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Minutes of the Second Meeting of the Secretary of Energy Advisory Board Panel on Emerging Technological Alternatives to Incineration Idaho Falls, ID and Jackson, WY August 22-24, 2000

OVERVIEW AND WELCOME

Chairman Ralph Cavanagh opened the second official meeting of the Secretary of Energy Advisory Board (SEAB) Blue Ribbon Panel on Emerging Technological Alternatives to Incineration at 9:00 a.m. MT 22 August 2000 at the Shilo Inn Conference Facilities, Idaho Falls, Idaho. Present were panel members, invitees from DOE Idaho, DOE Idaho contractors, and members of the public.

The Panel is a subcommittee of the SEAB), a duly constituted advisory committee under the Federal Advisory Committee Act (FACA) and is governed by the rules of FACA. Ms. Francesca McCann from the Office of the SEAB is the designated federal officer for Panel activities. A transcript of the proceedings will be available in the Public Information Reading Room on the first floor of the DOE Headquarters. Minutes of this meeting will be available in the Public Document Room or at the Secretary of Energy Advisory Board's Web site at www.hr.doe.gov/SEAB or the Secretary of Energy Advisory Board Office at telephone 202-586-7092.

The Chairman reiterated the charge of the panel -- to evaluate and recommend non-incineration technologies for the treatment and disposal of mixed waste at the Idaho National Engineering and Environmental Laboratory (INEEL) and potentially for other facilities around the country. Evaluation will be performed subject to criteria dealing with issues of public health, risk, feasibility, practicality and cost, and will deliver a report to the Secretary of Energy and the public by December 15, 2000.

The primary topics covered in the second meeting were:

1) Summary of the volume and composition of wastes that are to be removed from the Idaho site, treated and transported to the Waste Isolation Pilot Plant (WIPP),

2) Overview of relevant laws and regulations controlling waste transportation and acceptance at WIPP, and,

3) Survey of the current state-of-the-art of alternative treatment technologies.

In addition, the Panel sought public commentary in both Idaho Falls and Jackson.

In response to a request from the Chairman, the panel members briefly introduced themselves and were summarized as being five members appointed by the Secretary of Energy (Gretchen Long-Glickman, Robert Budnitz, Paul Bardacke, Andrew Athy and Mario Molina), two by the Governors of Idaho and Wyoming (Charles Till and Carl Anderson) and two by public interest groups (Marvin Resnikoff and Ralph Cavanagh).

Ms. Beverly Cook, Manager of DOE's Idaho Office, gave brief opening remarks covering the history, geography, technical activities and waste management functions of the Idaho site.

Advanced Mixed Waste Treatment Project (AMWTP) History, Virtual Tour, Inventory of Waste Characteristics, Processes, and Risk Assessment Results

Mr. Michael Bonkoski, DOE Idaho Project Manager for the AMWTP, gave a brief history of the project, described the history and gross properties of the waste and addressed the regulatory framework within which the waste must be managed. There are 40,000 cubic meters of transuranic waste and 25,000 cubic meters of alpha mixed low-level waste; the material is basically debris contaminated with radioactive and hazardous components.

Dr. Robert Holmes, BNFL Chief Scientist and technical manager for the AMWTP, presented information on the residual waste, i.e., the 22% of the waste or 14,000 cubic meters, primarily in 55-gallon drums, requiring alternative treatment. Consideration of the waste was governed by two main drivers - the Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria (WAC), i.e., the rules and regulations defining what the New Mexico disposal facility can handle, and transportation regulations. WIPP WAC bar any waste containing more than 50 parts per million (ppm) of PCBs; transportation regulations can restrict shipment of waste on the basis of specific levels of volatile organics, hydrogen, reactive materials, and free liquids. Investigation of records and anecdotal evidence allowed an assessment of a range of volumes of waste for which a treatment flowsheet would have to be developed. The result was that about 1,500 cubic meters of waste would likely need treatment with 150-300 cubic meters of this being PCB containing waste; the remainder of the waste, though still subject to record inspection and characterization, can probably be mixed, repacked and shipped directly to WIPP. For the 1,500 cubic meters of waste likely to need treatment a set of possible technologies was examined with the requirements that the chosen alternative should not be incineration, should have a track record, be comparable in cost to or cheaper than incineration, fit into the space allocated for the incinerator, have a wide spectrum of applicability, address safety (through examination of criticality, possible discharges and complexity of secondary systems), and be more easily permitted. A summary selection

pointed towards absorbents for free liquids and steam reforming for the remainder of the 1,500 cubic meters of waste.

Mr. Doug Nishimoto, SAIC permitting lead for the project, provided a summary of the AMWTP risk assessment. The risk assessment is separated into a human health assessment and an ecological risk assessment, uses a study area defined by a 50-kilometer radius circle from the facility and involved extensive input from state and federal regulators on the process. Risk analysis examined total facility emissions and had as elements, approved air dispersion modeling, pathway analysis modeling, exposure assessment, receptor analysis, and conservative exposure scenarios that included plausible and hypothetical locations. The results were that the excess cancer risk was one in ten million from radioactive standpoint and one in five million from a chemical standpoint; this should be compared with the general use risks assessments of between one in ten thousand and one in a million excess cancer risk as a benchmark criterion, and the fact that cancer risk from other causes is about one in four. Even if the incinerator is removed the risk does not go to zero since other activities have emissions and hence risks, but 80-90% of the chemical risk is based on contaminant exposure that results only from the incinerator. In response to a question it was stated that the likelihood that accidents may occur is addressed by raising the level of expected emissions and basing the risk assessment on the increased emissions levels. Finally, Mr. Nishimoto briefly addressed the ecological risk assessment in which it was determined that the risks associated with impacts to ecology are far below the benchmark levels that are used as a safe or no-impact point.

Relevant Federal Laws and Regulations

Dr. John Smith, USEPA Headquarters, presented information on the history of PCB regulations. Critical to understanding PCB regulations is that they are dependent on when they were proposed, and that they were not generally intended to address the type of waste found at INEEL. The disposal amendments of 1998, also known as the Megarule, became final 20 years after they were first proposed and banned PCB manufacture, processing and use in commerce except in the case of transformers, where disposal is required after use. The objective of these amendments was not to lower any protection but to offer more options for treatment. Although dilution to avoid compliance with regulations is prohibited, dilution can be allowed for certain specific situations. One such situation is PCB remediation waste, which is generally what is present at INEEL. There are three options for this type of waste: i) cleanup and disposal under the old PCB spill cleanup policy, ii) a performance based approach requiring incineration in a TSCA high efficiency boiler (or other technology equivalent to incineration) for PCB concentrations greater than 50 parts per million, and iii) a risk based disposal provision designed for situations similar to that at INEEL where there are many other constituents involved in addition to the PCBs. In response to a question, Dr.

Smith stated that under existing EPA regulations wastes with PCBs over 50 ppm cannot be put into WIPP; a permit would first have to be obtained and even then non-liquid PCBs, some of which are contained in INEEL waste would still not be allowed unless the regulations were modified. Dr. Smith summarized by saying that some type of treatment for the waste is likely to be needed. The development of new treatment technologies is inhibited by the difficulty of the task and the perception that there is not a large enough potential market to justify risking funds on development work. The situation is complex but it is believed that there is enough flexibility in the framework that further regulatory development should not be necessary to deal with the wastes under consideration at INEEL.

Relevant State Laws and Regulations

Mr. Bob Bullock, Hazardous Waste Permits Manager for the State of Idaho, discussed hazardous waste regulation basics for permitting in Idaho. By Idaho law the state regulations are as stringent but no more stringent than federal regulations. Idaho has adopted RCRA under state law, and uses risk assessment, but the RCRA regulations are very complicated and sometimes judgements have to be made on the interpretations of rules. In general, the rules in Idaho are based on the protection of human health and the environment and beyond this, Idaho tries to be flexible and reasonable to the extent that the regulations allow.

