NRC Workshop on Control of Solid Materials
October 5-6, 1999
Crown Plaza Atlanta Powers Ferry
6345 Powers Ferry Road NW
Atlanta, GA

Meeting Summary

Tuesday, October 5, 1999

I. Welcome and Staff Introductions

Donald Cool, Director, Division of Industrial and Medical Nuclear Safety, U.S. Nuclear Regulatory Commission (NRC), began the meeting by welcoming participants to the second NRC Workshop on the Control of Solid materials. In his presentation, he noted that there are currently no national standards that address appropriate levels of radioactivity in solid materials with which to assure public health and safety. Dr. Cool also observed that there are many materials in the environment outside of traditional licensed activities, which contain naturally occurring or man-made radioactivity. He commented that providing for the protection of public health and safety is further challenged by the task of determining how much radioactive material is allowable in other material while at the same time conserving resources. Dr. Cool stated that the current case-by-case approach to controlling solid material has contributed to the continuing debate and redefinition of appropriate levels of radioactivity. In response, he explained that the NRC decided to engage in a national dialogue on the issues associated with controlling solid waste to determine whether and under what conditions materials with small quantities of radioactivity should be disposed of in a licensed facility, safely reused or recycled.

Dr. Cool observed that many individuals support the idea of applying appropriate controls to solid material on the basis of the risks posed by the material. He stated that this and other future workshops are parts of an enhanced participatory rulemaking process that was initiated to help define the appropriate regulatory vehicles for establishing a national standard on the control of solid material. Dr. Cool described the workshops as an opportunity to hear from NRC staff and to hear the diverse perspectives of the public on potential rulemaking alternatives. He hoped that in the discussion, the group would explore the pros and cons of both old and new options. In this regard, Dr. Cool stressed that the options for rulemaking presented in the Issues Paper do not represent all possible options, and welcomed new ideas from the public. Dr. Cool then introduced the facilitators for the meeting, including Chip Cameron, Special Counsel for Public Liaison and Waste Management, NRC, and Dr. Michael Lesnick and Barbara Stinson from the Meridian Institute. He turned to Ms. Stinson to begin the discussions at the meeting.

Ms. Stinson also welcomed participants to the meeting. After describing the Meridian Institute, she restated the purpose of the meeting and clarified that the NRC staff was interested in fully considering all of the regulatory approaches to enable them to provide a fully informed recommendation to the NRC Commissioners in the spring of 2000. She explained that, through

the convening process, Meridian talked with a variety of interest groups and found that some individuals chose not to attend the meeting because they were not yet up-to-speed on the issues or they were concerned about precedents they felt had already been set regarding the process. Ms. Stinson described the role of the facilitators and indicated that highlights from the flip chart notes taken at the meeting, a transcript of the meeting and a full meeting summary would be available on request following the meeting. Ms. Stinson also noted that the next workshop would take place in Washington, D.C. on November 1 and 2, 1999 and a fourth workshop was planned for Chicago, IL on December 7 and 8, 1999. She then initiated a round of introductions and reviewed the agenda for the meeting.

II. Why are we here today?

Patricia Holahan, Division of Industrial and Medical Nuclear Safety, NRC, began with an overview of the origin and purpose of the meeting. She noted that one reason for the meeting was to address the congressional mandate and NRC responsibility for the protection of public health and safety and the environment. Following her presentation, Dr. Holahan asked for insights and input on regulatory alternatives relating to the control of solid materials, as well as on how to further enhance the rulemaking process. As a point of clarification, Dr. Holahan stated that the comment period on the Issues Paper was extended from November 15, 1999 to December 22, 1999.

Breadth of Materials and Alternatives Covered

A participant from the steel industry felt that there had been too much discussion on steel recycling at the San Francisco, CA workshop and he hoped that the discussion at this meeting would include how the rulemaking might affect other metals and solid material. Ms. Stinson commented that input from the copper, nickel, other metals and concrete industries was solicited in the convening process and she hoped there would be additional involvement from these industries at the Washington, D.C. workshop. She invited participants to provide additional information on individuals to contact for a broader representation. Stephen Klementowicz, Office of Nuclear Reactor Regulation, NRC, reiterated that as part of this process the NRC is also looking at other metals, soils and concrete.

Another participant from the fuel cycle industry commented that metals are not a large part of their waste stream. She explained that her industry generates byproducts from processing natural uranium and other solid waste including soil. She commented that reuse and recycling is part of their process and that the cost of different waste handling alternatives is a major factor in how they do business.

Robert Nelson, Chief, Special Products Section, Division of Waste Management, NRC clarified that the release of material addresses three scenarios including recycling, direct reuse, and disposal in other than a regulated a low-level radioactive waste (LLW) disposal facility. He commented that the group should try to consider all of these scenarios in their discussion, not just the recycling of metals and steel.

EPA Involvement

One individual from the recycling industry requested clarification on whether and how the NRC was coordinating with the U.S. Environmental Protection Agency (EPA) on the rulemaking effort in view of EPA's prior related efforts. Dr. Holahan confirmed that EPA had a similar rulemaking effort and that effort was currently on hold. She explained that EPA was contributing to the technical aspects of the issue in a work group on the NRC rulemaking effort. Mr. Karhnak, EPA, added that, in the process of addressing this issue in the prior rulemaking effort, EPA determined that the volume of material that might be recycled was very small compared to the total amount of material recycled in the U.S. In addition, he explained that EPA determined there was a greater problem with the orphaned radiation sources that ended up in scrap metal and recycled materials from foreign countries. He stated that EPA prioritized these concerns and is working with other states and the Conference of Radiation Control Program Directors (CRCPD) on the orphaned radiation sources, and with the International Atomic Energy Agency (IAEA) to control the sources of material from foreign countries. Mr. Karhnak reiterated that EPA did not abandon working on a standard.

Public Involvement and Education

One Agreement State representative supported early public involvement because it will make the process credible. In addition, several individuals felt it was important to have early public involvement because a rulemaking would also impact the public and many industries that are not currently regulated by the NRC or Agreement States.

A representative from the nuclear fuel industry was discouraged that representatives from the public interest community were not present to comment at the meeting. He felt that if the public was informed about the presence of background radiation and safe dose standards were established properly, they would accept standards proposed by the NRC.

Another individual from the metals recycling industry commented that the public is involved and informed by environmental organizations and various forms of news. He observed that, based on that input members of the public have clearly stated that they do not want radioactive scrap material in the market place. He cautioned that, if the pubic perceived that this material is in the market, they would not buy the affected products. He noted that the public must have a comfort level about the safety of the products on the market or there is a risk of repeating the experience of the Below Regulatory Concern (BRC) Policy in the early 1990s. In contrast, one participant felt that, based on her experience in the industry and public involvement regarding the Paduca site, the public did not fully understand the various dimensions of this issue. Mr. Karhnak, EPA felt that, based on his recent experience corresponding with the public about their concerns about radiation risk, there was some misunderstanding amongst members of the public. As an example, he recalled receiving a number of letters from the public in response to some EPA technical reports on radiation, which included an evaluation of recycling material, requesting that EPA not allow the recycling of material because the public did not want to be exposed to radiation. Mr. Karhnak explained that EPA responded to each of the letters with information on radiation risk including information on naturally occurring radiation, but received no indication that the members of the public understood the reality of radiation exposure.

