

APPENDIX J

EPA RESPONSES TO COMMENTS ON THE DRAFT SOURCE BOOK

EPA and Hardrock Mining: A Source Book for Industry in the Northwest and Alaska
Appendix J: EPA Responses to Comments on the Draft Source Book

Commentors on the Draft Source Book		
Number	Name	Affiliation
1	Kenwyn George	Alaska Department of Environment and Conservation
2	Steven Borrell	Alaska Miners Association
3	Luke Russell	Coeur d'Alene Mines Corporation
4	Clyde Gillespie	Fairbanks Gold Mining (Kinross Gold Corp.)
5	Rens Verburg	Golder Associates
6	Keith Brady	Pennsylvania Bureau of Mining and Reclamation
7	Pierre Mousset-Jones	University of Nevada - Reno, Mackay School of Mines
8	Lisa Kirk	Northwest Mining Association
9	David Chambers	Center for Science in Public Policy

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1	ADEC, Juneau	General	When opening the documents using Adobe Acrobat Reader 3.0 you get the message "Could not find the ColorSpace named Cs9", followed by the message "This file contains information not understood by the viewer. Suppress further errors?"	No response necessary.
2	ADEC, Juneau	General	I do not see anything on bonding for reclamation costs. Maybe add an Appendix just for Reclamation and Bonding? Bonding is required by state & federal permits (e.g. the USFS). The issues are many, from immediate maintenance and continuing operation of units to executing the exclamation plan (with the hope that the plan is sufficiently detailed that one could bid work from it). We are currently looking at bonding/reclamation of the Greens Creek mine in conjunction with the USFS and other agencies and the City & Borough of Juneau. Pete McGee of the Fairbanks office has recent experience with bonding problems at the Illinois Creek mine (and we will be using his knowledge and experience from this mine for the Greens Creek requirements). [Would you like this information/contacts?]	EPA has added a brief discussion of bonding in the main text, but has not added an entire appendix or section.
3	ADEC, Juneau	2.0	Page 7- How about having a second page similar to page 7, Figure 1, that incorporates State Certification? Also, perhaps on Figure 1, in the lower right box, Consider other applicable regulations, include State Regulations and Water Quality Standards?	EPA made no changes. This document focuses on EPA actions and permits, not state ones.
4	ADEC, Juneau	5.1.2	There are two page 32's (Table 6), and no page 33. In adobe this equates to two Table 6's on electronic pages 35 and 36.	Change made as suggested.
5	ADEC, Juneau	B-2.2	Page B-6 Item 2.2- how about listing the state web pages where state WQS are listed.	EPA added a reference to state web pages that include state water quality standards. Since URLs can change relatively frequently, EPA did not include the URLs.
6	ADEC, Juneau	B-3.2.2	Page B-18; Table B-2 is split onto two pages - it would be good to keep it all on one page.	EPA has modified the formatting to ensure that, at a minimum, the table's second half will include a title/header.
7	ADEC, Juneau	B-4.3	Pg B-21; 4.3 Is equal the sum [either equals, or is equal to]	Correction made as suggested.
8	ADEC, Juneau	C-4.4.1.3	Item 4.4.1.3 wastes using a a batch leach [duplicate a's]	Correction made as suggested.
9	ADEC, Juneau	C-4.4.5	4.4.5 batch test tended...(but not always)	How about "batch tests frequently, but not always, tended..."Correction made as suggested.
10	ADEC, Juneau	E.4.1	4.1 Surface water Hydrology provides [there is a hard return after water]	Correction made as suggested.

