MAINE YANKEE

PREFACE

LICENSE TERMINATION PLAN REQUIREMENTS - A NON-TECHNICAL SUMMARY

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P.0 LICENSE TERMINATION PLAN REQUIREMENTS - A NON-TECHNICAL SUMMARY

P.1 Introduction

Maine Yankee received feedback from a number of different stakeholders concerning plans for license termination and releasing the site for other uses. These stakeholders include the Maine Department of Environmental Protection, Department of Human Services Division of Health Engineering, the State Nuclear Safety Advisor, the Governor's Technical Advisory Panel, the Maine Yankee Community Advisory Panel, the Environmental Protection Agency, town of Wiscasset officials, Friends of the Coast, and various private individuals.

The feedback has generally indicated a desire for Maine Yankee to go beyond the NRC regulatory requirements (including ALARA) in reducing residual radiation exposure on-site. To that end, in the Preface to the Original License Termination Plan submitted on January 13, 2000, Maine Yankee proposed a site release standard of not more than 10 mrem/year for all pathways, including not more than 4 mrem/year from groundwater sources of drinking water. On April 26, 2000, the Governor of the State of Maine signed into law LD 2688-SP1084, "An Act to Establish Clean-up Standards for Decommissioning Nuclear Facilities." This legislation amended the Maine State definition of Low Level Radioactive Waste to exclude radioactive material remaining at the site of a decommissioned nuclear power plant if the enhanced state standards described in the new law are met. Prior to the passage of this legislation, on April 14, 2000, Maine Yankee had signed an agreement with several Maine groups to support this legislation and to fulfill our mutual intent to reduce the radiological burden at the Maine Yankee site. These groups included "Safe Power for Maine," "Citizens Against Nuclear Trash," "Friends of the Coast - Opposing Nuclear Pollution," and the Town of Wiscasset. The state law and the agreement identified above go beyond the NRC regulatory requirements in reducing residual radioactive contamination remaining on-site at license termination.

This section of the LTP has two purposes:

- To discuss key elements of the LTP while lending perspective with respect to public health and safety and
- To review the steps beyond the NRC regulatory requirements Maine Yankee will implement in being responsive to stakeholder feedback and state legislation. These steps are factored into Sections 1 through 9 of the License Termination Plan.

This Preface of the LTP is not intended for the NRC. Rather it is directed to the wide audience of readers who have a stake or an interest in the ultimate re-use of the Maine Yankee site.

P.2 Background and Definitions

NRC regulations require that decommissioning nuclear facilities clean up residual radioactivity (i.e., plant derived radioactive contamination above natural background radiation) so that the average member of the critical group would receive no more than a 25 millirem (mrem) dose over a year's period of time. This is total dose from any exposure pathway (e.g., drinking water, food, etc.). The enhanced state clean-up standard requires that this residual radioactivity result in not more than 10 mrem/year for all pathways, including not more than 4 mrem/year from groundwater sources of drinking water.

Dose is a measure of exposure to radioactivity. Naturally occurring radioactivity in Maine - i.e., from rock and minerals such as granite or from cosmic radiation - amounts to about 200-300 mrem/year. People are routinely exposed to many other sources of radioactivity.

In addition to the NRC's site release limit, the NRC also requires that the residual radioactivity be ALARA - "As Low As Reasonably Achievable." Using NRC guidance, "reasonably achievable" is determined by the amount of dose reduction achieved compared to the cost of additional dose reduction.

The Environmental Protection Agency (EPA) has also issued site release guidance for facilities other than commercial nuclear power plants. Their criterion is risk-based rather than dose-based. Without accounting for radioactive decay, the EPA calculates a "surrogate" limit of 15 mrem/year which, when decay is accounted for, results in guidance in excess of 30 mrem/year. The EPA also fosters an additional criterion of 4 mrem/year due to groundwater ingestion. The EPA does not have an ALARA standard.

Dose in this range (4 -25 mrem per year above background) is such a low value that it cannot be directly measured, particularly considering that total radiation exposure is the sum of many different exposure pathways such as eating, drinking and direct exposure.