Mr. Mike Simon, Permit Manager for the State of Idaho Department of Environmental Quality, discussed air-permitting issues. Idaho operates under an USEPA-approved State Implementation Program under the Clean Air Act. Mr. Simon discussed the permitting programs, other federal programs such as National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations that would be included in the state permitting process, state driven requirements for permitting and the time-line for the state permitting process.

Waste Isolation Pilot Plant Waste Acceptance Criteria and Shipping Requirements

Mr. Kerry Watson, Assistant Area Manager for the Carlsbad Area Office of the National Transuranic Waste Program, presented information on the WIPP WAC and shipping requirements. The WIPP WAC are currently in revision 7 and are a document based on the WIPP Safety and Analysis Report, the TRUPACT II Certificate of Compliance, the WIPP Land Withdrawal Act and WIPP Hazardous Waste Facility Permit requirements, and the USEPA Certification Decision. Some of these criteria may be changeable but the process is complex requiring USEPA, regional EPA and the State of New Mexico to be able and willing to coordinate and agree. The complexity protects New Mexico in that it prevents the criteria being changed solely at the discretion of an outsider thus

allowing the problem to be shifted from one state to another. Mr. Watson discussed the six sets of criteria - payload container, radiological, physical, chemical, gas generation and paperwork - that arise from WIPP WAC giving details of the restrictions. There is some confusion over whether or not WIPP can accept asbestos. The hazardous waste facility permit issued by New Mexico restricts disposal of PCBs to TSCA-regulated levels, though on August 8, 2000, a DOE request was submitted to EPA Region 6 for formal authorization to accept PCBs at WIPP. This was based on risk modeling that showed no treatment was required for WIPP to accept PCBs at concentrations greater than 50 parts per million; this will still require involvement of New Mexico, EPA and public hearings. The panel discussed whether this might solve the challenge it faced; it seems likely to further significantly reduce the amount of waste that would require treatment but further expert opinion is needed and assurances must be given that the problem is not being shifted from one state to another. In discussions the question of what other wastes (CERCLA, RCRA, TRU) might be accepted was raised since the panel's recommendations may have impact on wastes throughout the DOE complex.

Alternative Technologies Overview

Mr. Bill Owca, Program Manager for the TRU/Mixed Waste Focus Area (TMFA), spoke briefly about the Focus Area and introduced Mr. Bill Schwinkendorf and Mr. Vince Maio who would provide technical expertise on treatment alternatives.

Mr. Bill Schwinkendorf of Bechtel B&W, the INEEL site contractor, presented information on thermal treatment alternatives, stressing that a technology is not a stand-alone unit but a system with a sequence of operations each of which can have effects on the overall performance. Waste must undergo a series of pre-treatment steps - blending, sorting and separation, size reduction, waste feeding - before being treated. Pre-treatment must be adapted to the main treatment and concerns such as safety and emissions in the pre-treatment steps must be addressed. Treatment can include thermal or chemical destruction technologies or separation coupled with treatment of the separated hazardous organic component and possibly a stabilization technology for the inert matrix that may retain RCRA metals and/or radionuclides. From each of these options, secondary waste streams, including off-gases and aqueous wastes can be produced and these too must be managed. An in-depth consideration of thermal alternatives - plasma arc systems, electric arc systems, vitrification, steam reforming, molten metal, molten salt and supercritical water oxidation - was presented. Considerations included batch versus continuous operation, effectiveness with respect to volume of waste and particle size, size and nature of secondary waste streams, robustness with respect to waste composition variability, need for processing additives, susceptibility to corrosion, characterization needs, operating temperature, worker requirements, potential for toxic byproduct formation, and commercial availability of technology variants. Cost was not specifically addressed since most of the alternatives

are commercially available and the DOE privatization concept and the forthcoming Request for Information (RFI) on technology alternatives dictate that such information should come from the vendors. Performance was not addressed in the available time because it is a highly complex issue depending on a number of variables including organic constituent to be treated, the waste matrix, residence time and the operating conditions of the process. The panel inquired about the difference between incineration and thermal destruction and was informed that there is a specific regulatory definition of incineration involving the use of an open flame. Additionally incineration requires air injection, extended time and turbulence thus creating larger amounts of off-gas and particulates than thermal alternatives and while incineration is always an oxidation process many thermal treatments are reduction processes. The panel noted that consideration of upset conditions, off-normal transients and breakdowns are important since these may dominate risks.

Mr. Vincent Maio of Bechtel B&W presented information on non-thermal treatment alternatives. These technologies have characteristics very different from thermal alternatives, generally being corrosive, mostly acidic, batch processes that use a recoverable oxidizer. They operate at lower temperature and with much longer reaction times. Characterization, size reduction and mixing requirements are important and the processes can be sensitive to the matrix of the material being oxidized. Though off-gas streams are usually much smaller, secondary wastes can be much greater and require significant post-treatment stabilization operations. These ancillary requirements tend to make the technologies complex and hence expensive. Technologies considered included acid digestion, mediated electrochemical oxidation, direct chemical oxidation, dehalogenation, separation processes and biological treatment; it was noted that private industry technology suggestions arising from the RFI are likely to fall within these categories and therefore be subject to the criteria being considered for selection. Commercially available technology variants for each were discussed. It was noted that these technologies, though classified as nonthermal, still operate at elevated temperature (and some at elevated pressure) and that their target application in the waste need not be just the PCBs but also components such as volatile organic compounds that can involve transportation issues. Consideration was also given to the technology demands arising from the management of the three primary effluents - off-gas, wastewater and residual solids. During general discussion, the panel was informed by Mr. Bonkoski that upon formation of the panel by the Secretary of Energy, BNFL, the AMWTP contractor, sought alternatives to incineration and their partial evaluation led them to conclude that steam reforming is a good candidate for the destruction of the organic contents of the waste.

The panel expressed appreciation of the level of detail provided but asked that the information about the various technologies be collected together in a form that allows easy comparison for a winnowing down of options. The panel also felt that their deliberations would be helped by provision of cost data, background information on the

basis for originally selecting incineration over other options, and information on why there has been such a change in understanding as to the percentage of waste that needs to be treated, and information on the funding of the TMFA's investigations into alternatives to incineration relative to that given to incineration. Further, the panel noted that in the process of identifying an alternative to incineration for use with these wastes there is a risk of converting Idaho into a "magnet" for wastes from around the complex; in this light it is appropriate to consider whether any of the technologies possess alternatives of scale that would allow them to be dispersed around the DOE complex.

Public Comments - Session 1 Idaho Falls, ID

Ms. Jan Edelstein, Vice Chair of the INEEL Citizens Advisory Board, expressed support for facilities that are fully permitted in their operations, treatment plans that are within the time frame of the Idaho Settlement Agreement, and the selection of treatment processes that provide a high potential for success. As an individual, Ms. Edelstein expressed concerns over the possibility of sending PCBs to WIPP; if the prohibition can be so easily lifted the implication is that the decision system was faulty in the first place.

Mr. David Kipping, official observer from the INEEL Citizens Advisory Board and President of the Snake River Alliance, provided a historical perspective on past disposal practices and the poor regard in which many of these are now held. Incineration should be considered in this light especially since the volume of waste requiring treatment has undergone such a marked decline and incinerators have in the past shown major excursions from planned operating conditions.