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11	ADEC, Juneau	D-2.2.3	Pg D-9 - put Figure D-1 on the same page & just under the reference to the table.	Correction made as suggested.
12	ADEC, Juneau	D-2.2.3	Pg D-10 Figure D-1 - include intermittent and permanent surface discharges from the lake?	Correction made as suggested.
13	ADEC, Juneau	D-3.0	Pg D-11 3.0 (e.g. heap leach piles, [tailings piles?])	This change was not made, since tailings are addressed in section 4 of Appendix D.
14	ADEC, Juneau	D-3.0	Second paragraph - add to second sentence "and the design of the engineered, or reclamation cap"?	This concept has been included in a separate sentence.
15	ADEC, Juneau	D-3.1	Pg D-12 3.1 Similarly, actions taken at closure...[include "design of the final cover".]	Correction made as suggested.
16	ADEC, Juneau	D-3.1	Pg D-14 Figure D-2 needs to be larger - you cannot read the text at its current size.	Correction made as suggested.
17	ADEC, Juneau	D-3.1.1	Pg D-16 - last sentence of 3.1.1 - readers should refer to this document [which? this source book?, Appendix A?, a specific EPA publication?]	Two documents are cited at the beginning of the sentence. The sentence has been changed to read "...these documents," which should remove any ambiguity.
18	ADEC, Juneau	D-3.2.1	Pg D-16 3.2. and run-off (for run-off). ?? [Was this meant to be for run-on]?	The parenthetical "(for run-off)" will be deleted to for clarification
19	ADEC, Juneau	D-4.1	Pg D-20 4.1 run-on/runoff [Use run-off for consistency?]	The hyphenated version has now been used throughout the Source Book.
20	ADEC, Juneau	D-4.2.2	Pg D-25 Put Figure D-3 just after the reference to it?	Correction made as suggested.
21	ADEC, Juneau	D-6.0	Pg D-24 6.0 (e.g. the Multi-Sector General Storm Water Permit, [Sector G - add this?])	Correction made as suggested.
22	ADEC, Juneau	E-2.0	Pg E-2 In Table E-1, Storm Water Description, "contracts" should be "contacts"	Correction made as suggested.
23	ADEC, Juneau	E-3.0	Pg E-3 Item 3.0, last para - a range of different of options [remove second "of"]	Correction made as suggested.
25	ADEC, Juneau	E-5.1.1.2	Pg E-6 Item 5.1.1.2 Some sulfide precipitation occur [should be "occurs"]	Correction made as suggested.
26	ADEC, Juneau	E-5.1.1.2	Pg E-7 Put Figure E-1 with the text reference, i.e. on the previous page, with the last part of 5.1.1.2 on pg E-7 instead of E-6.	Correction made as suggested.

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27	ADEC, Juneau	E-5.1.1.3	Pg E-8 Item 5.1.1.3 ...precipitation efficiency beyond the use... [How about "greater" rather than "beyond"?)	EPA modified the wording to clarify the sentence.
28	ADEC, Juneau	E-5.1.1.3to describe a different type water treatment [type of...]	Correction made as suggested.
29	ADEC, Juneau	E-5.2	5.2 reactivessurface [should no doubt be reactive surface]	Correction made as suggested.
30	ADEC, Juneau	E-5.2	ions from the waste water.. [Extra period]	Correction made as suggested.
31	ADEC, Juneau	E-5.2	treated or disposed. [disposed of?]	EPA believes the meaning is clear, and so did not make any changes.
32	ADEC, Juneau	E-5.2	is used by , electroplatersdischarging [remove space, split the two words]	Correction made as suggested.
33	ADEC, Juneau	E-5.1.3	Pg E-9 5.1.3 semipermeable [hyphenate]	Correction made as suggested.
34	ADEC, Juneau	E-5.1.3the volume of brine stream [either "of the" or delete "stream"]	Correction made as suggested.
35	ADEC, Juneau	E-5.2	Pg E-11 5.2 uses a number of treatment processes destroy" ... [to destroy]	Correction made as suggested.
36	ADEC, Juneau	E-5.2.1	5.2.1 Change "...remove all forms of cyanide excluding" to "...cyanide, excluding"	Correction made as suggested.
37	ADEC, Juneau	E-5.2.1	Under ideal conditions, [delete comma]	The existing punctuation is consistent with the remainder of the document, so no change was made.
38	ADEC, Juneau	E-5.2.1	WAD cyanide, using a chemical, chlorine, that is.....[How about WAD cyanide, using chlorine, which is....	The sentence was revised to make it simpler.
39	ADEC, Juneau	E-5.2.1	and cyanide complexes [How about "and the problem that iron cyanide complexes....."]	Correction made as suggested.
40	ADEC, Juneau	E-5.2.4	5.2.4 Disadvantages include limited application and [application, and.....]	Correction made as suggested.
41	ADEC, Juneau	E-5.2.4	may need to be reduced , due [delete extra space]	Correction made as suggested.
42	ADEC, Juneau	E-5.2.4	to toxic effect [effects]	Correction made as suggested.
43	ADEC, Juneau	E-5.2.5	5.2.5 bacteria present [why not just "bacteria"?]	Correction made as suggested.
44	ADEC, Juneau	E-5.3	Pg E-14 5.3 electrical repulsive [electrically repulsive]	Correction made as suggested.