In order to demonstrate compliance with a dose limit, one must convert it to a surrogate value that can be directly measured. This value is called Derived Concentration Guideline Level or "DCGL." The DCGL is a limit for residual radioactive contamination levels in soil, buildings, etc. that, when put into a computer model to account for all exposure pathways, will result in doses not more than a pre-defined limit (e.g., not more than 10 mrem/year for all pathways, including not more than 4 mrem/year from groundwater sources of drinking water).

In order to identify the exposure pathways, one must answer the question, "Who receives the dose ?" The answer is found in regulatory guidance which requires the dose calculations to model the average member of the critical population group. In other words, a hypothetical, conservative scenario is created which includes theoretical individuals who could receive more radiation dose than could be expected for a member of the public.

As a result, Maine Yankee has chosen the so-called resident farmer scenario. In this case, a farmer is resident on the site, obtains drinking and irrigation water from the most contaminated portion of the site, and eats the crops and animals grown from the well water. As discussed in more detail in the LTP, this is an extremely conservative scenario because high quality community water service is readily available, and a resident farmer is unlikely to inhabit the property given the potential for certain commercial uses.

All of the exposure pathways applicable to the resident farmer scenario are considered in the computer model. This model results in the calculation of the DCGL. The DCGL is a value that can be directly measured. For instance, the residual contamination on a building foundation wall may be 15,000 dpm/100 cm^2. The term "dpm" stands for "disintegrations per minute" and is the number of radioactive atoms that decay in a minute. The "100 centimeter squared" provides an area over which the measurement is made. If the DCGL for this building example is below 18,000 dpm/100 cm^2 (e.g., in the Containment Building) then, under "MARSSIM" (see below), we can be assured that radiation exposure due to this portion of the building, combined with the remainder of the site, will be not more than 10 mrem/year for all pathways, including not more than 4 mrem/year for groundwater sources of drinking water.

Once the dose limit is converted to a readily measurable value, the question is "How should one measure it in a widely recognized manner with high confidence that the site meets the limit for release?" To solve this problem, various government agencies including the NRC, the EPA, the Department of Energy and the Department of Defense spent a number of years pooling their resources to come up with a solution. They developed a method that would ensure, on a rigorous statistical basis with a high degree of confidence, that any site areas to be released meet the site release criteria. These methods were published in December, 1997 under the title "Multi-Agency Radiation Survey and Site Investigation Manual," or MARSSIM for short. NRC and EPA recommend, and Maine Yankee has committed to, the use of MARSSIM.

P.3 Relationship Between the LTP and Site Cleanup Levels and Doses

The LTP's primary purpose is to demonstrate compliance with the NRC's annual dose limit of 25 mrem plus ALARA and the enhanced state clean-up levels of not more than 10 mrem/year for all pathways, including not more than 4 mrem/year from groundwater sources of drinking water. Due to conservatisms employed in demonstrating compliance, the ultimate site cleanup level will be lower.

Under NRC guidance and MARSSIM, Maine Yankee assumes that the site and buildings are contaminated. For dose calculation purposes, we further assume the contamination is everywhere at the DCGL limit. (Remember that the DCGL is that measured value that ensures that dose to the average member of the critical group is not more than 10 mrem/year for all pathways including not more than 4 mrem/year from groundwater sources of drinking water.)

In general, remediating higher contamination levels combined with pre-existing low contamination levels will result in actual contamination levels being a medium to small fraction of DCGLs. Recognizing that contamination levels lower than DCGLs translate directly into lower doses, we can also say that dose to the resident farmer will most likely be a medium to small fraction of 10 mrem/year for all pathways, including not more than 4 mrem/year from groundwater sources of drinking water.

In this sense, the LTP and the associated DCGLs are founded on very conservative assumptions only useful for proving prior to decommissioning that Maine Yankee's approach will meet regulatory requirements.

P.4 Additional Information

As discussed at the outset, this Section of the LTP is provided for stakeholders other than the NRC. It is intended to provide a point of reference and perspective on license termination issues associated with public health and safety. Additional information is available through several means: raising questions during meetings of Maine Yankee's Community Advisory Panel; reviewing Maine Yankee's web site at www.maineyankee.com; written correspondence via mail or e-mail; or simply contacting us at:

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Please feel free to use whatever communications means is available, and we'll do our best to answer your question.