Public Perception

Many participants from the steel industry were not supportive of recycling radioactive metals into steel because of the public perception that their products were unsafe. One representative stressed that the safety of their product was paramount and he would not risk the public perception that their product was unsafe because of recycled of radioactive material. Several others from the same industry agreed that the public would not buy products with radioactive material, regardless of how low the concentration was. They felt that a negative public perception of their product would jeopardize their livelihood. For this reason, they commented that the impact on steel recycling, aluminum and nickel recycling, and products made from scrap metal need to be addressed when considering rulemaking alternatives.

Dr. Robert Meck, Senior Health Physicist, NRC, observed that while public safety and public perception are linked, they are also independent issues. He asked the group for guidance on where the NRC should focus its efforts. It was the opinion of a representative from the nuclear industry that the key issue is public acceptance of and trust in the regulatory structure that is adopted. He noted that, since World War II (WWII), all recycled steel has had some level of radioactivity. Recognizing this and that there are also limitations in the ability to detect very low levels of radiation, he acknowledged the need to establish the criteria for the release or clearance of material from a facility. He felt it was important to determine whether there was a preference for a consistent health-based clearance standard or the "patchwork quilt" of criteria that has evolved over the years for the release of materials.

Setting a Standard

One participant from the recycling industry requested additional information on the American National Standards Institute (ANSI) consensus standard. It was explained by a member of the Health Physics Society's N-13 Committee that the standard addressed the need to move beyond surface contamination to volumetric contamination and to look at more things within a facility including tools and heavy equipment. He stated that the standard could be used to help move some of the larger equipment from a restricted area to an unrestricted area, thus potentially reducing the cost of disposal at a LLW site.

Several representatives from the recycling industry were supportive of establishing a standard for recycled metal and other high volume equipment. One individual commented that there are large volumes of equipment with no radiological history that are potentially suspected of contamination because of the area in a facility from which they originate. He felt it would be more costly to dispose of the equipment absent a standard to validate that the equipment is clean. Another individual from the industry observed that licensed facilities are highly regulated and strictly prohibited from releasing materials with volumetric contamination. He also felt it was important to distinguish between the recycling of sources, which are regulated throughout their use and disposal, and scrap metal. He stated that the volume of scrap metal was small and agreed that it was essential to establish a lower limit of residual radioactive activity below which scrap materials should not be regulated.

An individual from the nuclear technology industry agreed that it was essential to establish a

standard to sort materials at a facility to determine the disposition of the materials. He stated that there is a need to define a clear set of criteria and a threshold for what can be released because materials impacting the steel and other metals industries are being released every day. In addition, he felt that it was necessary for the standard to be consistent and that consistency will help to build public trust in the process.

Another participant suggested that the NRC take an approach to setting a standard that is similar to that of the Federal Aeronautics Administration (FAA) where they determine an appropriate value for the standard through numerical analysis and probabilistic risk assessments and then stand behind the value. As an alternative, an individual from the power industry suggested using Regulatory Guide (RG) 1.86 and establish limits based on "as low as reasonably achievable" (ALARA) requirements.

A representative of the U.S. Department of Energy (DOE) saw a possible need for the NRC to consider coordinating their efforts with the IAEA when setting standards. In a similar vein, he wondered if it made sense for the U.S. to establish standards without considering the standards in other countries that import materials that are derived from recycled radioactive material on a daily basis. Dr. Cool responded that the U.S. is generally trying to work closely with other countries to look at issues like orphan sources because there is a lot of interface between the countries. He referenced the work that Gwendolyn Bauer, U.S. Department of State (DOS), is doing with an interagency group called the International Radioactive Source Management, which interacts with the IAEA. Ms. Bauer commented that this group plans to meet the week of October 11, 1999 to discuss coordinating their efforts with the IAEA in the area of orphaned sources on issues like clearance standards at which time they hope to get an update on IAEA progress in its efforts to coordinate international guidance on clearance standards. Mr. Karhnak added that the U.S. agencies are also working with the IAEA on a draft Technical Document Number 855 (Tec Doc 855) dealing with the release of materials which he hopes can bring some science to bear on the process.

Alternatives

An individual from the steel industry requested clarification on how the current case-by-case approach would differ from applying a standard. Dr. Cool responded that the NRC is grappling with this question as part of the process. He commented that the answer would depend on the outcome of the process or the option selected, and what criteria are applied. For that reason, he indicated it would be helpful to have a better idea about the volume of recycled material.

The group discussed how the economics of the different release alternatives factored into what the industry considers to be viable alternatives. A participant from the decontamination and decommissioning industry observed that the cost of disposal in a LLW facility ranges between forty and sixty dollars per cubic foot in contrast to twenty dollars per ton for disposal in a Subtitle C or D landfill. The high cost of disposal at LLW disposal facility was recognized as the reason for the focus on the more economical option of recycling. While recycling was recognized as more economical, it was also observed that both the recycling and steel industries experienced costly and damaging problems as a result of recycling radioactive materials.

Another individual from the steel industry described the concept of a dedicated NRC licensed melter as a potential alternative for scrap metal that might be economical and more acceptable to the general public. He explained that the scrap material would go to a licensed melting facility, which would refine the metal and clean it through the heating process. While the participant felt that alternatives like this were important when considering economic viability and ALARA requirement, he also acknowledged that the steel and nickel industries were currently not interested in accepting the melted material in their production processes.

III. How does what we are discussing today fit into the overall picture?

Dr. Holahan provided the group with an overview of how the discussion for the day relates to the following issues: the types of solid materials and the NRC licensees involved; the potential radiation dose being considered and how it compares to the dose received from other radiation sources; and, information on what other countries, agencies, and/or States are doing with regard to the control of solid materials. After her presentation, Dr. Holahan invited questions and comments from participants on these issues.

Monitoring and Technology

Several participants posed questions about the measurement of radionuclides. One individual requested clarification on how the measure of one millirem per year (1 mrem/y) equates to what is measured when the radioactivity is measured directly in front of the source. Mr. Anthony Huffert, Division of Waste Management, NRC, began by noting that there was no established dose standard at this time. He explained that the value measured is the radionuclide concentration per hour, which must later be converted to a dose level. Assuming the monitor is calibrated to the radionuclide measured, he noted that the measured value is then converted to a dose using a method presented in NUREG-1640. Mr. Huffert also noted that, as would be discussed later in the meeting, additional different information is presented in RG 1.86. Dr. Meck added that the answer depends on the radionuclide, the detection capabilities of the monitoring equipment, and the distance the measurement is taken from the source of radiation. He also noted that the measurement would represent a value measured per hour versus a value measured per year. As a follow-up concern, some participants from the metals recycling industry stated that current hand-held monitoring equipment was not designed with the sensitivity that might be required. They felt that, if more expensive, advanced laboratory equipment were required, it would be difficult to clear and release large equipment in the field.

