

RISK COMMUNICATION WITHIN THE EM PROGRAM

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ABSTRACT

The U.S. Department of Energy Environmental Management program (EM) conducts the most extensive environmental remediation effort in the world. The annual EM budgets have exceeded \$6,000,000,000 for approximately ten years and EM has assumed responsibility for the cleanup of the largest DOE reservations (i.e., at Hanford, Washington, Aiken, South Carolina, and Idaho Falls, Idaho) as well as the facilities at Rocky Flats, Colorado and in Ohio. Each of these sites has areas of extensive radioactive and chemical contamination, numerous surplus facilities that require decontamination and removal, while some have special nuclear material that requires secure storage.

The EM program has been criticized for being ineffective (1) and has been repeatedly reorganized to address perceived shortcomings. The most recent reorganization was announced in 2001 to become effective at the beginning of the 2003 Federal Fiscal Year (i.e., October 2002). It was preceded by a “top to bottom” review (TTBR) of the program (2) that identified several deficiencies that were to be corrected as a result of the reorganization.

One prominent outcome of the TTBR was the identification of “risk reduction” as an organizing principle to prioritize the activities of the new EM program. The new program also sought to accelerate progress by identifying a set of critical activities at each site that could be accelerated and result in more rapid site closure, with attendant risk, cost, and schedule benefits. This paper investigates how the new emphasis on risk reduction in the EM program has been communicated to EM stakeholders and regulators. It focuses on the Rocky Flats Environmental Technology Site (RFETS) as a case study and finds that there is little evidence for a new emphasis on risk reduction in EM communications with RFETS stakeholders. Discussions between DOE and RFETS stakeholders often refer to “risk,” but the word serves as a placeholder for other concepts. Thus “risk” communication at RFETS is lively and involves important issues, but often does not inform participants about true “risk reduction.”

INTRODUCTION

THE “TOP-TO-BOTTOM” REVIEW OF THE ENVIRONMENTAL MANAGEMENT PROGRAM

The “Top-To-Bottom Review Team” (members unidentified) presented the results of its review of the Environmental Management Program to the Assistant Secretary for Environmental Management (J. Roberson) on February 4, 2002. The report noted (3) a “... systemic problem with the way EM has conducted its activities: the EM program’s major emphasis has been on managing risk, rather than actually reducing risk to workers, the public, and the environment.

Since the program's inception in 1989, more than \$60 billion has been spent without a corresponding reduction in actual risk."

The TTBR reported four major findings (4):

- The manner in which EM develops, solicits, selects, and manages many contracts is not focused on accelerating risk reduction and applying innovative approaches to doing the work.*
- EM's cleanup strategy is not based on comprehensive, coherent, technically supported risk prioritization.*
- EM's internal business processes are not structured to support accelerated risk reduction or to address its current challenge of uncontrolled cost and schedule growth.*
- The current scope of the EM program includes activities that are not focused on or supportive of an accelerated, risk-based cleanup and closure mission.*

The review team report contained four recommendations (5) "...designed to focus the program on one result—reducing risk to public health, workers, and the environment on an accelerated basis." The recommendations (6) were:

- Improve DOE's Contract Management.*
- Move EM to an Accelerated, Risk-Based Cleanup Strategy.*
- Align DOE's Internal Processes to Support an Accelerated, Risk-Based Cleanup Approach.*
- Realign the EM program so its scope is consistent with an accelerated, risk-based cleanup and closure mission.*

RISK REDUCTION

It is important to understand the concept of risk and how it applies to the DOE sites that have EM activities before discussing the role of risk communication in the EM program. Generally, "risk" is a descriptor related to hazards and the probability of those hazards actually causing harm. Where hazards exist and there is no exposure to those hazards, they pose no risk of harm. In practice, the computation of worker, public health, and environmental risk is complex and accompanied by great uncertainty. For example, while the consequences of human exposure to high doses of radiation are well known (i.e., the risk of high level radiation to human health as measured in real illness or death) the consequences of human exposure to low levels of radiation are still largely unknown (7-8).

