegible]	35	12- 29
[illegible]	104	19- 100
[illegible]	1785	85- 1000
[illegible]	1.2	- 10.0
[illegible]	1799	45- 1000
[illegible]	34.5	5.5-100.0

Lab Procedures According to ASETL Protocol

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