Establishing a Standard

A number of the participants were supportive of establishing reasonable standards that would enable clearance in the field of potentially radioactive material in a practical way. In their discussion of standards, the group was asked to consider the range of potentially affected materials. An individual from the nuclear technology industry commented that, for the clearance standard to be practical, it should be consistent and apply to all materials that would leave a facility. For this reason, he was supportive of establishing a dose-based standard. In addition, he felt that controlling the release of potentially radioactive solid material should be done in the context of how NRC addresses the release, use, and disposal of other potentially radioactive

materials such as waste water, air and ash from facilities, smoke detectors, and people treated with nuclear medicine.

The participants discussed different ideas about potential standards. One individual from the nuclear technology industry commented that the dose consequence could be customized and could be 1 mrem/y for recycling, 10 mrem/y for decommissioning and 15-25 mrem/y for disposal. A representative from a federal agency observed that, because circumstances require frequent monitoring with equipment in microrem per hour (mrem/h), it would also be helpful to address a standard in terms of hourly measurements in addition to mrem/y. An individual from the steel industry agreed that, while a dose limit of 1 mrem/y was possible when measuring a large mass of material, there were limitations in using a dose-based standard to back-calculate to mrem/h. He felt that the process of back-calculation did not address the flux (number of gamma rays emitted from the material.) Another representative from the recycling industry recognized that the licensee would probably always have to measure down to low levels of contamination and calculate the corresponding dose. He added that industry could evolve to a potential standard of 1 mrem/y but that setting a standard of 0.1 mrem/y would cause an "industrial revolution." Of most concern to him was the possibility of setting a standard of zero or non-detect because background concentrations would obscure these measurements. As a point of clarification, another individual from the nuclear fuel industry explained that they clear materials by individual pieces of equipment further upstream in the process based on RG 1.86, after which the material is stockpiled. In addition, he indicated that their industry is able to meet the 1 mrem/y standard as presented in the NUREG-1640 scenarios.

One individual from the fuel cycle industry asked if, in its evaluation of a potential standard, the NRC planned to consider the case-by-case standards of the past regarding materials that are being released today. Dr. Holahan responded that, as part of their overall effort, the NRC would look at current practices through the licensing process. Mr. Huffert also indicated that part of the response to this question would be answered during the discussion on NUREG-1640. However, he explained that regarding soils, the NRC would consider past practices at NRC licensed facilities and perform an extensive literature search with the help of the U.S. Department of Agriculture.

Cumulative Effects

Another individual from the recycling industry inquired whether the NRC planned to study the potential for the cumulative effects from using melted recycled material. He clarified that, unless the melted material would be released for a specific use, it was important to evaluate the potential for cumulative radioactivity after melting because the smelters would assume the liability of increased cumulative value of radioactivity. Mr. Huffert responded that the NRC evaluated both the effect of the possibility for build-up of radioactivity and contribution from multiple sources. A participant from the metals industry observed that the potential for the cumulative effects of radioactivity was presented as scenarios in NUREG-1640. Dr. Meck explained that tomorrow's presentation would provide additional details on their analysis and the regulatory approached used.

Available Technology

Several participants commented that it was important to have the technology for monitoring to the potential standard before the standard was set. Some individuals questioned the ability of current hand-held dose rate instrumentation to detect 1 mrem/y. In this regard, a participant from the nuclear energy industry commented that, while there is technology to detect a range of radioisotopes, the technology is challenged as the detection limit is lowered. In addition, he felt it was important to establish a standard that could be implemented.

An individual from the DOE felt that if a value of 1 mrem/y is proposed as the standard, the public should be confident that the standard is measurable. To respond to this concern, a representative from the metals industry stated that, using the information in NUREG-1640 and assuming a dose limit of 1 mrem/y, it was possible to detect 14 to 21 different radionuclides if the concentrations were high enough and the source had enough mass. Dr. Meck clarified that NUREG-1640 is a tool for assessing does and does not assume a standard. In addition, he explained that NUREG-1640 does not address measurement and implementation. Mr. Klementowicz acknowledged the concern about available technology and stated that, if the NRC proceeds with a rulemaking, it will require that instrument standards be developed early on in the process. He also indicated that the potential standard might require more sophisticated monitoring equipment.

Economic Impacts

In addition to the concerns about available technology, some participants raise issues about the potential economic impact of a standard, monitoring, and dose calculations. Several participants from the recycling industry commented that as the process of releasing material becomes more complicated and includes dose calculations for multiple pathways in addition to increased data needs, it will become less economical to recycle material and more economical to dispose of it. A representative from a federal agency observed that when developing the standard, the NRC should consider coordinating their efforts with the IAEA to help U.S. industry remain competitive with foreign countries in the scrap metal market, particularly for metals like copper and nickel that are sold by the pound.

International Concerns

When considering a standard, a representative of the DOS commented that it is important to recognize that an organization like the IAEA is responsible to consider whether its member states and countries are equipped to meet a potential standard. She added that in other countries there are different economies of scale and the level of technology will not be the same. Dr. Meck added that the NRC recognizes that, while its authority is limited, its actions might have ripple effects in the international arena. He explained that that is why the NRC had been working on some developments that overlap with the international arena, including coordinating with EPA on their technical analysis for dose assessment and the IAEA in the development of the draft Tec Doc 855. He noted that the NRC also attends meetings with them, some of which are with the European Union. Dr. Meck stated that the European Union has not settled on a clearance criteria but is has issued Recommendation No. 89 on metals, which a number of the member states are considering adopting in May 2000. As a follow-on comment, a representative from the nuclear

technology industry felt that focusing on the concerns about pubic perception on health risks is a luxury, which is not shared by the international community which tends to be more interested in practical implementation and clearing or controlling material.

IV. How does NRC currently handle control of solid materials?

Mr. Anthony Huffert, NRC, began the presentation on how NRC currently controls solid materials. His presentation covered information on the NRC's case-by-case approach, and the amount of solid materials released to date under current practices. After the presentation, Dr. Lesnick invited participants to ask questions of clarification and to provide comments.

Questions of Clarification

One participant from the recycling industry asked how NRC would address the decommissioning of sites if there were no rulemaking. Mr. Huffert responded that the NRC would continue their current case-by-case approach, using existing guidance values in RG 1.86. A representative from the nuclear industry added that, without a standard, as facilities are decommissioned, more material would be released and some of the material with greater than 25 mrem/y, would remain on site under the Decommissioning Rule. In contrast, he suggested that establishing a standard would provide an incentive to develop technology to decontaminate material for disposal or release.

A representative from the fuel cycle industry asked if the NRC planned to reduce the number of inspectors and whether that change would result in a move away from the case-by-case approach. Mr. Huffert responded that to the NRC, all options are open at this point, including taking a look at maintaining the case-by-case approach. Mr. Klementowicz added that, in the case of power reactors, as part of the Reactor Oversight Program, regardless of the number of inspectors, each inspector would adhere to a new risk-informing baseline procedure.

