COMMUNICATION PLAN

FOR THE MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND THE U.S. NUCLEAR REGULATORY COMMISSION ENTITLED:

CONSULTATION AND FINALITY ON DECOMMISSIONING AND DECONTAMINATION OF CONTAMINATED SITES

PURPOSE

This Communication plan outlines the process that will be used to effectively communicate the Memorandum of Understanding (MOU) to internal and external stakeholders. The Environmental Protection Agency (EPA) and the U.S. Nuclear Regulatory Commission (NRC) entered into an MOU on *Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites* (Attachment 1), recognizing their common commitment to protect the public health and safety and the environment. Decommissioning involves safely removing a facility from service and reducing residual radioactivity to a level that allows the NRC licensee to close out its license and safely release part or all of its property for other purposes. The purpose of the MOU is to describe a basic framework for the relationship between the agencies as they fulfill their respective responsibilities for the radiological decommissioning and decontamination of NRC-licensed sites.

GOALS

Key goals of the MOU are: 1) to provide reasonable assurance that decommissioning of power reactors, material licensees, and fuel cycle facilities, and the radioactive wastes from decommissioning, are managed in a manner that protects public health and safety and the environment; 2) to achieve finality of actions taken by licensees and each Federal agency when an NRC licensee decommissions its facility; 3) to increase public confidence in NRC's commitment and ability to carry out licensing and regulatory responsibilities for the decommissioning of nuclear facilities; and 4) to increase the efficiency and effectiveness of analyses supporting license termination decisions. This communications plan will aid in the fulfillment of these goals and identify the following communications objectives:

- 1. Ensuring clear communications between NRC, EPA, other involved Federal and State agencies, NRC licensees, and the public;
- 2. Increasing public confidence in the site's decommissioning and license termination process; and
- 3. Fostering each regulatory agency's accountability and credibility by demonstrating that each coordinate with the other, is well-managed, and is independent.

BACKGROUND

In 1997, the Commission published a final regulation on decommissioning criteria after considering extensive public comments. Under the authority of the Atomic Energy Act, the

Commission's regulations are 10 CFR Part 20, Subpart E. This MOU does not change these requirements. The MOU is a framework which the agencies can improve decision-making and ensure stakeholder confidence.

Since September 8, 1983, EPA has generally deferred listing on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) those sites that are subject to NRC's licensing authority. EPA deferred with the understanding that NRC's actions are consistent with the CERCLA requirement to protect human health and the environment. However, as EPA stated in a Federal Register notice announcing the policy of CERCLA deferral to NRC, if EPA "...determines that sites which it has not listed as a matter of policy are not being properly responded to, the Agency will consider listing those sites on the NPL" (see 48 FR 40658). Some licensees have decided to cease operations and begin decommissioning. These licensees and various stakeholders have expressed concerns on the finality of decisions since each of the two Federal agencies has different criteria for decommissioning and licensees could incur significant costs if compelled to meet both sets of criteria. They have also said that this approach was neither risk-based nor needed to protect public health and safety and the environment.

An August 3, 1999, report (106-286) from the House Committee on Appropriations to accompany the bill covering EPA's FY1999 Appropriations/FY 2000 budget request states:

Once again the Committee notes that the Nuclear Regulatory Commission (NRC) has and will continue to remediate sites under its jurisdiction to a level that fully protects public health and safety, and believes that any reversal of the long-standing policy of the Agency to defer to the NRC for cleanup of NRC's licensed sites is not a good use of public or private funds. The interaction of the EPA with the NRC, NRC licensees, and others, with regard to sites being remediated under NRC regulatory requirements--when not specifically requested by the NRC--has created stakeholder concerns regarding the authority and finality of NRC licensing decisions, the duration and costs of site cleanup, and the potential future liability of parties associated with affected sites. However, the Committee recognizes that there may be circumstances at specific NRC licensed sites where the Agency's expertise may be of critical use to the NRC. In the interest of ensuring that sites do not face dual regulation, the Committee strongly encourages both agencies to enter into an MOU which clarifies the circumstances for EPA's involvement at NRC sites when requested by the NRC.