Ms. Sue Rice, Vice President of Envirocare of Utah, commented on the fact that since only a minor part of the waste needed treatment, disposal options should be examined. She presented information on the background and current capabilities of Envirocare as a disposal option for some of the waste, including the fact that it can take some PCB waste without treatment and can be an option for orphan waste.

Mr. John Tanner, secretary of the volunteer group DOE Coalition 21, expressed his group's desire to see the most economical, safe and effective method applied to disposing of the waste. Disposing of the waste "as is" by regulatory modification may be the most economical approach. Moving a problem material from one place to another does not necessarily mean moving the problem itself. Becoming a magnet for waste may not be a problem for everyone.

Mr. William Quapp, private consultant, raised the need to distinguish "emissions" from "pollutants". Having examined many variants of thermal and non-thermal technologies, he said that incineration turns out to be a robust, proven, economic, demonstrably safe technology. Alternative, electrically heated thermal technologies may actually generate

greater total emissions than incineration when the emissions from the generating plant are included. Confidence in operating behavior is critical in these decisions and the history of incineration is a strong point here. Also the environmental effects of incineration can be less than is often believed.

Mr. Fred Feizollahi, Vice President of Allied Technology Group (ATG), described his company's operation as a treater of waste and commercializer of promising waste treatment technologies. ATG brought in the first commercial vitrification process to Hanford in 1997 and will be responding to the RFI since this technology is approved by EPA for PCB treatment and has been fully permitted. ATG's desire is for a fair evaluation for their technology.

Ms. Beatrice Brailsford, Program Director for the Snake River Alliance, expressed doubt about claims that DOE knows with certainty what is in the barrels of waste. Snake River Alliance has been active in scrutinizing INEEL operations and in getting all voices heard. The reason that the amount of waste needing treatment has dropped from 78% to 2% is that questions were raised. The questions must continue; while the treatment plant must deal with any material greater than 50 ppm in PCBs, there are plans for a dump close by that will take waste with up to 500 ppm of PCBs.

DOE Summary of Technologies

Mr. Vince Maio related that DOE asked TMFA for evaluation of potential issues, routes and choices to be made in considering alternatives to incineration. Four factors are important: the 100 nanocuries per gram limit that defines TRU waste; the flammability issue with combustible organics; the flammability issue with hydrogen; and the PCB issue.

Mr. Bill Owca outlined the status of DOE incinerators, discussed the potential for commercial alternatives to fill the need for treating mixed waste in the DOE complex, and set out the TMFA's R&D approach for treatment alternatives.

Public Comments - Session 2 Idaho Falls, ID

Ms. Kathleen Trever, head of the State of Idaho's INEEL Oversight Program made two recommendations to the panel. First, if the panel wants to base some of its deliberations on acceptance of PCBs at WIPP then it should work with the state of New Mexico, which has, indicated a preference not to change the WIPP WAC. Second, the panel should get additional information on the universe of waste that may be treated at the facility; buried waste could significantly increase the volume requiring treatment.

Mr. Gary Richardson, Executive Director of the Snake River Alliance, discussed inequalities in the budgets for addressing stored, above-ground waste and buried waste, and the lack of long-term thinking on budget issues. As further evidence of concern over budgets, he noted that more money is being spent on the Pit-9 lawsuit than on Pit-9 cleanup. Public pressure on DOE is probably responsible for the drop in the volume of waste requiring treatment. Snake River Alliance does not want to push Idaho's problems onto other states, preferring that they be dealt with here and now.

Mr. Dirk Gomberg, chemical engineer at INEEL, stated that incineration, like any other technology, can be made safe, but this requires that a cleanup level be set so that engineers can design to that limit. Without these limits, evaluations can not be performed. Nevertheless the public does not want incineration and Mr. Gomberg, therefore, asked the panel to fully consider steam reforming as a simple, viable option with a hundred-year track record.

Mr. Daryl Seiner, citizen of Idaho Falls, spoke in support of incineration as the most straightforward way to accomplish the mission. The uncertainties in waste composition and location are such that a large robust technology handling large amounts of material and based on a large amount of real world operating data is the best option to choose.

Mr. David Kipping, official observer from the INEEL Citizens Advisory Board and President of the Snake River Alliance, spoke of his assessment that characterization issues, the proposal to change PCB limits at WIPP, and buried waste are the majors questions to be considered.

Chairman Cavanagh adjourned the session at approximately 9 p.m.

Call to Order and Introduction (Second Session)

Ralph Cavanagh, Chairman, convened the second day of the meeting at the Shilo Inn Conference Facilities, Idaho Falls, Idaho commencing on the 23rd day of August 2000, at 9:00 a.m. MT.

The Chairman again provided introductory comments and stated that the panel has been convened to address alternatives to incineration for the treatment of mixed waste at the Idaho National Engineering and Environmental Laboratory (INEEL) and the meeting is being held pursuant to rules established in the Federal Advisory Committee Act, and therefore a responsible federal official, Francesca McCann, is present.

Army Assembled Chemical Weapons Alternative Treat Program and NAS Panel Findings

Dr. Randy Seeker, Senior Vice President from the Energy and Environmental Research Corporation, a wholly-owned subsidiary of General Electric Corporation, began by discussing activities that he has been involved with the Army, chairing a blue ribbon panel on Alternative Treatment Technologies for Assembled Chemical Weapons, looking at similar types of alternative issues. The processes and activities of the Army could be of interest in the current proceedings, because although it is a different waste stream, the technologies and issues of concern are similar. The Army Chemical Weapons Program is ahead of DOE's program by three or four years, so lessons learned from that program may be applicable to this effort.

Dr. Seeker said one of the key components from the Army program, and an important lesson learned, is the use of a public involvement process, called a Dialogue Group, consisting of state, federal regulators, community members from the affected states and national groups that regularly work on similar problems. Dr. Seeker pointed out that to make sure there was buy-in from the stakeholders, the stakeholder panel established a Citizens Advisory Technical (CAT) Group, where the Army provided funding for the stakeholder panel to hire technical experts to form the CAT Group. In Dr. Seeker's opinion, having a CAT has changed the program, and the Army would have done something different if it had not initiated this process. This group also issued a broad area announcement to capture other ideas that were not necessarily part of the total solution, and the NAS Panel provided them with information that would help expand these technology areas. Subsequently the program has completed three demonstrations involving three technologies and reported to Congress.

Dr. Seeker said two of the three technologies have advanced to the next phase, engineering design. The plasma arc technology was eliminated in Demonstration 1, due to mechanical failures. The three technologies from the original six that were selected, but were not demonstrated, are currently in Demonstration 2.

Dr. Seeker said one of the findings of the panel in Demonstration 1, based on the results of the General Atomic supercritical water oxidation, is that size-reduction component is the most difficult part of the process because of the energetic components and dunnage. Dr. Seeker said the six technologies evaluated for the Army are also the six being evaluated by this Panel. Dr. Seeker provided the schedule, stating results for all six of the tests will be available by March 2001.

Dr. Seeker highlighted findings of the NAS Panel that reviewed the Army program. Every technology evaluated was capable of achieving 99.9999% destruction efficiency. However, a key issue is that any oxidation process, chemical or otherwise, has the potential for byproduct formation and that has to be the focus of any demonstration.

Dr. Seeker said several of the technologies originally proposed “hold, test and release”, the concept of certifying that effluent is ready for release to the environment before being discharged. The NAS evaluation determined that none of the technologies adequately met this requirement. For the most part, the “hold, test and release” focus was on small effluents that might come out of the process rather than the potential bigger pollution sources-all the ventilation.