An individual from the steel industry explained his understanding that solid materials were being cleaned and not released to the environment. He asked for clarification on how the NRC was addressing these issues under RG 1.86. Mr. Huffert commented that materials with surface contamination would be screened and the results of the screening compared with the limits in the license or the Regulatory Guideline for release or other handling. He stated that materials with volumetric contamination, which are not covered under RG 1.86, would be addressed on a case-by-case basis. It was also clarified that only NRC is notified about the release of material from the facility and that material with no radiological hazard is not documented. Mr. Klementowicz added that, for power reactors the guidance is contained in Information Notice 8107 (IF 8107) issued in 1981. He explained that IF 8107 established as a release limit a value of 5000 disintegrations per minute per 100 centimeters squared (dpm/100 cm^2) which is interpreted as "no detection," a value that is consistent with information in RG 1.86. He noted that, based on this limit, if a more sensitive survey is performed, it is possible that radioactivity would be detected below the detection standard resulting in the release of radioactive material below that level.

A representative from the recycling industry asked for clarification on how RG 1.86 is applied when materials do not fall within or exceed the guidelines. Mr. Huffert explained that, for materials facilities, RG 1.86 has been applied in some cases and in other cases the facility uses an alternative. He stated that the NRC might establish a release limit that is higher or lower than those established in RG 1.86, depending of the license. Mr. Klementowicz noted that, instead of referencing RG 1.86 in their licenses, power reactors apply the "no detectable" standard. However, he clarified that this standard is consistent with the value in RG 1.86 of 5000 dpm/100cm^2. Mr. Klementowicz also stated that, if licensed material is identified with sensitive screening equipment, the facility must petition to release or dispose of it. After hearing this explanation, one participant requested clarification on the term "no detectable." Mr. Klementowicz explained that in IF 8107, the NRC established this as the "no detectable" standard for surface contaminated material. He noted that for volumetric contamination, the NRC established the environmental lower level detection (LLD) that is consistent with the power reactor's technical specifications to perform the environmental survey.

Another participant requested clarification on the equivalent dose rate for 5000 dpm/100 cm^2. Mr. Huffert responded that, based on IF 8107, 5000 dpm/100cm^2 was roughly equivalent to 5 mrem/y. He noted that the value was updated in NUREG-1640, where the NRC explains that the answer depends on the radionuclide and can vary from less than 1 mrem/y to 16 mrem/y.

Pros and Cons of the Case-by-Case Approach

As a point of clarification, Mr. Nelson, NRC, emphasized the importance of understanding the case-by-case approach because, whether or not there was a rulemaking, the approach would either change or stay the same. He clarified that the current and future approach would apply to power plants, fuel recycling plants, doctor's offices, pharmaceutical research labs, and other entities using radioactive material within the NRC licensing base. To highlight some of the potential pros and cons of the case-by-case approach, Mr. Nelson presented a scenario of a licensee who was responsible for a contaminated building. He noted that, while RG 1.86 is applicable to many of the surfaces in the building, the path for release of volumetrically contaminated material was unclear, time consuming, potentially costly, and must be handled on a case-by-case basis.

As a follow-up to this scenario, an individual from the nuclear energy industry commented that, while it is apparent the case-by-case approach might be less efficient, with or without a standard, there will be more material to address with the progress of decommissioning. He also observed that a key issue in either case is the ability to determine whether the material is contaminated or not, and whether there are alternatives to address the contamination. He was supportive of the need for firm guidance and a structure for decommissioning and felt that a standard would address this need.

Several other individuals felt that the case-by-case approach was time consuming and cumbersome. As an example, one individual from the decontamination and decommissioning industry cited a decontamination and decommissioning plan for a research facility that was submitted to the NRC for approval which took over two years to process. Some participants

noted that, when materials exceed the RG 1.86 guideline, the process of petitioning for alternative disposal is unclear and cumbersome. An individual from the nuclear energy industry felt the process would be streamlined if there were a national standard.

Many participants were supportive of RG 1.86. An individual from the recycling industry observed that, in 25 years of application, RG 1.86 is well understood, has been robust, and is protective of public health. A representative from an Agreement State commented that they used RG 1.86 successfully as a guideline for segregating and disposing material in LLW facilities. One representative from the nuclear energy industry felt that the Regulatory Guidance should also be applied to nuclear reactors. Another individual from the recycling industry described a successful cleanup of a bag house at a steel mill that was contaminated by a natural cesium release using the case-by-case approach and RG 1.86. A representative from the fuel cycle industry commented that, as a result of the case-by-case approach, they are able to recycle one of their byproducts, synthetic calcium fluoride, for later use to produce hydrofluoric acid.

Participants were also asked to comment on some of the limitations of RG 1.86. One representative from the recycling industry noted that RG 1.86 does not specifically address tritium and carbon-14 (C-14). He suggested that the 5000 dpm/100cm^2 was a factor of 1000 too low. A representative from the metals industry commented that the value was high and allowed for the release of potentially contaminated material. One individual felt that RG 1.86 did not provide guidance on standards for field instrumentation, such as calibration and decontamination protocols, consequently it is hard to correlate instrument readings. While this weakness was acknowledged by another individual in the steel industry, he also noted that a lot of government agencies dictate cleaning procedures prior to measurement.

Alternatives to the Case-by-Case Approach

An individual from the recycling industry asked the group to consideration the potential impact on the flow of material if a standard were in place, which required that equipment released from decommissioning had a specified use. One participant from the nuclear energy industry suggested that the flow of material would become more complex, more material would remain on the site, and valuable equipment would not be reused. He proposed that a more reasonable scenario would be to apply a standard with safe secondary recycling. Another participant from the metal recycling industry commented that the restricted use alternative has a limited capacity and placing material in "shield blocks" should not be the only alternative. A representative from an Agreement State commented that applying a national standard would also help to alleviate the confusion resulting from different interpretations of the term, "no detectable."

As a potential alternative, one individual from the recycling industry suggested considering a graded approach, which might apply more than one standard. He recognized that RG 1.86 does a good job addressing surface contamination, and proposed as an alternative that a more systematic, case-by-case approach be applied with a lower detection standard for volumetrically contaminated material, such as 10CFR 20.2002 or 20.302. In response to this suggestion, another individual from the recycling industry commented that, while there is a lot of guidance in these documents, it is hard to find. He suggested the need for providing specific realistic

scenarios as guidelines.

V. What are some other alternatives for addressing control of solid materials?

Frank Cardile, Office of Nuclear Material Safety and Safeguards, NRC, gave a presentation on other alternatives for addressing control of solid materials. The alternatives discussed included: 1) continue the current case-by-case practice; 2) set acceptable dose levels in a regulation which must be met before materials could be released for unrestricted use; 3) establish restrictions limiting release of solid materials to certain authorized uses; and, 4) establish a regulation that does not permit release of materials that had been in an area where radioactive material was used or stored. Following Mr. Cardile's overview, Chip Cameron, NRC, invited participants to ask questions of clarification and provide suggestions.

Alternative # 1
There was no discussion on Alternative # 1.

