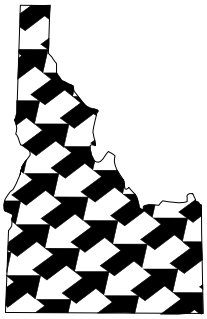

Citizens Advisory Board
Idaho National Engineering and Environmental Laboratory

DRAFT PLUTONIUM FACT SHEET
RECOMMENDATION TRANSMITTING COMMENTS AND SUGGESTIONS

The Idaho National Engineering and Environmental Laboratory (INEEL) Citizens Advisory Board (CAB) commends the U.S. Department of Energy's Idaho Operations Office (DOE-ID) for recognizing the need for a fact sheet addressing plutonium contamination at the INEEL. The completed fact sheet will provide a valuable source of factual information for the public. The draft fact sheet, developed by a DOE-ID team of professionals, was provided to the Board's Plutonium Committee for review and comment. We appreciate the opportunity to serve as a sounding board on a document prior to its release to the public; we also recognize the difficulties of such an endeavor.

Development of this consensus recommendation was time-consuming, which reflects both the complexity of the topic and the diversity of opinion surrounding it. Our struggles resulted in an appreciation of the challenges faced by the DOE-ID preparation team in overcoming the same obstacles we faced within the Board.

We offer the following recommendations, which were reached through consensus.

RECOMMENDATIONS

1. **The INEEL CAB recommends defining the specific objectives of the fact sheet and organizing the material accordingly.**

   It appears that the fact sheet has three specific objectives: 1) to provide an orientation to the overall topic of plutonium in the global setting, including discussion of its fate and transport, 2) to identify and discuss the potential impacts of plutonium on humans and the environment, and 3) to present information about plutonium contamination at the INEEL.

   Information to support achievement of the three objectives is intermingled throughout the draft fact sheet, which may contribute to a lack of comprehension by the intended audience. In addition, the ultimate format for the information product (i.e., fact sheet or pamphlet) appears undecided.

   We wonder if the topic is too complex and technically indeterminate to support achievement of more than one objective in a single fact sheet At the very least, the DOE-ID preparation team might consider separating the information presented into sections (one for each of the objectives) to enhance the public's ability to understand the topics addressed.

2. **The INEEL CAB recommends that information presented in the fact sheet should be based on factual, direct, and specific information whenever possible.**

We think you will avoid minimizing or exaggerating the hazards associated with plutonium if the information is presented as clearly as possible. In the absence of indisputable factual information, the full range of opinions should be described objectively.

3. **The INEEL CAB recommends the enhancement of the fact sheet through the incorporation of appropriate graphics and illustrations and improvements to the organizational layout.**

   Graphical depiction of information can greatly enhance the attractiveness and readability of a product and the ability of the public to understand the information presented. The fact sheet could be enhanced through more use of graphics, illustrations, pictures, diagrams, maps, sidebars, and boxes.

   In addition, the order of presentation of topics, the layout, and the placement of page breaks could be improved.

Attached is a set of detailed comments and suggestions that the DOE-ID preparation team may find of benefit in finalizing the fact sheet. The comments and suggestions were developed by the INEEL CAB's Plutonium Committee and were not considered by the full Board.

The following are comments and suggestions that were developed by the Plutonium Committee on DOE's draft fact sheet on plutonium at the INEEL. The Committee members reached consensus on 31 of the 32. They were unable to achieve consensus on the last one; an explanation of their views is included with it.

1. **Location:** General
   Suggestion: Add graphics/illustrations throughout. Examples of appropriate illustrations might include:
   - Background radiation
   - Total exposure/amount from plutonium
   - Types of radiation
   - Groundwater flow direction
   - Plutonium cycle

2. **Location:** General
   Comment: Where is the plutonium contamination found at the INEEL? What levels have been found? The reader can't discern the severity of the problem.
   Suggestion: The fact sheet should include information about where plutonium contamination is found and at what levels.

3. **Location:** General
   Comment: Several page breaks are not very good. The text doesn't flow easily
   Suggestion: Take a good hard look at page layout and organization.

4. **Location:** Page 1, first paragraph under the heading "An Historical Perspective on Plutonium," last sentence.
   Comment: The text understates the potential impacts of an uncontrolled chain reaction.
   Suggestion: End sentence after "… provide energy." Replace the rest of the sentence with the following: "Under accident conditions, the reactor could be damaged, resulting in the release of radioactivity that is threatening to humans and the environment. Under no circumstances could a reactor explode like a nuclear bomb."