AUDIENCE

External Stakeholders

Stakeholders, external to NRC, that have an interest in, or are affected by, our regulatory programs and decisions include: licensees; applicants; industry groups; NRC fee-payers; EPA; members of the public; environmental and business organizations; civic and public interest groups; Congressional representatives; and other Federal, State, Tribes, and Local Governments; and the media.

Internal Stakeholders

Stakeholder organizations within NRC include: the Commission; the Executive Director for Operations; the Office of Nuclear Materials Safety and Safeguards (NMSS); the Office of Nuclear Reactor Regulation; the Office of Nuclear Regulatory Research; the Office of Congressional Affairs (OCA); Regions, the Office of the General Counsel; the Advisory Committee on Nuclear Waste; the Office of State and Tribal Programs (OSTP); the Office of Administration's Division of Facilities and Security; and the Office of Public Affairs (OPA).

KEY MESSAGES

- NRC's most important mission is to protect public health and safety, common defense and security, and the environment.
- NRC is responsible for decision-making on NRC-licensee decommissioning
 plans and license terminations. EPA has adopted a policy of deferral to NRC
 decision-making on decommissioning without the need for consultation on sites
 except in specific circumstances. NRC has agreed to consult with EPA when
 any of the following MOU trigger criteria are met/exceeded:
 - NRC determines that there will be radioactive ground-water contamination in excess of EPA's Maximum Contaminant Levels (MCLs) at the time of license termination (Attachment 3);
 - Sites request restricted release (10 CFR 20.1403) or the use of alternate criteria for license termination (10 CFR 20.1404); and
 - There will be radioactive soil contamination at the time of license termination exceeding the corresponding levels in Table 1 of the MOU.
- Although both agencies have continuing fundamental policy differences, each
 agency entered into the MOU to facilitate consultation, which can improve
 decision-making on decommissioning. NRC believes this approach and
 framework for decision-making are consistent with NRC policy and its dosebased regulation.
- Because dual regulation drives up the cost of decommissioning without providing a commensurate increase in the level of protection to the public and environment, and because the MOU does not fully meet the intent of the House Appropriations Committee, NRC will continue to seek legislation that would eliminate the possibility of dual regulation of Atomic Energy Act contaminants for all decommissioning licensees (except in rare cases in which the NRC or the cognizant Agreement State invokes the application of CERCLA as necessary to effect an adequate cleanup).

COMMUNICATIONS TEAM

NRC Points of Contact

 Mr. Jack Strosnider, Director, NMSS, and Ms. Margaret Federline, Deputy Director, NMSS, are the senior executives responsible for management of the materials program. If concerns arise that cannot be resolved, then Sections V.E.2 and V.E.5 of the MOU provide that NRC and EPA senior management representatives will consult.

Mr. Jack R. Strosnider, Director Office of Nuclear Material Safety and Safeguards U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

- Mr. Larry Camper, Director, Division of Waste Management and Environmental Protection (DWMEP), NMSS and oversees decommissioning activities. He has the lead responsibility for managing the technical and regulatory aspects of site decommissioning.
- Mr. Dan Gillen, Deputy Director, Decommissioning Directorate, DWMEP, supervises the project managers responsible for daily operations with decommissioning sites, and the MOU Project Manager. The Deputy Director is the first manager that would respond to inquiries or concerns at an NRC-licensed site undergoing decommissioning concerning implementation of the MOU. If the concern cannot be resolved, then it will be raised to the next NRC management level.
- Mr. Derek Widmayer, DWMEP, NMSS, is the NRC Project Manager (PM) for the MOU. The PM will respond to inquiries or concerns about the MOU and help stakeholders to identify information or other staff contacts needed to respond to their questions.