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45	ADEC, Juneau	E-5.3	(e.g. anthracite coal or garnet sand) [Wouldn't this be and, rather than or?]	Correction made as suggested.
46	ADEC, Juneau	E-6.0	Pg E-16 6.0 sulfide precipitation), , [extra comma]	Correction made as suggested.
47	ADEC, Juneau	E-6.2	Pg E-17 6.2 At present, it unclear [it is....]	Correction made as suggested.
48	ADEC, Juneau	E-7.1	Pg E-20 7.1 extraction processes. . [extra period]	Correction made as suggested.
49	ADEC, Juneau	E-8.0	Pg E-21 8.0 disposal of wastewaters [Needs a period]	Correction made as suggested.
50	ADEC, Juneau	E-8.2	"surface water). Wastewater and ground water monitoring plan..." [How about] surface water), and "A wastewater and ground water monitoring plan..."	The bullets were corrected to be consistent with other bullet formats.
51	ADEC, Juneau	E-8.3	Pg E-23 8.3 demonstrate the ability maintain [to maintain]	Correction made as suggested.
52	ADEC, Juneau	E-9.0	9.0 STORM WATER MANAGEMETN [MANAGEMENT]	Correction made as suggested.
53	ADEC, Juneau	E-9.0	Pg E-24 Section 2 of Source Book [the Source Book]	Correction made as suggested.
54	ADEC, Juneau	E-9.0	...process water NPDES permits, may [delete comma]	Correction made as suggested.
55	ADEC, Juneau	E-9.0	...require preparation of BMP [require the....?]	The sentence actually reads "...require preparation of BMP plans", so no change will be made.
56	AK Miners, NWMA	Main text	Clarification of Intent - The Source Book is not meant to be a prescriptive regulation or policy document but rather general information listing of the types of data that will or may be necessary to meet the permitting requirements of the Clean Water Act (CWA) and the National Environmental Policy Act (NEPA). Several persons have raised the concern that although a document like this is not meant to be prescriptive, over time it may be used that way. The intent of the Source Book, that it is not prescriptive, regulatory or a policy document should be stated at specific locations within the individual sections which we will mention later. This intent also needs to be stated prominently and highlighted in the front of the document, possibly on the inside front cover and the introduction.	The purpose of the Source Book has been clarified on the title/disclaimer page and in section 1.1.