5. **Location:** Page 1, second paragraph under the heading "An Historical…" second sentence.
   Suggestion: Add "Two" in front of decades.

6. **Location:** Page 1, second paragraph in the box titled "Where Does Plutonium Come From?," last sentence, portion reading "in the time since the Earth was formed, a small amount of plutonium was formed from this uranium"
   Suggestion: Add "which has since decayed into uranium and other elements" to the sentence.

7. **Location:** Page 1, third paragraph in the box titled "Where Does Plutonium Come From?," first sentence, reading "Some tiny quantities of natural plutonium can be found in a deposit of uranium at Oklo, in Gabon, West Africa."
Comment: Not enough information is provided to allow understanding of why mentioned.
Suggestion: Add a box with information about Oklo, and put all the relevant information about it in the box. Begin with "Small quantities of naturally-occurring plutonium were formed in a natural reactor about 1.9 billion years ago at Oklo, in Gabon, West Africa." The rest of the box should explain that the deposit provides evidence about how mobile plutonium is over millions of years. Provide a concise explanation of what is known about the deposit and how applicable it is to INEEL or state that "Under the conditions at Oklo at the time and in the period since then, it appears the plutonium was not very mobile as it migrated no more than…"

8. **Location:** Page 2, first paragraph on the page, second to last sentence, date reading "1989" should be 1990
Comment: Reprocessing was discontinued in 1990 at the ICPP (although the policy was not changed until 1992)
Suggestion: Fix

9. **Location:** Page 2, second full paragraph, second sentence, reading "Waste that is stored above ground is scheduled to be moved to the Waste Isolation Pilot Plant near Carlsbad, New Mexico."
Comment: When is it scheduled to be moved?
Suggestion: Change the verb.

10. **Location:** Page 2, second full paragraph, last sentence, phrase reading "dealt with"
Comment: What does "dealt with" mean? (disposed, shipped out, processed?)
Suggestion: The text should explain that there are ongoing decision-making processes to identify appropriate strategies for cleaning up all of the buried wastes at the INEEL in accordance with federal law.

11. **Location:** Page 2, third full paragraph, first sentence, phrase reading "low-level"
Comment: Is it really low-level? Didn't it also contain hazardous components?
Suggestion: The description should be accurate.

12. **Location:** Page 2, third full paragraph, third sentence reading "There are traces of plutonium in the Snake River Plain aquifer outside the INEEL facilities where it was introduced, and there are traces in surface soils."
Comment: The public will not care if it has been found outside facilities or not. The public will care if plutonium is found outside the INEEL boundary or not.
Suggestion: Clearly state if plutonium has been detected outside INEEL boundaries or not.

13. **Location:** Page 2, third full paragraph.
Comment: The entire paragraph is confusing as it addresses both surface and subsurface contamination.
Suggestion: Address separately

14. **Location:** Page 2, fourth full paragraph, first sentence, phrase reading "we conducted disposal"
Comment: poorly worded
Suggestion: change to “disposal was conducted”

15. **Location:** Page 2, fourth full paragraph, second sentence, phrase reading "occurs within 5

kilometers (less than 3.2 miles) of the Idaho Chemical Processing Plant."
Comment: Which direction?
Suggestion: A graphic depiction of the wind rose at ICPP would be helpful

16. **Location:** Page 2, fourth full paragraph, third sentence, beginning "This can be attributed…"
Comment: Combining discussion of air and water contamination confuses the reader.
Suggestion: Separate discussions

17. **Location:** Page 2, third paragraph in the box titled "Isotopes and half-Life: What do They Mean?" last sentence reading "Other heavy elements have significantly longer half-lives: naturally occurring uranium-238 has a half-life of 4.5 billion years."
Comment: Could inflame critics as 24,000 years is pretty long.
Suggestion: Delete the last sentence and the sentences on Carbon-14.

18. **Location:** Page 2, box titled "Isotopes and Half-Life"
Suggestion: Add reference to the fact that only half of the material will be gone at the end of the first half-life and that virtually all will be gone at the end of 10 half-lives.

19. **Location:** Page 3
Comment: The portrayal of groundwater movement in the text is overly simplified and it implies that groundwater always moves at a constant speed.
Suggestion: State that "the speed of groundwater movement varies widely at the INEEL but averages . . ." Clarify if the movement of 50 kilometers is an average or maximum distance as distances have varied. The text should also state that the movement has generally been in a south-westerly direction.