Dr. Seeker said the NAS Panel was not convinced that these technologies employed continuous compliance assurance techniques to ensure measurements were being made protective of human health and the environment. Dr. Seeker stated that the technologies are still at bench scale and laboratory scale, not at full-scale. The NAS Panel struggled with the question: What is wrong with incineration? What are the public perception issues, and what are the underlying, underpinning technical issues that make incineration not an acceptable technology to the public? The NAS Panel concluded that minimizing emissions, particularly gaseous effluents, having continuous monitoring and having provisions to allow the continuous processes and a continuous assurance method to allow the public to be involved addresses these concerns.

DOE/EPA Memorandum of Understanding (MOU)

Dr. Seeker cited the MOU signed by DOE’s Gerald Boyd and USEPA’s Elizabeth Cotsworth to "establish a level of enhanced cooperation to address the problem of hazardous waste mixed with radioactive material." Though defined as cooperative research it was primarily focused on development and demonstration projects. The initial projects to be coordinated are: mercury bearing mixed wastes; alternative oxidation technology evaluation; and HEPA filter performance and monitoring. The impact of emerging regulations will also be considered. A National Technical Workgroup on mixed waste treatment has been used to address regulatory and technical barriers to the treatment of mixed wastes.

Comparison of Alternative Treatment Technologies for DOE Mixed Wastes Against Evaluation Criteria

Mr. Vince Maio and Mr. Bill Schwinkendorf continued their presentation on the 18 alternative technologies discussed on the previous day by evaluating them against the following criteria: functional and technical performance, operational reliability, pre-and post-treatment requirements, environmental, safety and health risk considerations, economic viability, investment risks, maturity, and stakeholder and regulatory interests.

Panel Discussion

Chairman Cavanagh requested that Mr. Schwinkendorf, Mr. Maio, Dr. Seeker and Dr. Holmes participate in a Panel discussion.

Dr. Till asked Dr. Seeker how relevant the Army program was to the INEEL waste treatment in view of the difference in the feed materials. Dr. Seeker replied that the volumes are similar but in both cases there are multiple waste streams to be cojnsidered. The debris component is very similar to dunnage. On the other hand, the chemical agents used by the Army are very different, and include complex chemicals containing phosphorus and other elements in a very complicated structure. The chemical agents are fragile, however, and break down quickly.

Dr. Budnitz pointed out that a crucial difference is that the consequences of an upset condition with an incinerator dealing with nerve gas are significantly more significant and more important than with a process dealing with INEEL wastes. A useful piece of information would be demonstration of performance for upset conditions, with high confidence for the situation. Dr. Seeker agreed that the acute hazards associated with nerve gas exposure are more severe than other chemicals. Dr. Seeker indicated the environmental hazards associated with upset conditions are clearly a focus and NAS-NRC Panel members have safety and accident-related expertise.

Dr. Resnikoff inquired from Dr. Seeker as to the operating status of the six listed ongoing studies and alternatives to incineration. Dr. Seeker explained that they started with and evaluated13 technologies, which were reduced to seven technologies. One of the seven technologies failed certain pre-screening criteria and was dropped from further consideration. Of the remaining six technologies, three technologies, plasma technology from Burns and Roe; the supercritical water extraction program from General Atomics Technologies and the supercritical water technology from Parsons/Honeywell entered Demonstration Phase 1. Of the three, Burns and Roe fell away and is no longer being evaluated. The two supercritical water technologies moved into the next phase, engineering design study.

Three additional technologies, offered by AEA, Ecologic, Foster/Wheeler, and Teledyne/Commodore are now going through a demonstration phase and have yet to move on to an engineering design study. Dr. Resnikoff questioned why the Vortec vitrification technology was not chosen; Dr. Seeker indicated that a separate Technical Work Group is evaluating whether the Vortec technology is applicable.

Dr. Till asked Dr. Holmes to provide the Panel with a written summary of what each of the waste streams is, and his assessment as to whether they would be treatable with the preferred technology. Dr. Holmes said he could provide a detailed breakdown of various waste forms, various contaminants in the stream, and whether they are treatable by the technology such as steam reforming. Steam reforming would be useful for the material

that is either absorbed on clay, or are acidic materials contained in 55-gallon drums. In some cases the material is contained in a bag as well, and it is made up of layers of material that have been poured into the drums. Dr. Till asked if the waste types are treatable with steam reforming and Dr. Holmes responded affirmatively.

Dr. Holmes said that in some of the 55-gallon drums the material was contained in plastic polyethylene bottles. He also described the aqueous waste stream as materials that are poured into cement to produce layered cement.

Dr. Till asked Dr. Holmes formally to provide his understanding of the INEEL waste streams, how many there are, and a description of what they are.

Dr. Molina asked Dr. Holmes for composition information on the mixtures of VOCs, PCBs and radioactive material and to what extent they are mixed. Dr. Holmes stated it is not possible to pick an individual drum and give quantitative information on Pu, PCB or VOC composition, but it is certainly possible to provide information on the range of what might be present in a particular drum, from existing databases.

Ms. Long-Glickman expressed her opinion to Dr. Holmes that if we have a better understanding of the composition of the waste streams; and we consider the technical providers for the six programs that are in some form of consideration by the Army, in combination with a comparison and recommendation of alternative treatments, the Panel will have a good work plan.

Ms. Long-Glickman asked Dr. Seeker to describe the role of the Citizens Technical Advisory Group and why the group had such a positive impact on the deliberations. Dr. Seeker answered that the most important role the group had was in keeping the process moving, in terms of moving technologies into demonstration phase, and acting in the role of an independent technical conduit, and the buy-in from both the citizen group and the technical group has been important.

Dr. Anderson asked Dr. Seeker for an assessment of the difficulty imposed by permitting procedures for a potential innovative technology. Dr. Seeker responded that although incineration has lots of guidance and procedures that have been well established, other technologies that have not been permitted will probably be permitted under RCRA Subpart X, which has very little guidance or protocol and is highly dependent upon the permit writer. The permit writer has the burden of having to judge this process for its human health and environmental impacts, so it is important to include the permit writer early in the process and provide the permit writer with more technical information.

Dr. Anderson asked Dr. Holmes if the size reduction requirement associated with the heterogeneity of the materials involved is a limiting factor in the application of steam

reforming technology. Dr. Holmes described two types of steam reforming processes being operated within the nuclear industry, at Oak Ridge and Erwin, Tennessee. The Oak Ridge process carries out the first stage of steam reforming in bulk, to treat waste that is relatively easy to handle. The Erwin process uses a fluidized bed, which requires size reduction of waste material.

Dr. Anderson asked Dr. Holmes if cryofracturing is an appropriate technology for size reduction of the waste we are talking about. Dr. Holmes said it is certainly a possibility, but it would have to be demonstrated first, requiring longer lead-time than using a simple mechanical device to size reduce.

Dr. Budnitz asked Dr. Holmes questions about whether INEEL has an adequate understanding of the waste streams volume distribution, in terms of numbers of waste drums, particularly on the uncharacterized drums among the150,000 total. Dr. Holmes explained the characterization process and that there are two sets of drums to consider. Those drums that contain debris can be readily characterized through records and real-time radiography. It is also possible to distinguish through real-time radiography if a drum contains solidified sludge as opposed to metal scrap. Analysis and examination would confirm the 2%. Dr. Budnitz asked Dr. Holmes for clarification that the 1,500 cubic meters represents 7,000 drums, but it only may be five to 10,000 drums at issue, and that only after this process were completed would he know individual drum's contents in terms of fullness and concentration; Dr. Holmes agreed.

According to Dr Holmes, issues in characterizing the drums include the fact that many of the drums are positioned under other drums in soil berms and a retrieval program would be necessary in advance of any treatment or shipment of waste. The characterization of would start September or October of 2002, and an inventory of known waste would be built up as it is retrieved. The Radioactive Waste Management Complex is currently carrying out a similar exercise on approximately 11,000 cubic meters of waste stored on site, and Dr. Holmes bases his confidence about the outcome on information that has been generated at places like Argonne National Laboratory--West (located at the INEEL site), where they have been coring drums for a number of years.