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57	AK Miners, NWMA	General	Existing Studies Completed - There is need for the mining industry to know what work has already been done for other projects, how it was done, the parameters, the methodology, the QA/QC of both sampling and lab work, etc. In other words, what have other projects done and how have they approached the issues. The very best, most comprehensive source of this information is the EPA's own library of files from past projects. These are examples of what has worked, what has been determined to be acceptable, etc. A listing of these studies would be a valuable tool in assisting other companies in knowing how to approach their specific project. The industry has spent multiplied millions of dollars developing these reports and they would be of tremendous benefit to future permitting by other companies. That an appendix be created listing the major mines and mining projects, by state, and for each provide a bibliography of the studies that were completed for that mine/project. The bibliography should list all baseline and other studies of all types developed for NEPA compliance and for final permitting for - air, surface water, groundwater, climatological, wetlands, fish, wildlife, endangered species, etc. The bibliography should list the study name, author(s), date completed, etc. For Alaska this appendix would include, at a minimum: Greens Creek, Red Dog, Red Dog Expansion, Fort Knox, Illinois Creek, Nixon Fork, Alaska-Juneau, and Kensington.	Although such a compilation of cases studies and project bibliographies could be valuable, this is beyond the scope of this Source Book. EPA would encourage the independent compilation of such case studies and bibliographies.
58	Alaska Miners Association	General	The Source Book should also contain descriptions of the various research programs, where the information has been obtained, who has generated that information, etc. It would also be beneficial to know how to contact the authors and what past work they have performed. These research programs should be developed into a cross-referenced stand-alone section organized by topic.	This would be useful, but is beyond the scope of the Source Book. EPA encourages independent preparation of such an "encyclopedia" of mining research.
59	Alaska Miners Association	General	Mining Specific References - Most of the texts, reference documents, etc. utilized by the mining industry are not mentioned. For example, the Mining Environmental Handbook is mentioned in the first chapter but it is not cited again after that. Many of the references cited are from meetings and workshops of limited exposure to the general public, and most particularly the mining industry. That a bibliography of mining specific texts, technical articles, references, etc. be added and that these items be referenced in the Source Book along with the existing references.	A comprehensive bibliography of references used by the industry is beyond the scope of the Source Book.
60	Alaska Miners Association	General	State by State Summary. A discussion and/or table should be included showing which regulatory programs have been delegated to each of the states in Region 10 and any differences, peculiarities, or special situations that exist for each of the states.	EPA has added a section to the main text.

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61	Alaska Miners Association	Title Page	Title Page - should include a list of the States to which the source book applies. It should also clarify that "hardrock" mines do not include placer/alluvial mines or sand and gravel operations.	The introduction has been revised to move this information closer to the beginning of the document.
62	Alaska Miners Association	1.1	Section 1.1, page 1, second paragraph notes that each mining operation is unique, that it is impracticable to develop guidance applicable to all sites, and that the guidance in the source book is not mandatory guidance. We support that concept, but are concerned that the source book will become mandatory either through adoption as EPA Region 10 policy or Regulation. Accordingly, we recommend the stated purpose of the source book be placed on the flyleaf as a Note to readers to clearly emphasize the information is only suggested guidance since each mine is unique. The Note should also indicate that new technologies and/or permit requirements could cause a significant revision to the data and methodologies described	EPA has no intention of adopting the Source Book as a formal policy or regulation. The purpose of the Source Book has been clarified in the introductory section.
63	Alaska Miners Association	1.2	Section 1.2, page 2, first paragraph notes that EPA Region 10 has difficulty in providing timely and consistent permitting advice to the mining industry and interested publics. A short discussion of why this difficulty exists and the extent that other EPA Regions also have this issue would be helpful in understanding the Problem Statement and the extent the source book resolves the issue of timely and consistent advice from EPA Region 10.	EPA has clarified the meaning of its statement. The basic premise is that EPA's role in the environmental review and permitting of new mines is not well understood by industry and the public in general. The Source Book is intended to clarify EPA's role and EPA's general information needs for timely processing of environmental reviews and permits.
64	Alaska Miners Association	1.2	Section 1.2, page 2, second paragraph generally describes the ecosystems in Region 10. We suggest that it would be more descriptive to add "Arctic Ocean" after "high plateau".	The sentence has been modified to show a greater range of ecosystems.