Risk has a temporal component—hazards can pose immediate or acute risks (e.g., the risk of breaking a limb as a result of slipping on an icy street) and long-range risks (e.g., the risk of dying from cancer in 2000 induced by exposure to a carcinogen in 1975) — as well as a spatial dimension (i.e., site hazards can pose risks to on-site workers, the public living near the site, and to people living far from the site (e. g., by contaminating regional water supplies)).

We note that reducing risk to public health, workers, and the environment, while laudable goals individually, may, at times, be in conflict with one another. If environmental restoration workers are exposed to immediate hazards while reducing hypothetical, long-range, environmental or

public health risks that later are shown to be insignificant, the total risk to human health from those hazards may actually increase as a result of the cleanup activities.

That Congress has not authorized, nor has the Executive Branch sought, sufficient funds to immediately correct all environmental problems caused by Federally mandated activities presents other challenges to the agencies responsible for environmental cleanup. Where resources, either financial or technical, are insufficient to restore damaged environments, choices have to be made about what work is done first and, possibly, what work is not done at all.

In the early stages of the DOE cleanup the DOE, along with other Federal agencies, met with environmental advocacy groups and other interested “stakeholders” (9) in “the Keystone Process” to discuss how to prioritize site cleanup when funds are insufficient to do everything that needs to be done. The DOE was represented by Cindy Kelly, then Director of the Office of Public Accountability (EM-5), Col. James Owendoff, then Deputy Assistant Secretary for Environmental Restoration (EM-40) and now Deputy Assistant Secretary for the Office of Science and Technology (EM-50), and James Werner, then Director of the Office of Strategic Planning & Analysis (EM-4) and later head of the Environmental Management Long Term Stewardship Program (EM-51).

After much discussion a consensus position emerged in which risk reduction was identified as only one of several factors important in prioritizing site cleanup activities. Other important factors included:

- cultural, social, and economic factors, including environmental justice considerations;
- statutory requirements and legal agreements;
- acceptability of the action to regulators, tribes, and public stakeholders.

While the TTBR identified the reduction of risk to public health, workers, and the environment as of greatest importance, “programmatic” risk also commands DOE attention. This term refers to the risk of program failure (e.g., the failure to meet cost and schedule requirements). Effective programs require that resources be available for time-critical activities when they are needed, management actions must be correctly phased, and disparate programs must be coordinated. EM’s success is, to a certain extent, dependent upon other programs. It can control certain programmatic risks by its own actions (e.g., the TTBR recommendation to “Improve DOE’s Contract Management”) whereas certain critical activities, such as the successful licensing of the high level waste repository at Yucca Mountain, are not under EM control. This paper will focus on public, environmental, and worker risk and will not explicitly address programmatic risk.

RISK METRICS

For EM to measure its progress in risk reduction it must have a measure of the risk before, during, and after program activities. Such estimates will, of necessity, include significant uncertainty and it isn’t clear that progress in risk reduction is measurable in the usual sense of the word. However, where an attempt has been made to estimate the risks from a DOE site (the “before” state), it was found that risk to the public and to the environment from site hazards were

negligible under even the most conservative of assumptions (10) and that the site risk was dominated by risks to worker health and safety from ordinary, construction-like, activities. A retrospective analysis of the DOE Uranium Mill Tailings Remedial Action (UMTRA) Project (11) concluded that worker deaths resulting from UMTRA program activities did not yield commensurate or greater reductions in public and environmental risk. The philosophy of “Do no harm” should guide agency actions— it is a poor bargain to trade the lives of workers for insignificant benefits to public health and the environment. Given the UMTRA experience as a guide, it is by no means certain that the EM program will actually result in reduced total risk at DOE sites.