Alternative # 2
One representative from an Agreement State asked for clarification on what was meant by "setting acceptable dose levels". Mr. Cardile explained that NRC would, through regulation, set a dose-based standard at a mrem/y while at the same time developing guidance on how to correlate concentration levels to that dose-based standard.

Alternative # 3
An individual from the DOS asked if the NRC performed an analysis of the potential impact of Alternative # 3 on the regulatory community. In addition, she inquired whether this alternative would result in a greater amount of released material and less burden on the disposal community. She also asked if the U.S. is prepared to assume limited-use imports as a result of implementing this alternative. Mr. Cardile commented that the NRC is evaluating the potential ramifications of these questions as part of the information presented to the Commissioners in the spring of 2000. Mr. Nelson added that, in regard to the international aspects of this alternative, the international community is looking at authorized first use in their clearance framework. He also described restricted or authorized use as intermediate steps to ultimate clearance, where the analysis would be similar to that use for clearance. Several other participants expressed concern about the potential for international implications. One individual from a federal agency commented that, by adopting Alternative # 3 or # 4, the U.S. would be limiting its own release of material and potentially subjecting itself to an increase in foreign material.

Based on some of the questions raised in the preceding discussion, an individual from the recycling industry asked who would control contaminated material. He also asked for clarification on the control of imported contaminated material. His third question was about the control of importing finished products that were made from decontaminated materials. Mr. Nelson explained that 10 CFR Part 110 regulated the export and import of radioactive material. He noted that, unless the material was cleared from our regulatory control, a license under the terms of this regulation was required to import material. Mr. Nelson commented that the requirements would be similar for

imported material, and they would include designating a specific individual who is authorized and licensed to use the material. He clarified that Agreement States would be subject to the same process.

As a follow-on question to the discussion about 10 CFR Part 110 and the control of imported material, several individuals recognized the possibility that imported materials could enter the U.S. without our knowledge. One participant from the recycling industry felt that adopting a consistent standard would help to prevent this from happening. He suggested that a possible alternative to address this concern would be a combination of Alternatives # 2 & 3, as described below under ***Other Alternatives***. Another individual from the steel industry was supportive of this alternative with the modification that the alternative end at establishing the release standard, after which the specific uses associated with materials release would be handled separately along with concerns about public perception. The participant also commented that the doses should be practicable, risk-based levels relative to other established values. Also in the context of discussing alternatives, one individual from the steel industry observed a disconnect between the work the NRC is doing and the standards currently used by the U.S. Department of Transportation where they apply a 0.24 bequerel per cm^2 (Bq/ cm^2) for surface contamination.

One individual from the recycling industry asked if the European Union adopts the equivalent of a 1 mrem/y requirement and we maintain the case-by-case approach and our use of RG 1.86, what standard would their material be required to meet.

A representative from the metals industry wanted to know how the NRC planned to address the handling of steel and aluminum that have radioactive materials with long half-lives when the useful life of the structure is exceeded. Mr. Cardile explained that this was an example of the restricted use of the License Termination Rule where the NRC would terminate the license because the radioactivity would have reduced to low levels over the course of restricted use. He noted that it would be necessary to determine the extent of the period of restriction in advance of accepting the alternative. As an alternative restricted use, Mr. Cardile explained that the material would go into a license-type use, like a drum for packaging radioactive material. He asked participants to also consider if, as in the case of the licensed termination rule, unrestricted and restricted use should both be presented as alternatives, or should it be one or the other?

Alternative # 4

A representative from an Agreement State requested clarification on how, if a material in a facility has not been associated with the use of radioactivity, it was subject to this regulation. Mr. Cardile explained that, in discussing this alternative, the NRC tried to distinguish based on process knowledge, what equipment and material was and was not likely to have been exposed to radiation. Mr. Nelson clarified that the concern was how to distinguish or draw the boundary between areas that are and are not contaminated with radiation. In that regard, this boundary would have to be established for all licensed facilities including power reactors and doctor's offices. Another participant from the fuel cycle industry commented that, based on the definition within 10CFR Part 20, most of the office buildings are in a restricted area and would be subject to the limitations of this alternative. Mr. Cardile explained that this alternative does not refer to "restricted" areas as

defined in 10CFR Part 20, but rather areas that would be restricted based on process information. The facilitator commented that a possible alternative would be to further define the boundary between contaminated and uncontaminated areas by defining the areas of use and storage as "restricted," as defined in 10CFR Part 20. The participant was not supportive of this alternative.

One representative from the nuclear energy industry observed that the language in this alternative implies that it would not be possible to decontaminate or recover materials. In effect, he commented that the language took away the potential for technology innovation to reclaim radioactive material.

Other Alternatives

Alternatives # 2 & # 3 Combined - Combination restricted and unrestricted alternative where an acceptable, consistent, dose-based level or clearance standard is established to control the release of materials. Based on the standard, establish the handling options that might include keeping the material within a licensed community or disposal at a LLW facility. The alternative was viewed as similar to the License Termination Rule where there is an option of terminating the license with or without restrictions, thus enabling the flexibility of relying or not relying on institutional controls.
Modified Alternatives # 2 & # 3 Combined - Establish a practicable, risk-based level or clearance standard to control the release of materials. Issues related to materials release would be handled separately.
Two-Dose Limit - Establish a two-dose limit, one dose for recycling materials, and a second for disposal of materials in Subtitle C or D landfills.
Dedicated Melt Alternative - Decontaminate radioactively contaminated material by melting it in a licensed melt facility, which refines and cleans the melt. The contaminated material, process, and the byproducts are controlled in the process
Pilot Rule - Where limited kinds of materials and licenses could be addressed in a pilot setting.

Economic Concerns
A representative from the recycling industry commented that, when evaluating alternatives for addressing material that are or might be contaminated with radioactivity, it is also essential to consider the potential cost of each alternative before selecting the alternative. As an example, she noted that her industry has melted contaminated materials to produce storage drums for the DOE. She explained that the process was not cost effective for her industry because they were producing small quantities of drums, they were targeting restricted markets, and the work took place at a licensed facility. The participant commented that all of these factors combined to make the effort costly. Another individual from the nuclear industry cautioned that, while the NRC is required to do a cost-benefit analysis of alternatives, its primary focus should remain on the health and safety of the public and the environment, and industry should focus on how to do responsible business in the open market.

VI. How Should Control of Solid Material be Assured Under Various Alternatives?

Mr. Huffert, NRC, discussed the control of solid material under various alternatives. After his

presentation, Mr. Huffert asked the participants for their input on control measures.

A participant from the specialty metals industry raised an issue about restricted versus non-restricted use of radioactive by-products from the cleanup of a DOE contaminated site. Her key concern was the potential for public exposure to radioactivity as a result of mixing by-products like uranium from site cleanup in the production of aluminum. Because there were no experts on the subjects at the meeting, the facilitator asked the group to shift their focus to the more general question on the kind of approach and controls, such as labeling, stamping and licensing. In response to this suggestion, a representative from the recycling industry commented on some of the survey methods. He felt that, when surveying material at a site for free or restricted release, the process history should be used as one method of determining whether or not material has a radiological history. In addition, he proposed using statistical sampling programs for homogeneous materials such as low-activity resins to justify the representative sample to characterize the material for release.