NRC Project Manager: Derek A. Widmayer, Project Manager NMSS/DWMEP/DCD Telephone: 301-415-6677

An NRC PM has been assigned to each site undergoing decommissioning. The
site PM has the lead responsibility for communicating with the stakeholders
(including communications with licensees' that are the subject of NRC-EPA
consultation), as well as managing the technical and regulatory aspects of site
decommissioning.

EPA Points of Contact

• Mr. Michael Cook, Director, EPA Office of Superfund Remediation and Technology Innovation (OSTRI), and Ms. Betsy Southerland, Division Director, EPA OSTRI, Assessment and Remediation Division (ARD), are the senior executives responsible for management of the EPA Superfund program. If concerns arise that cannot be resolved, then Sections V.E.2 and V.E.5 of the MOU provide that the NRC and EPA senior management representatives will consult.

Mr. Michael B. Cook, Director Office of Superfund Remediation and Technology Innovation U.S. Environmental Protection Agency Washington, DC 20460

Mr. Stuart Walker or Ms. Robin Andersen are the staff members in EPA's Office
of Superfund Remediation and Technology Innovation, who will respond to
inquiries or concerns about the MOU and help stakeholders to identify
information or contacts needed to respond to their questions.

EPA Point of Contact: Stuart A. Walker, Project Manager EPA/OSWER/OSRTI/ARD/SPB Telephone: 703-603-8748

TOOLS

Electronic Communications

- Except for proprietary, classified, or other sensitive information, non-sensitive correspondence about the MOU and all correspondence about the specific site undergoing decommissioning will be placed in the NRC Agencywide Documents Access and Management System (ADAMS). Reports of meetings held about the MOU will also be placed in ADAMS, as long as they also do not contain proprietary, classified, or other sensitive information.
- The MOU and all significant site-specific correspondence concerning consultation under the MOU will be posted on the Agency's external NRC Decommissioning webpage under a specific heading dedicated to the MOU to facilitate communication of the interactions between NRC and EPA.

General MOU Communications

- Changes to the MOU will be announced in the Federal Register.
- The NRC PM will coordinate with the Organization of Agreement States (OAS) (through OSTP), as required, regarding potential MOU's between Agreement States and the EPA. Furthermore, NRC will keep OAS abreast of developments between NRC and EPA, regarding the MOU.

- The NRC PM and site PM will conduct telephone conferences with the licensee as needed to discuss regulatory and technical issues about a specific site.
- The staff will use telephone calls, video conferences, letters, e-mails, and other means of communication to respond to inquiries from stakeholders on the MOU or specific sites.
- Should NRC become aware of other stakeholders, NRC will extend these same measures to open communications with them.

Site - Specific MOU Communications

 NRC conducts two levels of site-specific communication under the MOU (See Attachment 2 - Flowchart):

Level 1: Technical Consultation

- Technical consultation gives NRC a chance to request EPA's involvement at sites before the licensee initiates remediation, but after NRC is reasonably comfortable that licensees' proposed actions and cleanup levels are acceptable. Under level 1 consultation, NRC staff will engage EPA staff in a technical discussion on sites that NRC reasonably believes will trigger the MOU at the time of license termination, based on the Decommissioning Plan (DP) or License Termination Plan (LTP) that NRC is prepared to approve. For level 1 consultation, NRC may invoke the 90-day consultation period specified in the MOU. NRC will take action it determines to be appropriate based on its consultation with EPA. If NRC does not adopt EPA recommendations, NRC will inform EPA of its basis, and may either notify EPA that it will re-enter into sitespecific consultation after site remediation, if the values in the Final Status Survey Report still exceed the MOU triggers, or escalate the issue to a higher level of NRC management. Level 1 consultation will begin no later than 120 days before the expected date of approving the DP/LTP (except for sites which already have a DP/LTP pending NRC approval at the time which NRC begins implementing site-specific consultation under the MOU). Level 1 consultation would not occur earlier than the point in time that the staff concludes that the licensee's proposed actions and cleanup levels appear to be acceptable.
- When conducting level 1 consultation, staff will use the letter template provided in SRM-03-0206. In addition, consistent with SRM-03-0206, staff will consult the Commission before conducting level 1 consultation for any sites that are "very complex or potentially controversial..."