Dr. Holmes emphasized the importance of major waste constituents rather than detailed chemical composition to technology selection and that this is information that is very well known and well-recorded.

Dr. Budnitz offered that a well-designed statistical sampling process could overcome the possibility of encountering some completely new waste form. It is more important to deal with the major composition than whether there's eight drums or 1,400 of a certain kind.

Mr. Bardacke asked Dr. Seeker what role the states play in in the EPA/DOE MOU. Dr. Seeker responded that several states regulators and permit writers are actively involved.

In concluding comments, Dr. Molina provided his assessment that there are indeed alternatives to incineration. Some of these technologies are more robust than others because they are capable of handling a larger amount of waste, however not enough is known about the waste at this point to recommend a specific technology, and further studies are certainly warranted.

The Idaho Falls portion of the meeting was concluded at 12:00 noon and the Panel boarded a bus for transportation to Jackson, WY.

Call to Order and Introduction Jackson, WY

Ralph Cavanagh, Chairman, reconvened the meeting in Jackson, Wyoming on August 23, 2000, at 3:30 p.m. MT. He repeated the usual introductory comments, described the agenda for the afternoon session, and provided a sign-up sheet for members of the public who wished to address the Panel at the 7:00 p.m. MT evening session.

Overview of the Mixed Waste Issues at the Idaho National Engineering and Environmental Laboratory (INEEL)

Mr. Michael Bonkoski, DOE-ID, reviewed the mixed waste issue at the INEEL. Mr. Bonkoski also spoke briefly about the screening-level risk assessment. Mr. Bonkoski stated that the 65,000 cubic meters of waste under consideration for treatment in the AMWTP was shipped to Idaho, primarily (95%) from the Rocky Flats weapons production plant in Colorado, between 1970 and 1989. A few shipments still came to Idaho between 1988 and 1999. Rocky Flats was essentially a metals foundry and machining operation; the waste was essentially debris, construction material and contaminated protective clothing.

Mr. Bonkoski stated that the repository disposal site for transuranic waste was established in 1981 when the ROD on the WIPP in New Mexico was issued. DOE redefined transuranic waste as waste containing over 100 nanocuries per gram of transuranic nuclides. The new classification separated the waste into two parts: waste over 100 nanocuries per gram (i.e., transuranic) and waste under 100 nanocuries per gram (i.e., alpha mixed low-level or alpha low-level mixed waste).

In 1987, DOE issued the byproduct rule, definitely subjecting the waste to the Resource Conservation Recovery Act (RCRA), and ending the debate on the topic. In 1992,

Congress passed the Federal Facilities Compliance Act (FFCA), which gave federal facilities three years to enter into agreements with the various States to bring on-line treatment capacity in accordance with a Site Treatment Plan (STP). Each federal facility had three years, starting in 1992, to negotiate an STP, which included a schedule for bringing treatment on-line, treating the waste, and disposing of it. In 1995, the INEEL STP under the FFCA was negotiated and agreed to by Idaho. The schedule was taken from the INEEL STP and included in the Settlement Agreement (the result of a lawsuit over shipment of Fort Saint Vrain fuel to Idaho) with the State of Idaho. The Settlement Agreement contained milestones for treatment of the transuranic and alpha low-level mixed waste; the treatment facility had to be completely constructed by the end of 2002, operational by the end of March 2003, and 6,000 cubic meters of waste had to be removed from the state within a three-year period. The target date for completion of transport of all 65,000 cubic meters out of the state was 2015; the final date for complete removal was 2018.

BNFL's Contract

DOE's 1996 performance-based contract with BNFL for Phase 1 activities included preliminary design, permit applications, and development of sufficient information for the preparation of a National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS). In 1999, DOE completed the EIS and issued a ROD. Shortly thereafter, DOE authorized BNFL to continue with the remainder of the contract. BNFL's contract scope was to provide all services necessary to prepare 6,000 cubic meters of waste for shipment to WIPP in accordance with all applicable environmental and safety regulations. Originally, due to uncertainty that WIPP would get its RCRA Permit on schedule, the contract performance specifications required all the waste to be treated to meet both the WIPP WAC and the RCRA Land Disposal Restriction (LDR) treatment standards. Once WIPP became operational, the LDR standard was removed from the contract, allowing BNFL to reduce treatment requirements to WIPP's treatment standard.

Mr. Cavanagh interjected that he did not realize that originally there was some expectation that the waste might have to be disposed of in another fashion. Mr. Bonkoski elaborated that WIPP was always the primary option but alternative sites, should WIPP not be permitted, had included the DOE Hanford Site and the Nevada Test Site.

Mr. Bonkoski presented photographs and a description of the AMWTP. The waste came by boxcar from Colorado to Idaho and was placed on an asphalt pad in plywood and fiberglass reinforced plastic boxes, bins, and 55-gallon drums. The waste pile was covered with earth. DOE erected an engineered metal building over the waste pile as a weather enclosure for retrieval, and as a containment structure against contamination

during treatment. The buildings on the right side of the Transuranic Storage Area Retrieval Enclosure (TSARE), called Type 2 storage modules, store waste that had previously been retrieved and partially characterized.

In response to a question from Mr. Cavanagh, Mr. Bonkoski confirmed approximately 15,000 cubic meters of waste was stored in the Type 2 storage modules and that the practice had been discontinued. He added that the current contractor, Bechtel, intended to ship 3,100 cubic meters of waste selected from the Type 2 storage modules to WIPP when the AMWTP came on line. Mr. Bonkoski clarified, for Dr. Budnitz that WIPP could deal with about 98 percent of the waste.

Dr. Resnikoff requested clarification that the new facility at issue would only be required to handle 2% of the waste. Mr. Bonkoski stated that was not the case; the contract had an option that allowed DOE to assign up to 100,000 cubic meters of additional waste for treatment. He added that he did not believe there was that much waste in the entire DOE complex and that other sites have only identified about 2,000 cubic meters of waste to be treated at the facility in their STPs. The contract also required, should DOE exercise the option, that the wastes be fully characterized and meet BNFL's AMWTP waste acceptance criteria.

Dr. Resnikoff was concerned that once the AMWTP was built, facilities nationwide would send waste. He noted, with concurrence from Mr. Bonkoski, that the contract with BNFL could be altered to take waste from other DOE facilities in the future.

Mr. Bonkoski responded to Ms. Long-Glickman's question about using this facility for the buried waste by stating that if, under the Environment Restoration Plan, DOE decided to excavate, characterize, and treat waste from the pits and trenches, DOE could conceivably use the facility as one of the treatment options but this option is not currently identified as a goal.

Mr. Bonkoski also clarified for Mr. Cavanagh that the 65,000 cubic meters referred to the material in the berm and in the buildings behind the berm. Mr. Cavanagh inquired whether there was other waste onsite that was a potential candidate for incineration. Mr. Bonkoski stated that the Environmental Restoration Project waste, also originating at Rocky Flats, would be similar in nature to the 65,000 cubic meters but was not likely to materialize during the Panel's time-frame. His understanding of the Panel’s charge was that the Secretary wanted recommendations or immediate actions regarding the 65,000 cubic meters and recommendations for mixed waste at other sites that also require treatment.