DOE has operated some of its facilities for over 50 years with little evidence of significant risk to the environment and to neighboring publics. Each of the DOE nuclear material production sites (e.g., Hanford, Savannah River, INEEL) was constructed far from major population centers and had extensive land buffers between working facilities and the site boundaries. Even where there has been large-scale environmental contamination (e.g., the large tritium plume beneath the Nevada Test Site) or air releases of radioactive materials (e.g., I-131 releases at the Hanford site) it has been difficult to assert positively that these hazards have harmed public health.

It is likely that if one were to truly follow the risk reduction paradigm in the remediation of DOE sites, the best course of action would be to maintain institutional controls at the sites while pursuing an active technology development program devoted to the reduction of worker risks during remediation. Great emphasis would be placed on robotics so that workers need not enter high risk environments, better monitors of human exposure so that workers were promptly advised when hazardous materials threatened to compromise their health, better personal protective equipment so that workers could work safely in the presence of hazardous materials whenever necessary, and better monitors to track worker movements so that deadly “accidents” involving construction equipment (e.g., a back hoe) would be eliminated. Only when such technologies were available would site remediation begin. This has never been the policy of DOE with regard to the remediation of its sites. The EM organization devoted to technology development (the Office of Technology Development, later renamed the Office of Science and Technology) has never received as much as 10% of the total funding allocated to EM and little of that has been explicitly directed to the reduction of worker risk. In FY03 the DOE requested a significant budget reduction for the Office of Science and Technology, which attracted congressional attention. The Committee on Appropriations noted (12), “The Committee ... is skeptical that a robust Science and Technology program can be maintained given the \$164,000,000 cut. Long-term investment in research and development is the single most important thing the Department can do to ensure that clean-ups are completed quickly and efficiently. The solutions to many of the technical problems facing clean-up sites throughout the DOE complex have not yet been invented. Sharp cuts to science and technology are not the answer and the Committee hopes the Department will reconsider for fiscal year 2004.”

RISK COMMUNICATION

This paper is focused on risk communication, which can be more easily measured than risk reduction. Risk communication has been described (13) as: *An interactive process of exchange of*

information and opinion among individuals, groups, and institutions; often involves multiple messages about the nature of risk or expressing concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management.

An effective risk communication program requires conscious design. It features “two-way” communication and exhibits “*a spirit of open exchange in a common undertaking,*” and “*early and sustained interchange, including the media.*”

Risk messages should closely reflect the perspective, technical capacity, and concerns of the target audiences. A message should: *Emphasize information relevant to practical actions that can be taken; Be couched in clear and plain language; Respect the audience and its concerns; Seek strictly to inform the recipient, unless conditions clearly warrant the use of influencing techniques.*

Risk messages and supporting materials should not minimize the existence of uncertainty. “*Data gaps and areas of significant disagreement among experts should be disclosed. Some indication of the level of confidence of estimates and the significance of scientific uncertainty should be conveyed.*”

The Keystone Process (9) recognized that agencies involved in site remediation and the communities around those sites need to be in regular communication. The DOE has established site-specific advisory boards (SSABs) and citizens’ advisory boards (CABs) at its major sites and has made those boards one focus of its risk communication efforts. Although these boards need not conform to the Federal Advisory Committee Act, the Federal Facilities Environmental Restoration Dialogue Committee Final Report (9) does recommend that the SSABs and CABs comply with the spirit of that act in their deliberations. The CAB at RFETS, known as the Rocky Flats Citizen Advisory Board (RFCAB) has operated with great transparency for many years, publishing its minutes, recommendations, and other important documents on a publicly accessible web site. The dialog between DOE, and its RFETS contractor, and the RFCAB serves as a case study for EM risk communication in this paper.

The study of risk communication at RFETS is an interesting candidate for this analysis since the DOE in the TTBR has held up this site for particular praise. Robert Card, formerly the President and CEO of Kaiser-Hill Company, LLC, the current RFETS integrating contractor, is now Undersecretary of Energy while Jessie Roberson, the former Manager of the Rocky Flats Operations Office, now leads the Office of Environmental Management. Given these connections it is likely that RFETS will serve as a model for other DOE sites in the years ahead.