To help orient the discussion, Mr. Klementowicz asked the group to comment on the following survey methods: a 100 percent survey of the material; representative sample of the material; use of engineering judgement; and statistical sampling. Dr. Meck added to the list what volume or surface area is appropriate to average over. To address the question about appropriate volume or surface area, a representative from the recycling industry commented that engineering judgement and common sense should factor into the determination of what is appropriate. An individual from the nuclear energy industry commented that all of the suggested tools would be necessary to evaluate a broad range of materials depending on different circumstances.

Wednesday, October 6, 1999

I. Radiological Assessments for Clearance of Equipment and Materials from Nuclear Facilities (NUREG-1640)

Dr. Robert Meck, Senior Health Physicist, NRC, began his presentation with an overview of NUREG-1640. He described the key elements of NUREG-1640 and emphasized that it was not a standard but rather a tool to help decision makers evaluate the alternatives for solid waste control. After his presentation, participants asked questions and provided comments.

Questions of Clarification

A representative from the recycling industry asked for clarification on the types of furnaces used to obtain the data in the study. For example, depending upon the type of furnace used, radionuclides might end up in the slag, bag house dust, or in the steel. In response to this question, Dr. Meck explained that NUREG-1640 utilized the electric arc and basic oxygen furnaces because, after consulting with EPA, they felt that these two furnaces best illustrated current industry standards.

Another individual from the fuel cycle industry requested clarification on the breadth of material covered by NUREG-1640. Dr. Meck commented that NUREG-1640 addressed ferrous metals,

copper, aluminum, concrete, and equipment. He noted that soils were not covered in the document but they were covered in a separate, ongoing study. Dr. Meck also observed that participants have also suggested that the NRC expand the document to cover other composite and specialty materials like roofing material, sludges and resins, and calcium fluoride.

One participant from the recycling industry wanted to know which workers experienced the greatest potential for exposure to radioactivity. Dr. Meck responded that truck drivers carrying the materials away from clearance, scrap yard workers, and sometimes slag workers. However, he explained that the particular group varied depending upon the physical and chemical characteristics of the radionuclide.

A representative from the recycling industry asked for more details on the annual exposure of the most exposed worker or critical group. Dr. Meck explained that NUREG-1640 allows the user to determine, if a standard were to be set at a reference value such as 1 mrem/y, the amount of radioactivity to which the critical group would be exposed for selected nuclides for each ton of scrap. To describe how this information would correlate with the standards established by the European Union, Dr. Meck noted that NUREG-1640 is more restrictive and, at a value of 1 mrem/y, the concentrations are invariably lower than the European Union values.

An Agreement State representative requested more information about the dispersion of the results for the critical group. Dr. Meck stated that, in NUREG-1640, they reported on the 5^{th} and 95^{th} percentile and found that the results varied depending upon the radionuclide. He noted that the amount of dispersion or uncertainty of the results was of concern and the NRC plans to provide the Commission with guidance on how to deal with uncertainty.

Another individual from the recycling industry requested more information on whether the NRC considered as a basis for comparison, the dose of radioactivity from material other than scrap metal. Dr. Meck responded that the NRC did not make this comparison.

Questions of Accuracy and Suggestions for Improvement in the Document

One representative from the metals industry questioned the accuracy of some of the information in NUREG-1640. He noted that there were questions about the NRC's knowledge of the public process and the breadth and representation of the database. He cautioned against drawing too much on a limited database about industries and how they operate. As an example, the individual noted that the document over-emphasized the use of electric arc and basic oxygen furnaces. In addition, he commented that steel industries produce different products with different operations, which may result in different physical characteristics (partitioning) of radioactive material. He also suggested that the NRC check the use of terminology and make it common to the metal-making industry to make the document understandable. In response to these comments, Dr. Meck provided a brief explanation on the process NRC used to collect their data. He welcomed additional comments and stressed that the NRC intended to address these and other comments received by the end of the comment period on December 22, 1999. Dr. Cool reiterated that the NRC would like to draw on the expertise of the participants at the meeting to help make NUREG-1640 realistic and accurate. He echoed Dr. Meck's request for additional comments on the document.

As a cautionary point, an individual from the recycling industry commented that some radiation protection experts argue against calculating collective doses or cumulative effects in sub-fractions of millirem levels because they are not confident in the results. In response to this comment, Dr. Meck clarified that the concept of a collective dose is used as a tool to help decision makers rather than a representation of actual exposure. In a similar vein, another individual felt there was a need for the NRC to clarify under what circumstances released material would be melted for use in consumer products because of the concern for cumulative exposure. After some clarification on the issue, Dr. Meck stated that the NRC was eager to receive comments on how to capture this concern effectively in NUREG-1640.

A representative from the recycling industry also commented that, for the purpose of communicating the results of the dose calculations, it would be helpful to provide a comparison of exposures resulting from different materials in different scenarios. As an example, he suggested showing the difference in exposure resulting from transporting a load of bricks versus transporting a load of scrap metal.

One individual from the nuclear energy industry commented that the approach represented in NUREG-1640 was sound. He felt that the document implied that, in the process of evaluation, the dose to the general public was essentially zero. In addition, he observed that, for those few individuals who might be exposed, the NRC intends to control the worst case exposure based on the established criteria.

II. Additional Discussion on Alternatives for the Control of Solid Materials

Robert Nelson, NRC, initiated the discussion on alternatives for the control of solid materials using the Issues Paper and comments from the first day of the workshop as a basis. As a starting point, Mr. Nelson spent some time clarifying the boundary of regulatory control and the concept of restricted use. He then asked participants for comments on his representation of restricted use and to continue their discussion on alternatives.

A representative from the nuclear energy industry felt that, rather than discussing the concept of restricted use, it was important for the group to remain focused on establishing a clearance level or the level below which there is no regulatory control over the released material. Alternatively, an individual from the recycling industry observed that establishing a release value without considering a restricted pathway would result in releasing material without regard for its future use. He suggested initiating a discussion on restricted use and then working towards a release value as a way to engage the concerned public in the discussion on a rulemaking. The participant cautioned that, without addressing this public concern in the rulemaking, the NRC would risk a repeat of the BRC. The point was also made that, regardless of the value for the standard, whether the material is released directly from a licensed facility or the standard is reached when the material is in the form of a bridge, it is still effectively a release standard.

In a similar vein, the group discussed where licensed activities or regulated control fit into the spectrum of restricted use alternatives. Several individuals felt for the discussion on alternatives to be fruitful, it was important to have clarity on where regulatory control ends, after release from a licensed facility, following post-release processing (e.g., melters), or after an authorized use such as in a bridge. Mr. Nelson reiterated that the reason he was unclear about the boundary of control was because the NRC was soliciting input from participants on the placement of the regulatory boundary.