Level 2: Formal Consultation

Formal consultation is reserved for sites that have Final Status Survey
measurements that trigger the MOU and where EPA and NRC staffs have
already engaged in a technical dialogue (i.e., level 1 consultation), and issues
remain. Consultation at this level will use the process outlined in the MOU (e.g.,
escalation to management if issues remain).

 Consistent with SRM-03-0206, staff will consult with the Commission before conducting level 2 consultation.

Notification

(NRC also sent Notifications to the EPA on sites that would have been Level 1 consultation sites had their DPs or LTPs not already been approved prior to the MOU being signed. Level 2 consultations may still be necessary for these sites if they trigger the MOU at the time of license termination. There are no more sites with approved DPs or LTPs which require NRC to notify the EPA.)

NRC to EPA Letters

- When an NRC licensee is identified for consultation, the licensee will be notified telephonically by its NRC site PM. In addition, the licensee will be copied on any consultation letter sent from NRC to EPA before the site-specific MOU letter is transmitted.
- EPA will also be informed telephonically prior to the consultation letter being transmitted.
- The NRC PM will email the consultation letter to OPA for information in case there is any public interest on the site-specific correspondence.
- Similarly, any further correspondence from NRC to EPA concerning a specific site (e.g., if the EPA response to a consultation letter requires an NRC response), will include a telephonic notice to the licensee prior to the NRC letter being transmitted, followed by transmittal of a copy of the correspondence to the licensee.
- EPA will be informed telephonically also prior to these further correspondence letters being transmitted.
- The NRC PM will email the EPA letter to OPA for information in case there is any public interest on the site-specific correspondence.
- The NRC PM will email the EPA letter to OCA for information in case there is any Congressional interest on the site-specific correspondence.
- Following transmittal, the NRC MOU PM will post the site-specific correspondence on the NRC's Public Decommissioning webpage.

EPA to NRC Letters

• If the EPA responds to a site-specific MOU correspondence, the NRC MOU PM will notify the NRC site PM about the response as soon as possible, and provide the NRC site PM with a copy of the response letter when it is received.

- The NRC PM should notify the licensee telephonically about the EPA response as soon as he/she is informed by the NRC PM, and send a copy of the EPA response to the licensee following the telephonic notice.
- The NRC PM will ensure that OPA receives a copy of the EPA correspondence for information in case there is any public interest on the site-specific correspondence between the two agencies.
- Following receipt, the NRC MOU PM will post the site-specific correspondence on the NRC's Public Decommissioning webpage.

Public Meetings

- Meetings open to the public will be categorized as opportunistic, invitational, routine, or optional. Meetings concerning the MOU will be those public meetings that occur where NRC is in attendance and is asked to discuss the MOU. An invitational meeting is one where NRC is requested to present a discussion on the MOU. A routine meeting is one that typically occurs on a recurring basis with a stakeholder. An optional meeting may include a public meeting specifically to discuss the MOU which will be announced at least 2 weeks in advance of the meeting, in accordance with standard NRC practice.
- A meeting report will be prepared within 30 working days of the end of the meeting. The meeting report will be distributed to all appropriate stakeholders, on request, and placed in ADAMS. No meeting will involve classified, proprietary, or safeguards information.

