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TITLE: PROPOSED POLICY FOR DECONTAMINATION AND DECOMMISSIONING

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## PROPOSED POLICY FOR DECONTAMINATION AND DECOMMISSIONING

The DOE program in Decontamination and Decommissioning (D&D) is a major user of funds, is politically sensitive and requires cooperation between several parts of DOE, other Federal Agencies and the States. Thus, it is imperative that some overall guiding principles be formulated and agreed upon by the various individuals in DOE responsible for individual parts of the overall program. In this paper, we present some of these principles for the consideration of the members of the workshop and of the responsible personnel in DOE. We include some discussion not appropriate for a statement of policy in order to provide some background as to the reasoning involved.

### 1st Statement

"The dose limits to be used will be those currently available as Federal Guidance from the President or as regulation."

The present Federal Guidance is that devised by the Federal Radiation Council (FRC) and signed by the President in 1960. For the public it calls for a maximum whole body dose of 0.5 rems/yr with a value of 1/3 of this assumed to be the average for critical groups in the population, if no other data are available. This guidance has fallen into disrepute in recent years because of the practice of providing regulations for specific situations as based upon ALAP (or ALARA) or upon cost-benefit assumptions. Such dose limitations have, in the recent past, been considerably lower than the general FRC guidance. However, regulations to cover D&D activities and the residual activity following cleanup have not been promulgated so that specific values from this source are not available.

The lack of specific regulations has resulted in an uncertain situation in that cleanup is proceeding but we have no assurance that it will meet future regulations. This has led to a number of proposals such as the current NRC proposal of a limit of 5 mrem/yr whole body and the use of the methods of ICRP-26 to relate organ dose to whole-body dose.

It is our belief that DOE is responsible for using guidance or regulations now available. Attempts to outguess judgements of other agencies on what regulations will be forthcoming will result in a low probability of being correct. If the guess is too high we will be in the same situation as at present. If too low, excessive resources will be expended.

#### 2nd Statement

"The actual cleanup will be conducted to provide final levels as low as can be reasonably achieved."

This statement can be recognized as a common standard one accompanying radiation protection standards. However, in view of the situation on regulations that we discussed earlier, it has additional meaning. This lies in the fact that future regulations may well be derived on a cost effectiveness basis (or, in other terms, an ALARA basis.) Thus, if an effective and conscientious ALARA program is carried out on the cleanup, it should result in levels within the range of the future standard and will, furthermore, provide invaluable data, not now readily available, on the degree of cleanup possible at what cost, so that a vigorous input to future regulations

can be made. In essence, we depend upon this ALARA program to assure that future standards will be met although we retain the flexibility of working to higher standards to cover intransigent situations that will develop.

### 3rd Statement

"DOE will retain effective direction of the work during its progress."

Past experience with D&D work indicates that "surprises" occur frequently. These can range from the finding of an unexpected burial area to the occurrence of radionuclides in areas where the handling of such materials was not suspected, even after an initial survey. This makes it extremely difficult to execute a fixed cost contract and allow the contractor to proceed on a fixed pattern. Instead there must be a responsible DOE agent in close contact with the work to make the day-to-day decisions on where to proceed.

An important function of this individual (agent) will be to make decisions as to when the work has reached the point of ALARA. This will include a considered and documented judgement on such matters as the gain from further excavation as weighed against the extra cost or damage to the area or possible risk to the workers (in some situations). It may be that some areas cannot be decontaminated below the limits because of factors such as the extreme depth of the contamination, nature of the medium in which the contaminant is deposited, or the work would provide above normal risks. In these cases a decision on achieving ALARA may be proper with later decision

on release or use of the area based upon location of the contaminant and its mobility and the proposed use of the area.

Note that these decisions must be made during the time that the crew is working. Hence the need for continued DOE control.

#### 4th Statement

"A precleanup survey, including both radiological measurements and thorough documentation of the previous use or uses of the property will be made to assist in planning."

Information on the type and general location of contaminants is required to permit planning of the decontamination effort. This can come from two sources, 1) a survey of the property and 2) historical documentation of the uses of the property.

The survey should be conducted in such a manner as to locate places where excessive contaminants may be. Precision of measurement is not as important as complete coverage because the contaminated areas located will be removed or otherwise cleaned. If there is any possibility of contaminants in areas where they cannot be measured directly, such as buried in the soil or covered by paint on a wall, it will be necessary to obtain core samples or samples under the covering material at a spacing such that there is a reasonable probability of locating the contaminant.