To help the evaluation of the regulatory boundary, an individual from the recycling industry commented that it was important to know more about the "downstream" use of recycled material because of the variability of the recycling process and how materials are used subsequent to their release. For example, he noted that in some cases recycled material is reformed for reuse without melting, whereas in other cases, the metal is melted, reformed and returned to the recycling process prior to reuse. Mr. Cardile also noted that another factor to consider when evaluating authorized uses is that it is not the end user that sets the controlling dose, but the scrap truck driver or the person working in processing area.

An individual from the nuclear fuel industry stated that it was unclear whether the group was discussing the release of all material to restricted use or establishing a standard above which materials would be subject to restricted use. He commented that it would be a challenge to expect society to pay more for a product to prevent what he felt was a risk of a negligible increase in additional exposure to radiation. Another individual from the recycling industry stressed that, regardless of how many times the material is recycled, the key issue was to define the point of unrestricted release. He also commented that recycling was a less expensive alternative to

disposing of material in a LLW facility. He observed that, if it were less expensive to dispose of radioactive material, recycling would not be economical. Similarly, he felt that restricted use would not be economical because there are not sufficient resources to monitor divergent uses and it was not economically viable to have dedicated facilities producing products in competition with other similar products on the open market.

An individual from the nuclear energy industry described what he viewed as a two-tiered approach, which began with determining whether or not the material could be released based on established criteria followed by a variety of existing disposition alternatives. To him the decision point, which was a low value of radioactivity that does not pose a risk, was the key point of the discussion.

III. What are potential Health and Environmental Impacts of Various Alternatives?

Robert Nelson, NRC, initiated the discussion on the potential health and environmental impacts of various alternatives with the statement that the basis for NRC's consideration of these alternatives was to protect the public health and the environment. He then provided an overview of some of the potential impacts and invited participants to ask questions and comment on the presentation.

Overall Impacts

A representative from the metals industry noted that the assumption that recycled metals would replace raw metals and impact the mining industry is probably not valid in view of the small quantity of recycled materials involved. He suggested that the concept would be more accurately represented as replacing one form of recycling with another. Mr. Nelson observed that the NRC received a similar comment at the San Francisco meeting and explained that regardless, the issue would still be addressed in the Environmental Impact Statement (EIS).

An individual from the recycling industry felt that it would be appropriate in the EIS to evaluate the economic and ecological impact of the radioactivity in steel made since WWII compared with that resulting from recycling radioactive material. Another participant from the metals industry clarified that the impact of steel made since WWII would be more likely to influence shielding for low level detection and whole body counting and more sensitive materials like film.

Cumulative Impacts

Another individual from the metals recycling industry felt that a key health concern was the cumulative effect of radioactivity over time. He stated that in view of the fact that 46 percent of the materials used in steel production is recycled material, over a period of years there is a potential for an accumulation of materials from facilities both in and outside of the U.S. For a basis of comparison, he suggested that the NRC perform half-life calculations for several radionuclides and a statistical analysis on the cumulative additions of those nuclides over different periods. In addition, the participant proposed that the NRC look at the contribution from various waste streams.

Also, in regard to the potential for cumulative impact, a representative from the nuclear energy industry provided input from some focus groups discussing related issues. He noted that the

groups also raised concerns about the safety and cumulative risks of recycling radioactive materials. In addition, the groups wanted to be assured that the NRC would evaluate all of the different exposure pathways to insure that the public was not selectively exposed to excess radiation. The participant stated that the groups wanted to be able to trust that regulators would strictly control recycled material with effective enforcement.

A representative from the recycling industry expressed concern about reporting inaccurate or premature impact data. Mr. Nelson agreed that the communication of risk needs to be clear to avoid inappropriate conclusions.

Agreement State Concerns

A representative from an Agreement State observed that there were a number of policy issues raised in the discussion and requested that the NRC provide latitude for Agreement States in their implementation process. Mr. Nelson recognized the concern and that clarified that he heard the individual was also addressing the level of compatibility that might be assigned to the potential rule to enable states to implement changes or variations to the rule. As a further clarification, Dr. Meck felt that compatibility would be more of an issue when addressing intrastate commerce.

Environmental Justice

One representative from the fuel cycle industry inquired whether the NRC would consider the impact of increased disposal of radioactive material versus recycling on communities surrounding landfills in its EIS.

Multiple Sources

The group was asked to comment on the way in which multiple sources would be made from recycled material. In response, a representative from an Agreement State observed that regional processors in their state received scrap material from different "mom and pop" operations. He also felt that there was a potential for regional processors to receive materials from smaller recyclers in surrounding states.

Public Perception

The group discussed whether and how public perception of various alternatives factored into the assessment of the impact on public health and the environment. A representative from the fuel cycle industry felt that the public perception of increased exposure to radiation from recycled material in addition to the background radiation in materials made since WWII would be a real issue for the NRC to address in its evaluation of alternatives. Mr. Cameron, NRC, suggested that this concern accentuated the need for good risk communication and also identified the need to address public perception in the EIS. In response to this clarification, Mr. Nelson commented that it would be difficult to address public perception in the EIS unless the concerns could be quantified. Mr. Nelson observed that risk communication would be done more effectively in other venues such as public meetings. A representative from the metals industry recognized public perception as a real and important concern, but one that might be more appropriately addressed as a policy issue.

NUREG-1640

A representative from the metals industry commented on environmental impacts and the assumptions used in NUREG-1640. He observed that the assumptions in NUREG-1640 on the basic oxygen and arc furnaces should address the fact that there is a greater potential for the release of radioactive material from the process used in the basic oxygen furnace. In addition, he noted that the NUREG-1640 should also take into consideration the fact that there is some recycling (e.g., the recycling of sinter) that takes place within the steel-making process prior to the release of product.

Sensitive Populations

Mr. Cameron asked participants for comments on their concerns about sensitive populations. In response, an Agreement State representative stated that there are challenges both with addressing and not addressing sensitive populations. She explained that the public wants an EIS to address sensitive populations, however, by focusing the study on the sensitive population, regulators run the risk of effectively identifying them as a target population for risk. As a follow-up to this observation, Mr. Cameron asked how "worst case" analysis factored into the EIS process. Mr. Nelson explained that the EIS was developed based on reasonable scenarios using a critical or sensitive group, not by evaluating the worst case.

A representative from the nuclear energy industry commented that there are many different sensitive populations and that it would be challenging to regulate to protect all of them. He noted that, while the NRC has identified the fetus as a radio-sensitive individual deserving special protection, they have not clarified whether the public health standard of 100 mrem/y is safe for all members of the public including sensitive populations. He noted that a further complication is the fact that four out of five members of the public will get cancer and that members of the public are also sensitive to other environmental factors.

IV. What are Potential Economic and Cost-Benefit Considerations Associated with Various Alternatives?

Following the discussion on health and environmental impacts, Mr. Nelson provided participants with an overview of potential economic and cost-benefit considerations associated with different alternatives. After his presentation, Mr. Nelson asked the group for questions and comments, and input on other considerations the NRC should address.

A representative from the nuclear energy industry suggested that the NRC factor into their evaluation the cost of making a mistake, accidentally or otherwise, and releasing material at levels that are higher than the standard, the impact downstream from the facility, and the cost of remediation.