RISK COMMUNICATION AT RFETS

The current environment at RFETS supports a broad exchange of information between DOE, the public, and Kaiser-Hill, the current RFETS management and integration contractor. The RFCAB web site lists 14 different groups with a significant interest in activities at RFETS. They are subdivided into Rocky Flats-Specific Groups, which includes:

- Health Advisory Panel;
- Rocky Flats Environmental Monitoring Quarterly Exchange of Information Meeting;
- Rocky Flats Coalition of Local Governments;
- Public Participation Focus Group;
- Rocky Flats Citizens Advisory Board;
- Site Technology Coordination Group;

and public interest groups that work on Rocky Flats issues, which includes;

- American Friends Service Committee;
- Citizens Against Nuclear Disinformation in Denver;
- Colorado Coalition for the Prevention of Nuclear War;
- Environmental Information Network;
- Greenpeace;
- Physicians for Social Responsibility;
- Rocky Mountain Peace Center;
- Sierra Club.

The RFCAB archives the minutes of its regularly scheduled meetings from 2/95 to 12/02 and makes them accessible to the public via its web site (<http://www.rfcab.org/Minutes.HTML>). These minutes constitute a valuable record of public communications between the parties involved in the RFETS cleanup. This paper presents an analysis of a subset of these minutes to determine how the newly proclaimed interest in “risk” found in the TTBR recommendations was conveyed by DOE representatives to the RFETS public and how that message was received by the RFCAB membership and the general public, which has opportunities to speak at the meetings.

Four samples from the seven years of documented discussions were chosen for analysis. The 2002 meetings after the publication of the TTBR, from February 2002 through October 2002; meetings between February 1995 and October 1995; meetings between February 1997 and October 1997; and meetings between February 2000 and October 2000. Two measures were used to determine the extent of risk communication in the samples; the number of times “risk” and “hazard” were mentioned in the meeting texts—a simple numeric measure—and the relative importance accorded to risk and hazard issues in the meeting minutes—a more complex, qualitative measure. Additionally, the RFCAB site was scanned to locate other indications of the risk environment at RFETS. This was an attempt to discern how well the public appreciates “risk” concepts and illustrate its importance in communication between the community and DOE. For example, the RFCAB lists the recommendations that it made to DOE between 1994 and 2002 (<http://www.rfcab.org/Recommendations.HTML>); these are expected to indicate the RFCAB’s strongest interests.

DATA ANALYSIS

Table 1 contains simple numeric counts of words related to the concept of “risk” that appeared in the RFCAB minutes in the four years sampled. In addition, words related to secondary risk

quantifiers are also tabulated. These suggest the types of risk most important to the community; if ecological or environmental risk is more of an issue at the site than, say, worker risk, it is likely that “environment” and “EPA” would be cited more often than “worker” or “OSHA.” Words that might be related to more general public risk concerns, such as “health” or “cancer,” are also tabulated.

Table 1. Frequency of target words in February - October RFCAB minutes, 1995, 1997, 2000, 2002.

Term	1995	1997	2000	2002	Total
<i>Primary</i>					
Risk	61	37	26	51	175
Hazard	19	14	9	5	47
Danger	3	8	1	2	14
<i>Secondary: Environmental</i>					
(Ground)water	43	62	46	106	257
Soil	17	49	55	98	219
Environment	37	32	22	16	107
EPA	39	10	30	17	96
Air	3	17	18	1	39
Ecolog-	1	7	2	9	19
<i>Secondary: Worker</i>					
Worker	23	40	20	18	101
Union	3	3	4	0	10
OSHA	0	0	1	0	1
<i>Secondary: General</i>					
Safe(ty)	33	62	49	40	184
Health	15	17	11	9	52
Cancer	7	8	1	5	21
<i>Secondary: Communications</i>					
DOE	149	127	83	61	420
Public	108	72	96	77	353
CDPHE	27	8	19	6	60
Stakeholder	19	14	8	4	45
Citizen	14	12	8	4	38
DOE-RFFO	0	10	6	9	25
DOE-HQ	5	17	3	0	25
Local	8	5	9	2	24
Communicat-	4	2	9	2	17

The data were collected from the RFCAB minutes from February to October of 1995, 1997, 2000, and 2002. This was done by storing the minutes into annual text files, importing these files into Nisus 5.1.3, word-processor software designed for use with Macintosh computers, and then searching the files simultaneously using the unusually extensive search capabilities of that software.

