Ultra-Low Level Radiation Effects

SUMMIT

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Waste Isolation Pilot Plant,
Carlsbad, NM

CONGRESSIONAL BRIEF

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Elucidating answers for public benefit through science

ORION INTERNATIONAL TECHNOLOGIES

Background

- Current radiation protection standards were set by the EPA using a linear extrapolation of WWII atom bomb survivor data (Figure 1).
- There are no scientific data to prove or disprove the linear extrapolation of Hiroshima survivor data, particularly at very low levels of ionizing radiation.
- The huge uncertainty in health effects at very low radiation levels is illustrated conceptually in Figure 1 by the very large uncertainty band.

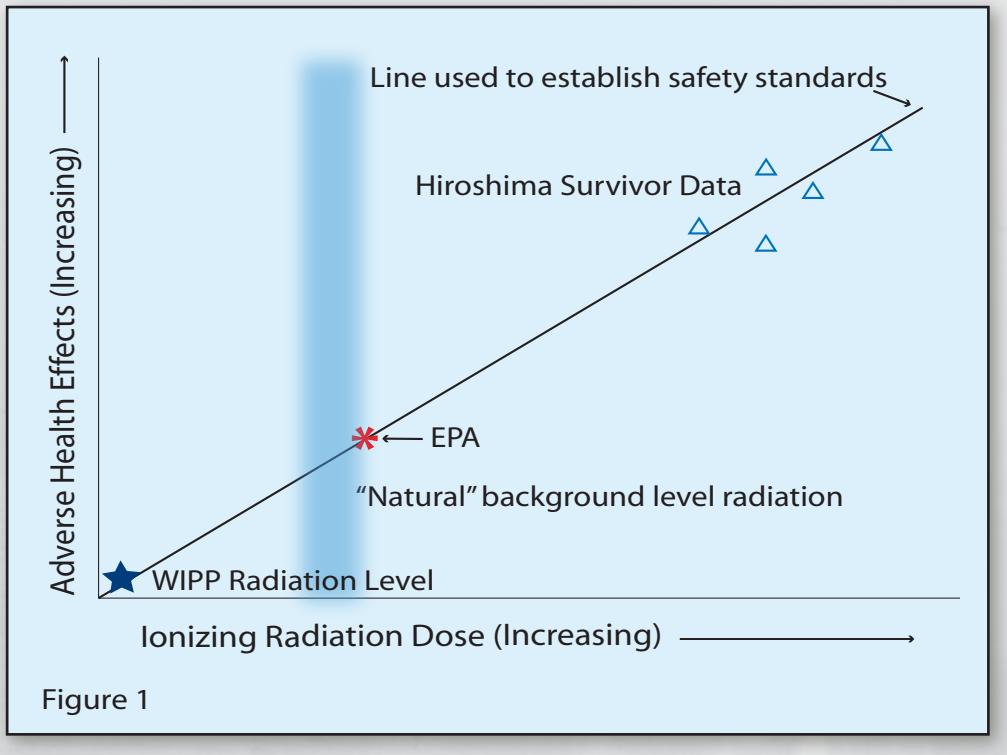

Figure 1

The National Strategic Need

There are no definitive low-level radiation-effects measurements to justify current protection standards. Further, no facilities exist for conducting research on the biological effects of ultra-low radiation doses. This lack of science-based standards precludes us from setting cost-effective standards for critical national needs such as:

- Clean-up of existing radiation-contaminated facilities and sites
- Long-term storage facilities for nuclear waste
- Construction of new nuclear power plants
- Standards for response in the event of a "dirty bomb"

The Scientific Consensus

The consensus of the Low Level Radiation Effects Summit, conducted by ORION on Jaunary 15 - 18, 2006, was to establish the need for a laboratory facility at the Waste Isolation Pilot Plant (WIPP) to resolve the radiation protection standards question.