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65	Alaska Miners Association	1.3	Section 1.3, page 3 provides a list of things that Applicants can do to minimize delays in the NEPA and CWA decision process by EPA. This is good, but we recommend that a second list of things EPA Region 10 can do to provide timely and consistent advice be added. For example, the National Research Council in its 1999 report "Hardrock Mining on Federal Lands" notes in RECOMMENDATION 10 that from the earliest stages of the NEPA process all agencies must cooperate effectively in the scoping, preparation and review of environmental impact assessments for new mines. The NRC further noted that it is imperative that key staff for the relevant agencies actively participate. On page 112 the NRC expressly notes "The EPA was frequently singled out as an agency that often creates such problems because of its unwillingness to participate early in the NEPA process." Accordingly, EPA Region 10 should indicate in the source book their commitment to be more effective and proactive in providing timely and consistent guidance. Another area that EPA should comment on is a prompt review and timely report to the mining company that required monitoring data has been received, reviewed and the mining operation is consistent with EPA permit requirements, or if not, corrective action that is required to bring the project into compliance.	EPA is continually trying to improve the way in which it fulfills its responsibilities under the Clean Water Act, NEPA, and other statutes under which it has responsibilities. The development of the Source Book is in part a response to criticism that EPA does not engage in the NEPA process early on. The Source Book could in fact be viewed as a detailed yet generic scoping document intended to provide pre-proposal guidance to any mining company considering the development of a new mining operation in the Northwest or Alaska. Comments regarding early feedback on compliance monitoring have been referred to our enforcement and compliance assistance staffs.
66	Alaska Miners Association	2, 3, 4, 5	Sections 2, 3, 4 and 5 provide a general overview of the EPA role in mine permitting. We recommend these discussions be more focused on mining operations in the EPA Region 10. In general, EPA's role in mine permitting and approval is not different in Region 10 than elsewhere in the nation.	Region 10 is necessarily more involved in mine permitting than are other Regions by virtue of the fact that two Region 10 states (AK and ID) are not yet authorized to implement the NPDES program and so the program is implemented by EPA.
67	Alaska Miners Association	General	The source book gives short attention to mines in the coastal zone. We recommend that the EPA role for mine permitting in the coastal zone be expanded so the Applicant knows the extent of EPA involvement and any additional data requirements.	Text has been added to clarify additional procedures and information that may be required to comply with the Coastal Zone Management Act, which is implemented primarily by states.
68	Alaska Miners Association	General	The source book should have a thorough discussion about EPA permitting requirements for mining projects involving marine, estuary and intertidal waters. This should include discussions about marine discharges considered for the A-J Mine and Kensington Mine and Quartz Hill, all in Alaska.	As a general rule, tailings may not be discharged into waters of the U.S., including marine waters. The exceptional circumstances that led to consideration of submarine tailings disposal in marine waters for the A-J and Quartz Hill projects are so limited that a detailed discussion is not warranted.
69	Alaska Miners Association	2.0	Section 2.0, Figure 1 would be improved by adding the time it takes to get through each step for a simple and a complex mining operation.	The time required to go through each step is so variable that it would be misleading to add time to the figure, even ranges. A note has been added to the text indicating that the time required to complete each step is greatly influenced by the timeliness and completeness of information provided by the applicant.