The files were stripped of some boilerplate from meeting minutes and then the resulting “reduced files,” which contained all of the meeting discussions, were searched for keywords, with the results collected in a “summary search” file. This procedure searches each file in a “catalog” using the same search qualifiers (e.g., not case sensitive, not exact word (so that “risk” and “risks” are captured in the same search, etc.) and prepares a summary listing showing the location of the hit (file name, line number) as well as the phrase in which the word is found. Each “hit” is linked to the original file so the word can be seen in context. A portion of a typical summary search is provided in Figure 1. Given that word frequency is, at best, a qualitative indication of the relative interest of the RFCAB in a subject, attempts at portraying this metric as quantitative will be avoided. So, for example, no attempt was made to normalize the number of hits from year to year. However, for the record, the total number of words in each annual collection of minutes didn’t vary greatly. The total was: for 1995, 29167; for 1997, 25041; for 2000, 23241; and for 2002, 22807. These totals were obtained using the Nisus Word Count “tool,” which also provides information about readability and the complexity of the text. The “grade levels” of the text were approximately constant across the four samples: for 1995, grade level was 13; for 1997, 2000, and 2002, it had increased to 14. The average word length was also relatively constant: in 1995 it was 4; in the other years it was 5.

1995 meeting minutes/reduced	Line: 27	is a baseline <u>risk</u> assessment. EPA will
1995 meeting minutes/reduced	Line: 36	no human exposure the <u>risk</u> goes down
1995 meeting minutes/reduced	Line: 81	a qualitative <u>risk</u> evaluation of all
1995 meeting minutes/reduced	Line: 83	and ecological <u>risks</u> . A report will
1995 meeting minutes/reduced	Line: 260	putting workers at <u>risk</u> by cleaning up to
1995 meeting minutes/reduced	Line: 310	basis of a baseline <u>risk</u> assessment. If a
1995 meeting minutes/reduced	Line: 311	is based on that <u>risk</u> assessment, it's a
1995 meeting minutes/reduced	Line: 319	You run the <u>risk</u> of cleaning up
1995 meeting minutes/reduced	Line: 326	Both of those use <u>risk</u> assessments to
1995 meeting minutes/reduced	Line: 399	kids the liabilities of <u>risks</u> to health, risks
1995 meeting minutes/reduced	Line: 399	of risks to health, <u>risks</u> to the
1995 meeting minutes/reduced	Line: 676	confirm that the <u>risks</u> of low-level
1995 meeting minutes/reduced	Line: 705	exposed and have no <u>risks</u> . To what
1995 meeting minutes/reduced	Line: 790	which land is at a <u>risk</u> level that could

Figure 1. Sample from Nisus search of RFCAB minutes for “risk.”

“Risk” is used quite often in the RFCAB discourse. It was mentioned more often, for example, than the word “environment.” A further analysis of word content considers the context within which the word “risk” is used. Table 2 presents the word groupings in which “risk” was used

more than once in the combined transcripts of four years of RFCAB deliberations. Where concepts were similar they were grouped to reduce the total number of reference types. For example, risk analysis was grouped with risk assessment and actual risk was grouped with current, immediate, baseline, and RFETS risk. Ten references to risk, which were only cited once, are not contained in this list. One notices from Table 2 that the risk discourse within RFCAB deliberations is broad, with many varied references to risk and its relationship to the RFETS facility. It appears that in the four years sampled most of the interest has been in assessing risk and discussing how to reduce risk. While the word combination “risk communication” did not occur frequently, every discussion of risk within the RFCAB is itself evidence of risk communication and, from Table 1, we see that “risk” is a frequent topic for the RFCAB. Has the discussion of risk become broader since the Top-to-Bottom Review report was released? The evidence from this study suggests that the diversity of risk topics was greatest in 1995 and has declined somewhat since. In 1995 13 of the 16 categories in Table 2 were discussed (81%) while the figures in 1997, 2000, and 2002 were 69%, 50%, and 63%, respectively.