Internal Communications

- The NRC PM for the MOU will keep NRC site PMs informed regarding sitespecific consultation with EPA under the MOU.
- NRC site PMs will use e-mail, notes, briefings, and meetings to coordinate sitespecific and policy information pertinent to the MOU, with other NRC staff and managers as appropriate.
- The NRC PM for the MOU will provide e-mails, briefings, presentations, and any
 other material to the Commission, the Advisory Committee on Nuclear Waste the
 Decommissioning website, to D-Board meetings, to the Decommissioning
 Counterparts meetings, and other internal meetings and coordinating
 committees, as required, to facilitate communication on the status of
 implementation of the MOU

Instructions to Licensing Offices

In accordance with the November 25, 2002, letter from Martin Virgilio, NRC project managers and license reviewers should review information in the DP or LTP (for possible Level 1 Consultation) or in the Final Status Survey Reports or Groundwater Assessments (for possible Level 2 Consultation) for the sites they manage. The PM

should determine if any of the criteria in the MOU could be triggered. If there are any indications of soil or ground-water contamination that could exceed the MOU values at the time of license termination, and/or it is likely that the site license will be terminated under NRC's restricted or alternate release provisions, then the project manager is to notify the Deputy Director, NMSS/DWMEP. Based on this information and subsequent dialogue with the project manager and license reviewer, NMSS/DWMEP, in accordance with the above guidance will make a determination regarding whether (and when) to conduct site-specific consultation with EPA. NMSS/DWMEP, is responsible for coordinating all day-to-day interactions with EPA regarding implementation of this MOU.

EVALUATION AND MONITORING

Each agency has appointed a designated contact for implementation of the MOU. The NRC designated contact is the Director, NMSS, and the EPA designated contact is the Director, Office of Superfund Remediation and Technology Innovation, or as each designee delegates. The designated individuals should meet at least yearly to review sites that trigger consultation and, at the request of either agency, to review specific NRC-licensed sites that meet the criteria for formal consultation pursuant to Section V.C.2.

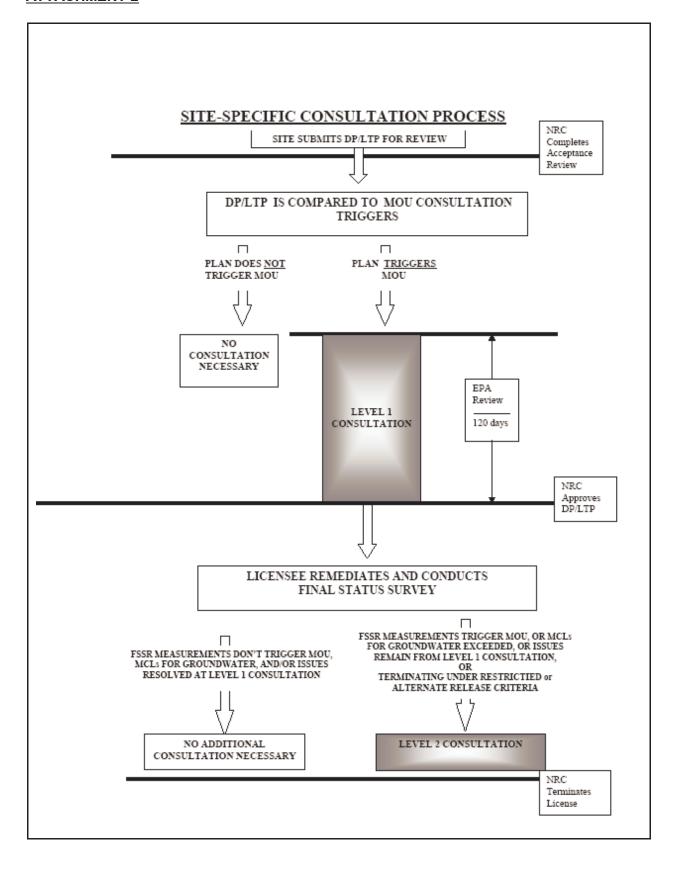
Attachments:

- 1. MOU
- 2. MOU Flowchart
- 2. EPA MCLs

ATTACHMENT 1

EPA/NRC MOU: Available in ADAMS at ML022830208 and online at:

http://www.nrc.gov/reading-rm/doc-collections/news/2002/mou2fin.pdf



Attachment 3: List of Radionuclides addressed by 4 mrem/yr man-made beta particles and photon emitters MCL standard¹

H-3	<u>Nuclide</u>	pCi/I	<u>Nuclide</u>	pCi/l	<u>Nuclide</u>	pCi/l	<u>Nuclide</u>	pCi/l
C-14	H-3	20,000	Sr-85 m	20,000	Sb-124	60	Er-169	300
F-18	Be-7	6,000	Sr-85	900	Sb-125	300	Er-171	300
Na-22	C-14	2,000	Sr-89	20	Te-125m	600	Tm-170	100
Na-22	F-18	2,000	Sr-90	8	Te-127	900	Tm-171	1,000
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V-48 90 Mo-99 600 Cs-134 80 Os-193 Cr-51 6,000 Tc-96m 30,000 Cs-134m 20,000 Ir-190 Mn-52 90 Tc-96m 30,000 Cs-135 900 Ir-192 Mn-54 300 Tc-97 6,000 Cs-136 800 Ir-194 Mn-56 300 Tc-97m 1,000 Cs-137 200 Pt-191 Fe-55 2,000 Tc-99m 900 Ba-131 600 Pt-193 Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Co-57 1,000 Ru-97 1,000 Ba-140 90 Pt-197 Co-58 300 Ru-103 200 Ce-141 300 Pt-197 Co-58m 9000 Ru-106 30 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m	Sc-47	300	Nb-95	300	I-135	30	Os-191	600
Cr-51 6,000 Tc-96 300 Cs-134m 20,000 Ir-190 Mn-52 90 Tc-96m 30,000 Cs-135 900 Ir-192 Mn-54 300 Tc-97 6,000 Cs-136 800 Ir-194 Mn-56 300 Tc-97m 1,000 Cs-137 200 Pt-191 Fe-55 2,000 Tc-99 900 Ba-131 600 Pt-193 Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Co-57 1,000 Ru-97 1,000 La-140 60 Pt-197 Co-58 300 Ru-103 200 Ce-1441 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-1443 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-63 50 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-103m <td>Sc-48</td> <td>80</td> <td>Nb-97</td> <td>3,000</td> <td>Cs-131</td> <td>20,000</td> <td>Os-191m</td> <td>9,000</td>	Sc-48	80	Nb-97	3,000	Cs-131	20,000	Os-191m	9,000
Mn-52 90 Tc-96m 30,000 Cs-135 900 Ir-192 Mn-54 300 Tc-97 6,000 Cs-136 800 Ir-194 Mn-56 300 Tc-97m 1,000 Cs-137 200 Pt-191 Fe-55 2,000 Tc-99m 900 Ba-131 600 Pt-193 Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Co-57 1,000 Ru-97 1,000 La-140 60 Pt-197 Co-58 300 Ru-103 200 Ce-141 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-105 30 Ce-144 30 Au-199 Ni-59 300 Rh-105 300 Pr-142 90 Au-199 Ni-65 300 Pd-103	V-48	90	Mo-99	600	Cs-134	80	Os-193	200
Mn-54 300 Tc-97 6,000 Cs-136 800 Ir-194 Mn-56 300 Tc-97m 1,000 Cs-137 200 Pt-191 Fe-55 2,000 Tc-99 900 Ba-131 600 Pt-193 Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Co-57 1,000 Ru-103 200 Ce-141 300 Pt-197r Co-58 300 Ru-103 200 Ce-141 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-142 90 Au-199 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-103	Cr-51	6,000	Tc-96	300	Cs-134m	20,000	<u>lr-190</u>	600
Mn-56 300 Tc-97m 1,000 Cs-137 200 Pt-191	Mn-52	90	Tc-96m	30,000	Cs-135	900	<u>lr-192</u>	100