Another individual from the power industry commented that the cost-benefit analysis should include the cost of replacing the existing disposal capacity under 10 CFR 61 once the capacity is used up. He noted that siting and building that facility would be very costly and in the range of millions and hundreds of millions of dollars. Similarly, a representative from the steel industry

stated that the cost to the steel industry of losing its share of the food can industry to plastic or aluminum would be billions if not hundreds of billions of dollars.

One representative from the decontamination and decommissioning industry explained that they try to run a cost-effective business by recovering the value of materials at a facility to help offset clean-up costs. He explained that they use a graded approach that might be applied by others where they segregate material that has no history of contamination from contaminated material and focus their clean-up efforts in the areas of contamination.

A participant from an Agreement State commented that the options of disposal and free release are not the only options. He explained that, as part of the Decommissioning Rule, the licensee also has the option of leaving the material on the site upon license termination. The participant felt that the cost of this alternative should also be integrated in the cost-benefit analysis. Mr. Nelson acknowledged these comments and noted that there was a need to clarify the connection between the Decommissioning Rule and a clearance rule. An individual from the nuclear energy industry commented that the Decommissioning Rule did not address day-to-day materials that would be cleared out of the facility. He also noted that, if faced with a "no release" scenario, materials would either have to be disposed or the building would have to be left intact with institutional controls. He observed that the disconnect is between the 25 mrem/y plus ALARA set in the Decommissioning Rule and whatever value is set for a release standard in a clearance rule. Mr. Nelson clarified that the License Termination Rule (which is also referred to as the Decommissioning Rule) applies to soils and structures and explained the connection between the Decommissioning Rule and a clearance rule.

Another representative from the fuel cycle industry felt that the potential cost of upgrading monitoring equipment to address additional radionuclides and different standards should be factored into the cost-benefit analysis. Mr. Nelson responded that there would be a cost associated with upgrading equipment. He also noted that there would be additional protocols and possibly different equipment to measure volumetric contamination. In this regard, the participant inquired whether the NRC planned to grandfather the existing case-by-case sites or require them to adapt to the new standards. Mr. Nelson responded that there would be circumstances that the NRC would address based on cost considerations.

One participant from the nuclear fuel industry asked if the NRC had established a per person per rem cost estimate to help evaluate the cost of applying different standards. Mr. Nelson responded affirmatively and stated that a value of $2,000.00 was established in NUREG/BR-0058.

An individual from the LLW management industry commented that, with regard to LLW disposal versus release decisions, depending upon the value of the release standards that are set, economics would drive the decisions that are made in the industry. As an example, he noted that if the standard were set at 100 mrem/y, the market would shift back to disposal in a traditional LLW disposal facility and limitations would be imposed when the disposal capacity was used up.

A representative from the nuclear fuel industry cautioned against an alternative that the public

would perceive as releasing material to the environment. He suggested incorporating ALARA into proposed screening levels and continue handling releases of material on a case-by-case basis.

One member of the recycling industry commented that the economic impact of sending materials to a LLW facility would be minimal on carbon or iron-based steel, whereas it would have a measurable impact on the nickel and copper producers. He noted that copper and nickel are traded in much smaller volumes at cost per pound.

V. Additional Discussion on Implementation Issues

Ms. Stinson began the session on implementation issues by inviting participants to consider and discuss what they saw as NRC's greatest obstacles and opportunities to implementing the various alternatives discussed during the workshop.

A representative from an Agreement State commented that the Agreement States would want to see flexibility in the rule and the opportunity to be more restrictive, as needed. Dr. Meck acknowledged that some states currently regulate NORM differently. Based on this precedent, he expressed concern about the potential variation in regulation between different Agreement States.

An individual from the fuel cycle industry reiterated that she hoped the NRC would consider grandfathering some of the case-by-case circumstances based on economics and the fact that the case-by-case approach is successful at these locations.

One individual from the recycling industry encouraged the NRC to include a broad range of furnaces in their evaluation of furnaces in NUREG-1640.

Another participant from the nuclear energy industry commented that there is a full range of materials to be addressed by the alternatives and that steel comprises only 20 percent of these materials. He saw as an obstacle for the NRC, the need to expand the technical basis of their alternatives to cover the full range of materials. The individual suggested that the NRC consider using, as a reference, the American National Standards Institute (ANSI) standard for all materials. In addition, he advised that, if the NRC establishes a standard, they should take care in how they frame the decision and present it as a definitive value that is protective of public health and the environment.

A representative from an Agreement State requested that the NRC provide some guidance on measurement standards and protocols, particularly for the measurement of volumetric contamination. A second individual from the metals industry added that the protocols should also address good sampling techniques and statistics.

Letter Presented by Glenn Carroll

Ms. Stinson introduced Glenn Carroll, President of the Georgians Against Nuclear Energy (GANE) for some comments. Ms. Carroll referenced a letter to the NRC from 125 entities and individuals from environmental and public interest organizations addressing their decision not to participate in

the workshop. She explained that these individuals chose not to attend the meeting because they do not agree with releasing radioactive material to the marketplace, a view they also expressed in 1990 with regard to the BRC Policy, and again in 1993 during the NRC rulemaking procedure on decommissioning criteria for nuclear power plants. In addition, Ms. Carroll recognized two other practices of concern to them that are highlighted in the current NRC process, disposing in LLW facilities, and dismantling and landfilling used nuclear power plants. She also noted that the individuals who signed the letter share the concern for the high volume of materials that have been spoiled for other uses because they were used by the nuclear industry. Ms. Carroll stated that the signatories feel strongly that the NRC's approach should be to contain radioactive wastes, isolated from the environment. She requested that her comments be entered into the National Environmental Policy Act record.

Following the comments of Ms. Carroll, Ms. Stinson commented that a number of the issues raised in the letter and the concern about public perception also were of concern to other participants at the meeting and were represented in the discussion at the workshop. She then invited participants to continue with comments.

A representative from the scrap metal recycling industry responded to the comments of Ms. Carroll. He noted that his industry has not supported introducing radioactivity into the scrap recycling stream. He explained that he was attending the workshop to hear the discussions on whether there is some level of radioactivity above zero that can be part of the recycling stream. He summarized what he had heard from the NRC and EPA and observed that some of their concerns are consistent with what he has heard from the environmental and public interest communities. The participant stated that it would help his industry to come to a better decision on the issues if they could hear a point and counter point discussion between the nuclear representatives and individuals from the environmental and public interest communities. He suggested that a group representing all interests reconvene in another forum to enable a full discussion of the issues to help make a better decision.

Other participants were supportive of finding alternative, creative methods of bringing all parties together to continue the discussion. He also noted that the European Union is discussing these issues and encouraged the NRC to forward a summary of these discussions for their consideration.

Dr. Cool reaffirmed the Commission's hope that the workshops would offer a forum for the inclusive dialogue where the point and counter point discussions could take place. He expressed optimism that this kind of discussion could still take place at the remaining two workshops, but remained open to and supportive of the possibility that this type of dialogue could take place in another forum and would hope to be able to take part, if appropriate.

Following Dr. Cool's comments, the workshop was adjourned.