Documentation of previous uses of the area can provide valuable clues as to what possible contaminants are present, their location and, even, their chemical form. Such documentation may require interviewing people who worked in the facility or others familiar

with the work such as the user of the product produced. Any records available should be carefully examined for clues. Such documentation is not easy, particularly if the facility has been closed for a number of years, but the clues that can be obtained by such a procedure can be invaluable in the initial survey and following cleanup.

#### 5th Statement

"The use of a single radionuclide to serve as an indicator for a group of radionuclides shall be proven to be valid for each area."

A single, easily-measured radionuclide is frequently chosen as an indicator of contamination on the assumption that all other nuclides in a mixture containing this radionuclide have behaved the same as the indicator. For example, radium is frequently used to indicate the presence of tailings or uranium. If the assumption of similar behavior is correct, the use of such an indicator radionuclide can simplify the work. However, if this assumption is wrong, then the risk of leaving undetected contaminants may be high.

The degree of potential separation that may occur will depend to a large extent degree on the process used and the method of disposal. For example, in a uranium milling operation, the tailings and the slimes may contain different radionuclides. If they are disposed of in separate areas, or without good mixing in the same area, an effective separation of the indicator radionuclide from the other radionuclides can occur.

It is to avoid the possibility that undetected contaminants will be left, that the requirement for proving the validity of the indicator contaminant to locate all contaminants is included.

6th Statement

"All operations during the initial survey, cleanup, and final certification of the area will be thoroughly documented."

The purpose of such documentation is two-fold. 1) to provide information on how thoroughly the operations were done, what was found and any problems encountered to serve as a legal description; and 2) to provide a record of experience that can be used by others doing the same type of work and to justify any levels of contamination left. Such documentation will assure the owner or buyer of the property that an adequate job was done and will inform him of the conditions remaining. If possible, a detailed breakdown of costs included in the documentation will provide evidence on the cost-benefit relationships in such work.

7th Statement

"The final judgement on the suitability of the area for its final use will be made from a final certification survey along with consideration of the information collected during the cleanup."

Information collected during cleanup is frequently confused by later actions in the area. It is valuable for documenting what was removed and the condition of a given area where demolition or

excavation was required especially if some areas were left with some contamination. However, as a final proof of the effectiveness of the cleanup and the condition of the area, a "certification" survey is believed to be useful. This survey, in contrast to the initial survey, should provide for both location of any residual contamination and measurement of the quantities and concentrations of any residual contamination with reasonable precision. Statistical techniques should be used both for planning the survey and for interpreting the data. While it would be useful in providing increased public credibility for the results of this survey to have it done by a group other than those doing the decontamination, this may not be practicable in most cases.

#### 8th Statement

"Instrumentation, sampling methods and analytical methods shall be properly calibrated, shall have appropriate sensitivity and shall be capable of giving results in a time meaningful to the cleanup operations or certification survey."

There are several related items in this statement; we will discuss them separately.

Field instruments are the first method of measurement used because they are fast and easy to use and, if the contamination levels are high enough, considerable information can be gained on the location and general levels of contamination that are close enough to the surface to permit a reading. However, in many cases these instruments are not calibrated for the quantity of interest in D&D

work. These quantities include activity per unit area for surface contamination or activity per weight (or volume) for soil contamination. As a result the real meaning of the readings in relation to standards are not known.

We recommend that a calibration program for the instruments to be used with the radionuclide(s) of interest in the medium of concern be an initial step in any D&D program. We recognize the many variables that will influence the reading in the field making the absolute value of the reading uncertain. However, the effect of some of these variables should be measured in the calibration program. Finally, an order of magnitude estimate is better than just an instrument reading.

The question of appropriate sensitivity applies primarily to analytical work done on samples. There is a tendency to analyze all samples by existing methods to provide the best possible sensitivity and precision with the result that analyses are expensive and time consuming. This has the effect that the number of samples are limited. However, in a situation where the contamination is non-uniform, it may be preferable to take a larger number of samples and use a cheaper analysis with lower precision. Here we recommend that a decision be made on the sensitivity and reproducibility required for single samples considering the variability caused by other factors, such as the non-uniform distribution then cheaper methods of analysis should be the desired designed to provide precision and sensitivity.

The turn-around time for results during the cleanup phase is crucial. Once a crew has completed one portion of the cleanup it is

necessary to take samples and measurements on a schedule that will allow additional cleanup if necessary. (Here we assume that the field measurements are not sensitive enough). This can be done by measuring samples directly or even following simple chemical manipulations at a location near the cleanup.

#### Conclusions

We have presented several policy statements that, if agreed upon by the concerned parties, will provide a foundation for the planning and execution of D&D work. There may be additional statements required but we believe that they should cover key areas in general statements so that they will not hinder the execution of the work.