Fe-55 2,000 Tc-99 900 Ba-131 600 Pt-193 Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Co-57 1,000 Ru-97 1,000 La-140 60 Pt-197 Co-58 300 Ru-103 200 Ce-141 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-198 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-147 200 Hg-197m Cu-65 300 Ag-105 300 Pm-147 600 Ti-201 Zn-69 6,000 Ag-110m	Mn-54	300	Tc-97	6,000	Cs-136	800	Ir-194	90
Fe-59 200 Tc-99m 20,000 Ba-140 90 Pt-193m Co-57 1,000 Ru-97 1,000 La-140 60 Pt-197 Co-58 300 Ru-103 200 Ce-141 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-147 200 Hg-203 Zn-69 6,000 Ag-110m	Mn-56	300	Tc-97m	1,000	Cs-137	200	Pt-191	300
Co-57 1,000 Ru-97 1,000 La-140 60 Pt-197 Co-58 300 Ru-103 200 Ce-141 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-147 200 Hg-197m Cu-65 300 Ag-105 300 Pm-147 600 Hg-203 Zn-65 300 Ag-110m 90 Pm-147 600 Ti-200 Zn-69m 6,000 Ag-111 100 Sm-151 1,000 Ti-201 Zn-69m 200 Ag-111	Fe-55	2,000	<u>Tc-99</u>	900	Ba-131	<u>600</u>	Pt-193	3,000
Co-58 300 Ru-103 200 Ce-141 300 Pt-197m Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-110s 90 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109	Fe-59	200	<u>Tc-99m</u>	20,000	Ba-140	90	Pt-193m	3,000
Co-58m 9000 Ru-105 200 Ce-143 100 Au-196 Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-105 300 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109 600 Sm-153 200 Ti-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-113m	Co-57	<u>1,000</u>	Ru-97	1,000	<u>La-140</u>	<u>60</u>	Pt-197	300
Co-60 100 Ru-106 30 Ce-144 30 Au-198 Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-105 300 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109 600 Sm-153 200 Ti-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m <td< td=""><td>Co-58</td><td>300</td><td>Ru-103</td><td>200</td><td>Ce-141</td><td>300</td><td>Pt-197m</td><td>3,000</td></td<>	Co-58	300	Ru-103	200	Ce-141	300	Pt-197m	3,000
Ni-59 300 Rh-103m 30,000 Pr-142 90 Au-199 Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-105 300 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109 600 Sm-153 200 Ti-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-115m	<u>Co-58m</u>	9000	Ru-105	200	Ce-143	<u>100</u>	<u>Au-196</u>	<u>600</u>
Ni-63 50 Rh-105 300 Pr-143 100 Hg-197 Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-105 300 Pm-147 600 Tl-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Tl-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Tl-202 Ga-72 100 Cd-109 600 Sm-153 200 Tl-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m <t< td=""><td>Co-60</td><td><u>100</u></td><td>Ru-106</td><td>30</td><td>Ce-144</td><td><u>30</u></td><td><u>Au-198</u></td><td><u>100</u></td></t<>	Co-60	<u>100</u>	Ru-106	30	Ce-144	<u>30</u>	<u>Au-198</u>	<u>100</u>
Ni-65 300 Pd-103 900 Nd-147 200 Hg-197m Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-105 300 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109 600 Sm-153 200 Ti-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113	Ni-59	<u>300</u>	Rh-103m	30,000	<u>Pr-142</u>	90	<u>Au-199</u>	<u>600</u>