- 92% of the attendees agreed that in order to establish a scientific basis for radiation protection standards at low doses, a research environment is needed that allows for ultra-low dose experiments
- Due to the existence of “noisy” background radiation from naturally occurring sources, ultra-low dose radiation experiments cannot be conducted effectively on the Earth’s surface
- The ideal test environment has zero to negligible levels of radiation
- The principal environments with Ultra-low levels of natural radiation, suitable for low dose experiments without adding extensive additional shielding are under ground salt mines
- 96% of the attendees agreed that WIPP is the ideal location to conduct these experiments
- Existing infrastructure at WIPP will assist development and minimize the construc tion cost of the proposed facility.

The Solution & The Savings

The Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, provides the only site in the United States where a research facility could be established with virtually all background radiation eliminated. This site will allow scientific experiments to be conducted that, for the first time, produce a broad set of data on the biological significance at the lowest levels of radiation exposure.

Results could lead to relaxation of standards and significant reduction in cleanup costs.

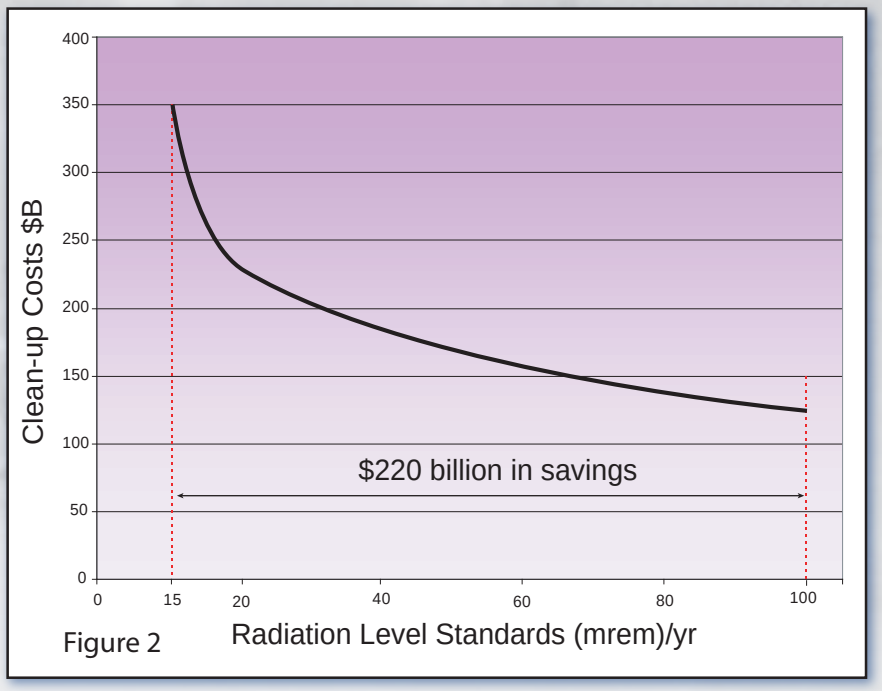

Figure 2

Budget Requirements

Low Level Radiation Effects Research Facility Cost Estimate* (in $ millions)					
	2007	2008	2009	2010	2011 - 15
Conceptual Design	$1.4				
Detailed Design		$6.5			
Excavation		$2.0			
Construction			$29.5	$29.5	
Mine Access			$1.9	$1.9	$1.9/yr
Operational Support					$1.0/yr
Research					$9.0/yr
Totals	$1.4	$8.5	$31.4	$31.4	$59.5

* Initial Cost Estimate. Final estimate will be developed in the conceptual design study.

Conclusion

Establishing an improved scientific basis for setting an ionizing radiation standard has the potential to save more than $200 billion in the cleanup of radiation sites nationwide. Countless other billions of dollars could be saved in other areas affected by radiation standards.

- Better knowledge of the effects of radiation levels will give policy makers and the general public a more realistic view of the consequence of nuclear events, accidents or terrorist activities (dirty bombs).
- Knowledge about the low dose effects of radiation may help to remove the stigma that currently restricts greater use of nuclear energy.
- Funding for a low dose radiation facility at WIPP will ultimately generate data crucial to understanding ultra-low level radiation effects on biological systems and provide a scientific basis for setting radiation protection standards.

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