Mr. Bonkoski stated that BNFL's original proposal required that 78% of the waste be thermally processed. However, 78% of the waste was greater than 60 millimeters in

size and thus qualified for treatment by macro-encapsulation under RCRA's "debris rule" leaving the remainder of the waste, or 22 %, needing treatment by something other than macro-encapsulation to meet the RCRA LDR. WIPP WAC include an upper limit of 50 parts per million for PCBs and 1% for free liquids. The transportation requirements preclude generation of flammables/explosives. Elimination of the LDR requirements from the contract left WIPP WAC and the transportation requirements as the drivers for treatment; the waste requiring incineration went down to 2% of the 65,000 cubic meters. The alternative facility must effect destruction of PCBs, removal of oils and organics, and absorption of free liquids.

Dr. Resnikoff inquired as to DOE's anticipated cost for the alternative facility. Mr. Bonkoski responded that the cost of the alternative facility would be less than the cost of the incinerator (approximately $57M).

Dr. Holmes stated that BNFL, in reviewing alternatives, had planned that treatment would consist of using sorbents for the free liquids and steam reforming for the remainder of the waste (2%); BNFL projected a five-year treatment time-frame and were confident that all waste could be treated and shipped by 2015.

Mr. Bonkoski stated that the Preliminary Screening-Level Risk Assessment was part of the RCRA/TSCA Permit Application performed by SAIC for BNFL. As directed by EPA, the methodology was modeled after the risk assessments that were completed in EPA Region 10 by ATG using the new EPA guidance. The non-cancer and excess cancer risks that resulted from the analyses are contained in the documents provided to the Panel (the full Risk Assessment Document and copies of the Risk Assessment Executive Summary). Additionally, the risk assessment includes ecological risk assessment, and examines the impacts to receptors other than humans, such as plants and animals. Ms. Long-Glickman confirmed that the risk assessment included the incinerator, and also that the study area was within 50 kilometers of the facility. Mr. Cavanagh, redirecting a question from a spectator, asked if any catastrophic risk assessment was performed. Mr. Bonkoski responded that aside from the risk assessment that was done as part of the permit application, DOE requires a Preliminary Safety Analysis Report that was prepared by BNFL, reviewed by DOE Idaho, DOE Headquarters, and by the Defense Nuclear Facilities Safety Board. Dr. Anderson confirmed with Mr. Bonkoski that the same types of receptors were considered since the risk assessment was based on a risk assessment that was done in Washington. Mr. Cavanagh, Mr. Bonkoski, and Dr. Budnitz discussed criticality concerns briefly.

Dr. Resnikoff returned to the cost of an incinerator versus an alternative technology. He suggested that $40,000 per cubic meter sounded expensive to process only the aboveground waste and concluded that most people would anticipate accepting more

waste to amortize and lower the unit cost of treatment. Mr. Bonkoski concurred that was potentially the case.

Overview of the Categories of Alternatives to Incineration

Mr. Cavanagh went to the second topic, an overview of the categories of alternatives to incineration, by introducing Mr. Vince Maio. Mr. Maio stated that he provided details on 18 alternative technologies to incineration in Idaho, and he would discuss some general classes of technologies and define the basic principles associated with those classes. He stated that the four reasons to treat wastes were regulatory requirements, volume reduction, transportation requirements, and disposal facility requirements. He further noted that the five classes for alternatives to incineration were non-incineration thermal destruction, chemical oxidation-based techniques, dehalogenation methods, separation methods, and biological methods.

Technology Selection Criteria

Mr. Cavanagh summarized that there were a number of technological alternatives to incineration that the Panel was being tasked to investigate. Ultimately they would have to make some judgments about the relative merits of these alternatives in terms of an R&D program for DOE, while cognizant of the host of regulatory requirements at the state and federal level.

Dr. Molina stated the difficulty involved in recommending one technology. Dr. Budnitz replied that finding two alternatives would be prudent, but not 11, because otherwise the engineering challenge and cost would diminish the probability of success. Mr. Schwinkendorf stated that some of these technologies could be used in series or in parallel to operate on different waste streams resulting in multiple technologies operating on multiple waste streams. There are also technologies that are very robust that can handle all the waste streams individually. Any of the technologies would require incorporation into a system but that did not stipulate a need for a dozen of them to treat the waste.

The Panel continued to discuss selection criteria for alternative technologies. Ms. Long-Glickman suggested safety, cost, and simplicity to accomplish the job, with no more than two or three treatment methodologies recommended. Mr. Cavanagh summarized that the Panel was obligated to investigate the R&D strategy in development at the DOE as a means of enriching their understanding of the alternatives before arriving at a final solution. He mentioned that the Panel was not tasked to identify a winner on December 15 but to help DOE do a better job of eventually finding

the solution. Dr. Budnitz further noted that meeting all applicable regulations was not enough since the incinerator met all of the current regulations. He proposed selection of a technology that can reduce risks, hazards, and emissions far below current regulations.

Regulatory Concerns

Mr. Cavanagh asked Mr. Bardacke and Dr. Anderson to assist in summarizing the relevant regulatory concerns. The agreement between the federal government and the State of Idaho sets a useful time-frame for removal of the wastes we've been discussing, i.e., by 2015, preferably, 2018 at the latest. The Environmental Protection Agency, States of New Mexico, Idaho, and Wyoming are also involved.

Dr. Anderson noted that Wyoming does not have permitting jurisdiction for any of the activities but his role included considering the potential impacts on the health and safety of Wyoming, for any technology selected.

Mr. Bardacke discussed at length DOE's August 8, 2000 request to EPA for authorization to dispose of wastes with PCBs in excess of 50 parts per million at WIPP. He noted the apparent lack of notification of the request to the State of New Mexico. While he agreed that approval of this request would resolve some treatment/disposal issues, he expressed strong doubts that the New Mexico portion of the process would be quick or easy.

Dr. Molina recommended comparing the risks involved in treating the waste and reducing PCB content to below 50 parts per million, to the risk of storing the waste containing PCBs above 50 parts per million. He suggested that if one risk proved considerably larger than the other did, it should be reported, since the Panel's goal was to minimize the overall impact to human health and the environment. Mr. Bardacke concurred.

Mr. Cavanagh adjourned the afternoon session.

Evening Session Call to Order and Introduction

Mr. Cavanagh reconvened the meeting at 7:03 p.m. MT and, after making quick introductory remarks describing the Panel's activities and calling on the other Panel members to introduce themselves, opened the public comment portion of the program.

Public Comments--Session 1 Jackson, WY

Mr. J. T. Stevens, a longtime resident of Jackson Hole, Wyoming, stated that his experience included 24 years in the Radiological Monitoring Division at the Puget Sound Naval Shipyard. He mentioned the EIS (December 1999) for the high-level waste disposal at INEEL. He was puzzled that PCBs were of concern, since PCBs only become very dangerous when burned. He also suggested laundering anti-contamination clothing, the use of EDTA, and decontamination of large objects as a means of reducing the quantity of waste. He was glad that the new incinerator had been stalled but noted that inside this EIS was another "buried" incinerator. He suggested that there were about 35 other large operating incinerators at INEEL and that some of them were hand-made and unapproved. Dr. Resnikoff disagreed with the EDTA proposal since EDTA essentially acts as a detergent, gets all the other radioactive materials mobile, and facilitates contaminant migration from disposal sites.

Ms. Fran Van Houten posed questions regarding volumes and dates for Idaho waste cleanup. She also inquired about reconciling of actual health impacts for completed projects to the projected health impacts to see whether or not the projections are effective. Mr. Cavanagh stated that health assessments on incineration are beyond the scope of the Panel and would not be addressed.

Dr. Resnikoff restated the Panel's charge; essentially to look at alternative technologies to treat two percent of the waste that is being stored right now (about 1,500 cubic meters). He noted that in the big picture, as discussed earlier with Mr. Bonkoski, DOE would consider treating the INEEL buried waste, and waste that may come from other DOE facilities. Dr. Resnikoff stated that DOE wants the facility to be a “magnet” for waste from all around the country.