Cu-64 900 Pd-109 300 Nd-149 900 Hg-203 Zn-65 300 Ag-105 300 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109 600 Sm-153 200 Ti-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113	<u>Ni-63</u>	<u>50</u>	Rh-105	300	<u>Pr-143</u>	<u>100</u>	<u>Hg-197</u>	<u>900</u>
Zn-65 300 Ag-105 300 Pm-147 600 Ti-200 Zn-69 6,000 Ag-110m 90 Pm-149 100 Ti-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Ti-202 Ga-72 100 Cd-109 600 Sm-153 200 Ti-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>Ni-65</u>	<u>300</u>	<u>Pd-103</u>	900	<u>Nd-147</u>	<u>200</u>	<u>Hg-197m</u>	<u>600</u>
Zn-69 6,000 Ag-110m 90 Pm-149 100 Tl-201 Zn-69m 200 Ag-111 100 Sm-151 1,000 Tl-202 Ga-72 100 Cd-109 600 Sm-153 200 Tl-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>Cu-64</u>	900	Pd-109	300	Nd-149	900	Hg-203	<u>60</u>
Zn-69m 200 Ag-111 100 Sm-151 1,000 Tl-202 Ga-72 100 Cd-109 600 Sm-153 200 Tl-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>Zn-65</u>	<u>300</u>	<u>Ag-105</u>	300	Pm-147	<u>600</u>	<u>TI-200</u>	<u>1,000</u>
Ga-72 100 Cd-109 600 Sm-153 200 TI-204 Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>Zn-69</u>	6,000	<u>Ag-110m</u>	90	Pm-149	100	<u>TI-201</u>	<u>900</u>
Ge-71 6,000 Cd-115 90 Eu-152 200 Pb-203 As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>Zn-69m</u>	200	Ag-111	100	<u>Sm-151</u>	1,000	<u>TI-202</u>	<u>300</u>
As-73 1,000 Cd-115m 90 Eu-154 60 Bi-206 As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	Ga-72	100	<u>Cd-109</u>	600	<u>Sm-153</u>	200	<u>TI-204</u>	<u>300</u>
As-74 100 In-113m 3,000 Eu-155 600 Bi-207 As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>Ge-71</u>		<u>Cd-115</u>	90	<u>Eu-152</u>	200	Pb-203	<u>1,000</u>
As-76 60 In-114m 60 Gd-153 600 Pa-230 As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>As-73</u>	<u>1,000</u>	<u>Cd-115m</u>	90	Eu-154	<u>60</u>	Bi-206	<u>100</u>
As-77 200 In-115 300 Gd-159 200 Pa-233 Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>As-74</u>	<u>100</u>	<u>In-113m</u>	3,000	Eu-155	600	Bi-207	<u>200</u>
Se-75 900 In-115m 1,000 Tb-160 100 Np-239 Br-82 100 Sn-113 300 Dy-165 1,000 Pu-241	<u>As-76</u>	<u>60</u>	<u>In-114m</u>	<u>60</u>	Gd-153	600	<u>Pa-230</u>	<u>600</u>
<u>Br-82</u> <u>100</u> <u>Sn-113</u> <u>300</u> <u>Dy-165</u> <u>1,000</u> <u>Pu-241</u>	<u>As-77</u>	<u>200</u>	<u>In-115</u>	300	Gd-159	200	Pa-233	<u>300</u>
	<u>Se-75</u>	900	<u>In-115m</u>	1,000	<u>Tb-160</u>	100	Np-239	<u>300</u>
· · · · · · · · · · · · · · · · · · ·	<u>Br-82</u>	<u>100</u>	<u>Sn-113</u>	300	Dy-165	1,000	Pu-241	<u>300</u>
<u>Rb-86 600 Sn-125 60 Dy-166 100 Bk-249</u>	Rb-86	<u>600</u>	<u>Sn-125</u>	<u>60</u>	Dy-166	<u>100</u>	Bk-249	<u>2,000</u>
<u>Rb-87</u> <u>300</u> <u>Sb-122</u> <u>90</u> <u>Ho-166</u> <u>90</u>	<u>Rb-87</u>	300	<u>Sb-122</u>	90	<u>Ho-166</u>	90		

¹For those isotopes where an MCL is calculated, concentration values were rounded using the same format as EPA guidance for the 1976 MCL rulemaking.