Table 2. Contextual references to “risk” in RFCAB minutes for February - October in 1995, 1997, 2000, and 2002.

Word Grouping	Number of Hits
Risk analysis, assessment, comparison, evaluation, judgment, model, rank order	39
Risk reduction	21
Risk-based approach, strategy	14
Age-related, cancer, health risk	13
High risk	11
Ecological risk	10
Worker, safety risk	8
Actual, baseline, current, immediate, RFETS risk	7
Risk level, probability	6
Future, potential risk	5
Risk communication	4
Public risk	4
Programmatic risk	4
Minimal, zero risk	3
Risk screen, screening	2
Risk management	2

RISK COMMUNICATION IN “2002” AND “1995”

To better understand the DOE risk communication effort in 2002, that year’s minutes were compared against the minutes from 1995 in a more detailed fashion to see: 1) how the DOE risk messages differed for those two years and 2) how those messages were received by the RFCAB. Much progress was made in the cleanup of the RFETS facility during this 7-year period and it is

natural to expect significant differences from one year to the next. Also, the composition of the RFCAB and the DOE staff at RFETS changed over the period of 7 years as well.

Between February and October 2002, the following senior DOE staff appeared before the RFCAB:

Gene Schmitt, RFFO Manager
Kim Chaney, RFFO Deputy Manager
Bob Goldsmith, RFFO Asst. Manager for Safety Programs
Joseph Legare, Assistant Manager for Environment and Stewardship
John Rampe, Director, Communications and Stewardship Division
Richard DiSalvo, Director, Compliance and Restoration Division

The presentations by Schmitt and Chaney were occasioned by their new appointments and did not discuss topics related to risk at RFETS in any but the most general terms, but Goldsmith (14) had a substantial, risk related, message to deliver to the RFCAB. He noted a high frequency of safety occurrences (e.g., an employee mistakenly cut into a live conduit), described DOE's responsibility to insure that the site contractor had appropriate systems in place to support worker safety, noted that important safety data at the site were not well organized, and promised to bring in an external advisory group (National Safety Council) to analyze and improve the situation. The RFCAB responded to Goldsmith's remarks by noting that workers were being forced to work too many hours, were under substantial pressure to meet accelerated work schedules, and were managed by people insufficiently interested in their safety. They pointed out that management incentivized project completion whereas safety was not similarly incentivized.

Legare's presentation to the RFCAB in May (15) included reference to a new, "risk-based approach" to site cleanup that reflects some of the points in the TTBR. He announced that DOE intended to modify portions of the Rocky Flats Cleanup Agreement (RFCA) to reduce the cleanup of subsurface soils so that surface soils, presumably more mobile and posing greater risk to human health, could be remediated to lower radiation levels (50 pCi/g) than originally announced within the budget for RFETS cleanup. This announcement caused the RFCAB End-State Discussion Steering Committee to draft a letter to RFCA principals requesting that revisions to the RFCA be delayed until the RFCAB could develop comments and recommendations. Members of the RFCAB noted that DOE was pushing for new flexibility in the regulations that guided its activities but offered no flexibility in the RFETS closure date or in the funding that could be made available to complete the closure. "There is a lot of flexibility in the new strategy and approach, but there is no flexibility in the date for closure or the funding. It is unfortunate that long-term safety and security for future generations is not built in as an important consideration in the process." (16)