20. **Location:** Page 3
Comment: The map takes up a lot of room and communicates very little information. Maps are good, but should communicate more.
Suggestion: The INEEL map should indicate the location of the wells relative to the location of facilities. The map of INEEL should not illustrate so much beyond the boundaries, although surface water is important (Camas Creek, Mud Lake, Birch Creek, Little Lost River, Big Lost River). The maps of Idaho and INEEL should be separated. The INEEL map should include names/locations of communities.

21. **Location:** Page 3, map, arrow (labeled 1953 to 1998)
Comment: The arrow is supposed to indicate the distance moved but it implies the direction of movement as well. In addition, it could be badly misinterpreted if applied to map of Idaho instead of the map of INEEL.
Suggestion: Delete the arrow's point, delete "using 3 meters/day flow-velocity" and clarify if average or maximum distance.

22. **Location:** Page 3, box titled "How Mobile is Plutonium," second to last sentence reading "Migration of these small particles is limited because they readily adsorb onto surfaces of the solids with which they come in contact"
Comment: Implies that adsorption renders the particles immobile, as if clays can't/don't move. The particles can also chelate onto organics. Shouldn't overstate the lack of mobility. Conflicts with recent news from Nevada Test Site. Provides fodder for critics who say DOE lies to the public.
Suggestion: The text should acknowledge that the migration potential of plutonium varies widely under different environmental chemistry and hydrology conditions. We also suggest adding applicable INEEL, NTS, and other relevant information here, if possible.

23. **Location:** Page 4, several places including first (partial) paragraph, phrase reading "400 times lower;" first full paragraph, second sentence, phrase reading "hundreds of times less concentrated;" Page 5, second full paragraph, third sentence, phrase treading "one hundred thousand times smaller"
Comment: We think that is a bad way to express fractions and impossible to understand
Suggestion: Use fractions or percentages consistently.

24. **Location:** Page 4, first full paragraph, first sentence, phrase reading "is most dangerous to"
Suggestion: Rephrase to "has the greatest potential health impact"

25. **Location:** Page 4, second full paragraph, first sentence, phrase reading "and for alpha radiation"
Comment: Alpha radiation has not been defined or explained**.** It has not been stated that plutonium is an alpha-emitter. Unclear why the standards apply to plutonium. Doesn't readily allow reader to understand why plutonium is dangerous to humans.
Suggestion: Reorganize the fact sheet so that the information in the left column, lower part of Page 4 is presented first.

26. **Location:** Page 4, second full paragraph, last sentence
Comment: Missing information on the numbers and locations of wells and frequency of sampling.
Suggestion: Briefly state or graphically illustrate the number/location of wells and the frequency of sampling.

27. **Location:** Page 4, box titled "Glenn Seaborg in 1997, on the Dangers of Plutonium, The Element He Discovered"
Comment: Could alarm people
Suggestion: Change title to simply "Glenn Seaborg, On Plutonium, The Element He Discovered" Add date to the sentence about his interview.

28. **Location:** Page 5, first full paragraph, last sentence, phrase reading "whereas the average citizen of the State of Idaho receives thirty-five times that amount from natural background sources of radiation that have nothing to do with plutonium or the INEEL."
Comment: Confusing and alarmist, long and wordy
Suggestion: Change to read "…Idaho residents, on average, are exposed to an annual dose of radiation from natural sources (caused by the state's elevation, geology, fill in) that is 35 times that amount.

29. **Location:** Page 5, third full paragraph, second sentence, phrase "less than 0.002 percent of the 350 millirem exposure."
Comment: Very confusing.
Suggestion: Change to 0.07 millirem. Add a reference (like 1 foot out of a mile).

30. **Location:** Page 5, box titled "You Can Be Involved in Plutonium Safety Issues in Idaho," third paragraph, "quarterly" meetings
Suggestion: Change to bi-monthly meetings, and add the CAB's homepage address.

31. **Location:** Page 6, List of References
Comment: Too long. Not a good use of space. Where can the references be **found?**
Suggestion: Cut back references list to a small number of the most relevant references and add information about where they can be found. Add Nevada Test Site report. Add Oklo reference. Use the space that is available.

The following comment did not achieve consensus within the Plutonium Committee.

32. **Location:** Page 5, first full paragraph, first sentence, phrase reading "serious danger"
Comment: Alarmist
Suggestion: Provide evidence that plutonium is dangerous or change your explanation of the rationale for the EPA standards.

One faction of the Committee felt the current language is alarmist as plutonium has never been proven to cause harm to a person. They felt the language should reflect the fact that plutonium is only a potential hazard.

The other faction felt the language was appropriate as it clearly communicates the potential dangers of inhalation of plutonium. They felt the language should not be changed.