Ms. Laurie Kahn, a Bechtel scientist in the INEEL environmental cleanup program and supervisor of the INEEL Outreach Office in Jackson, clarified that she was a contractor employee speaking as a private citizen. She offered two recommendations. First, Dr. Molina's recommendation to do a comparative risk assessment should be implemented. Second, the Panel should assume that the regulations or the requirements at WIPP could not be changed for PCBs.

Ms. Sophia Wakefield, Jackson private citizen of nine years, requested an honest appraisal of the alternatives by the Panel. She pointed out that incineration was no longer an alternative in Europe. She was very concerned about funds being used for investigating the feasibility of another incinerator while other incinerators were operational at INEEL. She also questioned the Panel's ability to evaluate alternatives without adequate characterization of the waste.

Ms. Jan Edelstein, Vice Chair of INEEL Citizens Advisory Board, paraphrased Chairman Cavanagh's definition of the Panel's two jobs; to recommend DOE investment of R&D

dollars for alternative treatment technologies; and to identify the relevant regulatory issues. She suggested a third area for the Panel; public acceptance of alternatives and recommends the Panel to utilize the NAS-NRC evaluation regarding public acceptance.

Mr. Jeffrey Joel, mathematician and mathematical physicist, questioned the atmospheric dispersion laws used in the environmental assessment for the AMWTP, and also for the high-level plant. He suggested that the models seem to assume linear flow and precipitation from the stack; no one has accounted for ground-level winds or other dispersions of dust particles into the local biosphere.

Ms. Janet Sluska, private citizen, inquired how other countries that have nuclear energy as their main sources of energy deal with their waste. She also mentioned a technology called accelerator transmutation of nuclear waste.

Ms. Kathleen Tucker, President of the Health and Energy Institute, and Secretary of the National Committee for Radiation Victims, stated that there was no easy solution for dealing with the nuclear waste problem. She urged the Panel not to select incineration even if it found, as she did in her research, that there was not a good alternative to incineration.

Dr. Erik Ringelberg, Executive Director, Keep Yellowstone Nuclear Free, was most concerned with the application of technologies at INEEL. He urged the Panel to investigate closed technologies; technologies that do not release air or water emissions outside of the facility itself. He recommended technologies that are passive failsafe and called for a new risk assessment. He offered that cost should not be a consideration.

Mr. Gerry Spence, attorney for Keep Yellowstone Nuclear-Free (KYNF), took issue with the number of lawyers on the Panel as opposed to an all-scientist Panel. He provided a history of events leading to KYNF's lawsuit to stop the incinerator and his acrimonious relations with Ms. Sullivan, DOE General Counsel. He noted the apparent impropriety of BNFL, the $1.2B contractor, authoring the EIS; the situation was compounded by an INEEL official, at the time of the contract, who moved to a high-level job with BNFL. Mr. Spence also provided the KYNF rationale for non-participation on the Panel, which he considers to be a fraud. Since the time and funding resources are not adequate to find a solution, the Panel is destined to fail to find an alternative to incineration; KYNF would have inadvertently "bought in" to the DOE process by participating on the Panel. Mr. Spence indicated, however, that the Panel's work could exceed his expectations, and reserved final judgement pending final completion of the Panel's report.

Mr. Mike Fitzgerald, non-practicing attorney, described a group in New Mexico who have been looking for an alternative to incineration for disposal of high-level nuclear

waste for 12 years. He agreed with Mr. Spence that there was not enough time to perform the Panel's charge properly.

Mr. Tom Patricelli, Jackson resident and member of the Board of Directors of KYNF, supported Mr. Spence's statements. He suggested a scenario where the Panel made alternative recommendations that are rejected due to the timelines in place at INEEL.

Mr. Gary Richardson wanted to ensure that the figures relating to the waste quantities were noted. He also suggested that the Panel include a recommendation that DOE, like Department of Defense, form a citizens' advisory technical committee, supported with technical assistance at a fairly substantial financial commitment, so that there is real citizen involvement.

Mr. Spence stated that the Panel's mandate was to find alternatives to incineration. He suggested that if the Panel could not find an alternative, the report should recommend storage of the waste in new kinds of containers that would hold for the next 50 years while a panel of this nature discovers that alternative.

The Panel discussed the timetable and feasibility of completing the task.

Mr. Cavanagh thanked the participants and concluded the session at 8:46 p.m. MT

August 24 Session, Jackson, WY

Chairman Cavanagh opened the final session of the meeting at 9:00 a.m. MT 24 August 2000 with all members present.

The Chairman alerted panel members and the public to the meeting scheduled from 8:00 to 3:00 on September 27, 2000 in Washington, D.C, and the follow-up conference call for panel members on October 2nd 3:00-4:30 p.m. ET. The Chairman said he wanted to schedule at least one more meeting in October, and a final two-day early-December meeting of the Panel to complete deliberations.

Chairman Cavanagh indicated that the current session would include discussion of work and issues facing the Panel; schedule; review of information sought by the Request for Information (RFI); and additional input needed by the Panel. His objectives were to clearly define what presentations that the Panel would receive at the September 27, 2000 Washington, D.C. meeting, and clarify the broad outline of the Panel's report.

Next Steps for the Panel

Mr. Cavanagh suggested that the Panel needed to understand the current state of the DOE/EPA effort to develop a R&D plan for alternatives to incineration. Dr. Till agreed that this should be a priority at the September meeting.

Dr. Resnikoff suggested reviewing the Department of Defense efforts involving chemical risks. Dr. Budnitz agreed that some of their evaluation might be relevant to the Panel's work. He has a professional relationship with MITRETEK, the principal company under contract to the U.S. Army, and volunteered to provide contact information.

Ms. Long-Glickman added that getting input from the private sector, thus insuring creative thinking from outside the existing DOE system, would be a key element in the Panel's success.

Mr. Cavanagh appointed a subcommittee, the five Ph.D. members of the panel, to review the RFI submissions and determine which would merit the attention of the full Panel. He hoped that the responses to the RFI would be available at the September meeting. Preliminary review discussion by the subcommittee could then occur on the October conference call. Mr. Carl Cooley, DOE will assist the Vice Chair, Dr. Molina, in the RFI review.

Dr. Budnitz wondered about the perception that the Panel was rubber-stamping if they used too much DOE information. He added that he believed the report would be stronger substantially if there were a reasoned rationale for each proposal rejected.

Mr. Cavanagh said that the concern he heard from the public in both Idaho Falls and Jackson was whether, in fact, the Panel's recommendations would have validity. He added that the best way to make sure that the recommendations had practical value and effect was to make sure that the Panel understood in detail the evolution of the alternatives.

Technical Advice for the Panel

Dr. Molina wondered whether there would be some mechanism to obtain reviews from experts. Mr. Cavanagh advised that Mr. Carl Cooley, DOE, should be asked to supply any resources deemed necessary.

Ms. Long-Glickman expressed a concern that the Panel had adequate independent technical assistance. She thought that while Mr. Cooley would obviously be of great assistance, he was a DOE employee; perhaps he could provide other experts that were non-DOE. She added that it would give more assurance to the whole Panel as well as to the public if more of that input could be documented; maybe some more formalized short-term arrangements given the Panel's schedule.

Dr. Budnitz requested clarification on the appropriate way to consult with colleagues to avoid misconceptions that surround tasks of this sensitivity and importance. Mr. Cavanagh noted that it was important that the Panel consult multiple sources. He thought the Panel had set a good example of reaching out across the spectrum. He noted that the panel members' backgrounds had been fully disclosed and suggested that panel members also disclose reliance on consultations with particular individuals or particular companies.