The new EM emphasis on risk reduction mirrors statements captured in the 1995 minutes when Nancy Tuor and Robert Card, representing the Kaiser-Hill team that had been awarded the contract to close RFETS, spoke to the RFCAB (17). As did TTBR in 2002, Kaiser-Hill in 1995 promised to establish a "risk-based strategy" to accomplish site cleanup. They promised to reduce worker and public risk by 90% by FY98 but admitted under questioning (18) that RFETS risk estimations were the result of "professional judgment" and that "... it would probably cost

\$10 - 20 million in 3-4 years to do a complete, integrated, definitive risk assessment of Rocky Flats. By then, we'd know what it was but there would be no money left to do anything about it. ...” This policy of relying upon professional judgment to assess site risks led a member of the public to remark (19) “The words ‘liability’ and ‘risk reduction’ are used so generically that it has become very difficult to understand what they really mean,” and another to reflect (20) that the promise to reduce worker and public risk by 90% was basically “fluff.” How could a 90% reduction in risk be proven when Kaiser-Hill would not carefully assess risk at the outset? Subsequent to this discussion, Kaiser-Hill attempted to measure the human health, worker health, and environmental risks associated with RFETS cleanup options. For example, in 1996, they published a comparison of the relative risks of cleanup alternatives (21) but stated (22), “...the information needed for quantitative risk profiles is still under development and subject to a broad range of accuracy and interpretation.”

CONCLUSIONS

The use of risk analysis to guide environmental cleanup remains problematic. Despite mounting awareness that the chief risks associated with the EM program are those faced by workers (10, 11), there is little evidence that either EM or the many groups interested in DOE site cleanup is motivated to make the reduction of those risks their highest priority. When the RFCAB met in September 2002 to discuss its highest priorities for 2003, it listed “long-term stewardship” as number one. Far behind in 9th place (23), worker safety and health was tied with “natural resource management” and “post cleanup site configuration.”

DOE’s interest in risk management can be similarly questioned. DOE EM closed the DOE Center for Risk Excellence shortly before the publication of the TTBR and it no longer sponsors an active, federally directed, center of risk expertise. Professional risk assessment capabilities reside at most DOE national laboratories and many DOE contractors and these can be called upon when needed. DOE EM also supports a university consortium that studies risk-related issues at DOE sites (24) but the closure of the central EM organization devoted to environmental risk appears to belie the importance of “risk” to the EM program as refashioned following the TTBR. [NB The author was partially funded by the Center for Risk Excellence.]

Despite the poor public and DOE record in using “risk” to guide cleanup activities at DOE sites, it seems that both parties have benefited from risk communication. This may seem like a perverse conclusion given the previous discussion but the analysis of the RFCAB documentation indicates that “risk” discussions have, over the course of the period studied in this paper, provided excellent opportunities for DOE and concerned citizens to consult in charting a future for the site. Often the term “risk” was a centerpiece of the discussion even when it is likely that it was a placeholder for other concepts, such as equity and cost efficiency. For example, the site and the RFCAB argued long and hard about the residual soil Pu concentration at the completion of site cleanup. A risk analysis utilizing a well accepted risk model yielded allowable residual Pu concentrations of about 600 pCi/g whereas a citizen-inspired risk analysis, using a different end state, concluded that the residual concentration should be no more than 35 pCi/g. It is likely that the argument about the final residual soil level for Pu at RFETS centered more about the concept of equity than risk. The local stakeholders seemed upset that anyone would attempt to foist a 600

pCi/g residual soil level upon them when DOE had agreed to remediate Pu in soil to much lower levels at other sites (25).

The National Research Council study of risk communication observed that (26) “Even great improvement in risk communication will not resolve risk management problems and end controversy (although poor risk communication can create them).” Controversy seems, at times, a “constant” at RFETS but, over the last decade, many dedicated citizens and Federal employees have constructed a communications network that serves the democratic process well. Although this paper cannot conclude that the new attention to *risk-based* cleanup announced in 2002 is any more than the “fluff” that a citizen accused Kaiser-Hill of proposing in 1995, it is clear that the communications network that has evolved at RFETS provides an effective mechanism for the discussion of DOE actions as it enters the final phase of the RFETS mission.

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