Mr. Cavanagh added that DOE would ask the subpanel members who were reviewing proprietary information received in response to the RFI to sign a standard non-disclosure agreement. He anticipated that any other panel members interested in proofing that material would be asked to do the same. He found it an appropriate safeguard to protect commercially sensitive information associated with potentially promising alternatives.

Waste Characterization and Treatment

Dr. Resnikoff revisited the issue of waste characterization. He is interested in reviewing the information that Dr. Holmes said that he would provide to the Panel. He noted that the best treatment processes to be used depend heavily on the nature of the waste.

Mr. Cavanagh added that this had repeatedly arisen as a critical point. He suggested that Dr. Resnikoff outline for the panel members the information needed and provide Dr. Holmes with a very specific request. The request should ensure that the Panel receives the necessary waste characterization information.

Dr. Resnikoff stated interest in much smaller processes; he thought the Panel's charge was to deal with the wastes on the pad at INEEL. He is concerned that a large facility that could handle a lot of waste would draw waste from the entire DOE complex—a "waste magnet."

Dr. Anderson added that the public indicated some interest that the recommended alternative would also be able to deal with the buried waste, and that there was a fine line between the 2% and the buried waste without creating a magnet. Mr. Cavanagh postulated that the magnet issue was perhaps independent of the question of whether the technology used at INEEL would also be used for the buried waste. Dr. Resnikoff agreed.

Ms. Long-Glickman noted that the process of incineration meets EPA standards, but nonetheless the public has low confidence in incineration being a safe method. Instead the public is concerned about what happens when there are malfunctions on any

technology. As processes become larger and more complicated, there seem to be more possibilities for things to go wrong. The public has a sense of discomfort and some distrust, because any human being or any government department, and maybe even more specifically DOE, can make errors. She believes the Panel needs to address this matter. Also, there appears to be a lack of confidence that EPA's standards are adequate, and she suspects that this contributes to the degree of discomfort on a process that meets EPA standards.

Public Acceptance

Dr. Anderson stated the need to acknowledge that at some point DOE would have to proceed with waste treatment. Given the distrust by some of the public and the stakeholders, in terms of their interactions with the DOE, he believed that the Panel's work would be for naught if they recommended something that was publicly acceptable, but became publicly unacceptable, not because of the technology, but because of DOE's implementation process.

Mr. Cavanagh noted the good ideas from the Army experience in terms of what DOE might do both with public involvement and with the states. He emphasized the need to remain aware of actions by DOE after the Panel is done. The Panel's charge is to help DOE formulate and execute a technology strategy for their R&D budget; it has been stated repeatedly that a principal obstacle to their execution in the past has been public concerns and dealing with the States. He felt it would be important for the Panel to pursue opportunities to help DOE improve in this regard. The best hope for public acceptance at the end of the process will be a transparent effort that actually applies the best scientific judgment on the best alternatives to incineration.

Meetings: Schedule and Agenda

Mr. Cavanagh suggested that the September 27th meeting include a presentation in of the current DOE R&D plan for alternatives to incineration is presented in great detail to the Panel, and the Panel has the opportunity to ask questions occur. He stressed the importance of reserving a substantial part of the meeting for deliberation.

A meeting to discuss the responses to the RFI was scheduled for October 11 in Albuquerque with an alternate location being Denver. (Note: Denver was subsequently selected.) The subpanel for reviewing the RFI responses was scheduled to conduct a planning teleconference at 3:00 p.m. on September 22.

Public Comments

Mr. Tom Stevens noted that a lot of the procedures working with nuclear materials are classified as secret, top secret, confidential, etc. He thought the Panel would probably encounter this shield of secrecy when sensitive data was requested. He noted that DOE notoriously classified problems to make them disappear. He wondered how the Panel proposed to pierce this veil of secrecy. A brief Panel discussion concluded that some members of the Panel held high clearances that could possibly be used; they would wait to see if problems arose.

Mr. Mike Spritzer, General Atomics in San Diego, California, encouraged the Panel to consider the Army's programs that parallel the Panel's mission, specifically the assembled chemical weapons program described earlier by Dr. Seeker. He referred to a prior Army program, not mentioned by Dr. Seeker, which developed or evaluated alternative technologies to incineration for two chemical agent bulk sites at Aberdeen, Maryland and Newport, Indiana. He also wanted to correct an impression that the chemical alternatives were focused only on well-defined matrices since many must deal with extremely complex matrices. He contended that the spectrum of wastes, while not identical to the wastes involved at Idaho, were more similar than dissimilar. He concluded by wishing the Panel good luck in their very difficult and challenging mission.

In response to questions about contacts from Dr. Resnikoff, Mr. Spritzer suggested starting with someone like Dr. Seeker, and possibly with others in the Army program such as Mr. Joe Novad, who was previously mentioned by Dr. Seeker. He added that there were people at ADL in Boston who were very closely aligned with this program, and named Armand Balasco as a key individual.

Mr. Mike Fitzgerald, Teton Village resident, stated that the impact of a billion-dollar incinerator on the economy of Idaho is, in effect, putting $3 billion into the economy of Idaho. For a state the size of Idaho, it is extremely important. He encouraged the Panel to look at the private sector, not in conflict with DOE, but really as a supplement to it. He noted that he had attempted, in vain, to give DOE information on the solid waste disposal method that Delphi Research had sent him. Mr. Cavanagh noted that Delphi Research would be included in the RFI submittal.

Dr. Melissa Clark Rhodes, Jackson, Wyoming resident and retired Ph.D., offered that the Panel appropriately includes scientists and legal experts, because the waste treatment and disposal problem is partly scientific and partly regulatory. She noted improved communication between the DOE, the scientists on the Panel, and the public. Despite some doubts regarding the usefulness of this Panel expressed on the previous evening, she stated that the value had already been proven.

Ms. Sandy Shuptrine, Teton County Commissioner, stated that the application of risk assessment in evaluating alternatives was extremely important. She hoped that there

would be some recommendations for tracking health assessments both for workers and the surrounding area. She hoped the Panel would be open to considering some revisions in regulations should they be appropriate and expressed confusion as to how these standards were set. In response to a question from Dr. Budnitz, she responded that there were standards that shaped the Settlement Agreement and were creating pressure to move forward, and she hoped that those standards were clearly scientifically valid. Dr. Budnitz shared his perspective that standards, such as the PCB standard, were generally adopted on a national basis without specific regard for any particular waste stream.

Summation and Closing

Mr. Cavanagh summarized the Panel's tasks and the Panel discussed the tentative format of the report.

Mr. Cavanagh reviewed the action items. He will work with Ms McCann and Mr. Cooley to make sure that the right presenters attend the September meeting to present the R&D plan for alternatives to incineration. Ms. McCann will work with Dr. Molina to set up his subcommittee and to determine what technical support beyond Mr. Cooley is required.

Dr. Resnikoff and Dr. Till will refine the Panel's inquiries regarding the waste forms and characterization of the waste stream. Dr. Resnikoff and Dr. Till will report their reactions to that material at the September meeting. Ms. McCann will inform them that they are an important part of the agenda; they will lead a discussion on the topic. The Panel will confirm that the Albuquerque meeting can be held in Albuquerque. If not, the alternative will be Denver. Mr. Cavanagh will circulate the report outline for comment and review no later than Labor Day weekend.

Mr. Cavanagh noted that although the deliberations of the Panel were subject to the Federal Advisory Committee Act, which required public deliberations on the record, the conference calls are only an aid to the deliberations and are not on the record.

After brief closing remarks and expressions of appreciation, Mr. Cavanagh adjourned the meeting at 12:00 noon