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70	Alaska Miners Association	2.0	Section 2.0, page 8 notes that EPA is not obligated to permit an application to mine. This is an issue that should be firmly resolved during the first meeting between EPA and the potential Applicant discuss a proposed project. If EPA believes the proposed project is not permissible by Region 10, the Applicant should be immediately notified in writing that no permit will be issued and why. This avoids unnecessary expense and frustration by the Applicant and should be listed as things EPA Region 10 will do. (see comment 65).	In general, EPA cannot state with authority that a permit cannot be issued so early in the process. EPA often tells applicants when a particular approach might be extremely difficult, and advises of the steps that would be required. This in turn often leads applicants to make their projects more "permissible." However, it is entirely up to the applicant to decide how to design its project and then up to EPA to determine whether the project can be issued a permit.
71	Alaska Miners Association	2.2	Section 2.2, page 10 notes that the EGL guidelines do not apply to placer gold mines. This needs to be discussed in Sections 1.1 and 1.2. (also see comment 61)	The introduction has been clarified to state that the Source Book does not address placer mines.
72	AK Miners, FGMI	2.2	On page 13 the discussion regarding the use of Best Professional Judgement (BPJ) to develop technology-based limits is of concern. When technology-based limits cannot be defined, discharges should only be required to meet the applicable water quality standards for the receiving stream.	A sentence has been added to make the commenter's point. The existing discussion is not otherwise changed.
73	AK Miners, FGMI	2.3	On page 16 the explanation of Anti-degradation is not appropriate and we recommend that the text be replaced with the following: Anti-degradation: Each State must adopt an anti-degradation policy. In states that have approved NPDES permit programs the states will incorporate compliance with their anti-degradation policy as a part of the permitting process. For states without an approved NPDES program where EPA will be issuing the permit, EPA will require that the affected state to determine compliance with the state's anti-degradation policy and provide EPA with certification of compliance. Applicants should consult with the affected state agency and be prepared to demonstrate that the proposed project will comply with the state's anti-degradation policy as a part of the permitting process.	EPA does not agree that the discussion of anti-degradation is "not appropriate" and has left it unchanged. However, we have added the commenter's language concerning the process that applicants should follow to ensure compliance with anti-degradation requirements.
74	AK Miners, FGMI	3.0	Pages 22 and 23 contain discussions regarding EPA's authority to veto permits issued by the Corps of Engineers. Since EPA's veto authority is based on a resource value determination, it appears this determination must be made early in the permitting process - this would be very beneficial to the mine seeking the permit and could save delays along with significant financial commitments (see comment 65).	EPA agrees that an early determination is desirable but notes that sufficient information to make a determination may not be available until later than desirable. That makes it incumbent on applicants to provide the right information as early in the process as possible.

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75	AK Miners, FGMI	4.3	On page 29 a bullet should be added to the second list of bullets to read: Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on the balance the effect will be beneficial. This point, found in 40 CFR 1508.27(b), appears to have been overlooked.	The commenter's point has been noted in the text.
76	Alaska Miners Association	6.1.1	Section 6.1.1 page 43 indicated an Applicant should have a baseline hydrological study extending beyond the boundary of the proposed operation. We do not disagree with the concept, but recommend that EPA Region 10 give some examples of how to determine how far the boundary should be extended.	The precise boundaries cannot be defined except on a site-specific basis. The text has been modified to indicate that the boundary may need to encompass the entire watershed.
77	Alaska Miners Association	6.2	Section 6.2, page 45 discusses water quality on a watershed basis. As noted in comment 77, Region 10 should include several examples of what has been required of mining operations in Alaska and the other Region 10 States so the Applicant and the public have a common starting point.	Section 6.2 is a summary of information needs regarding potential impacts to water quality. Appendices A and B provide detailed guidance for characterizing hydrology and receiving water quality at the appropriate watershed scale.
78	Alaska Miners Association	6.3	Section 6.3, page 51, last paragraph discusses aquatic resources studies. This, like most of the topics are issues that are finalized in the NEPA scoping process. Accordingly, we recommend the first sentence be modified by changing "predict changes that might occur..." to "predict relevant changes that might occur..."	Correction made as suggested.
79	Alaska Miners Association	B-2.4.1.1	Appendix B, pages B-13 and B-14 discuss the Red Dog Mine. This is the sort of description of permitting actions that are suggested for greater use in the final document (see comment 67). The discussion of the Red Dog Mine should also be expanded to include a summary of the EPA decisions in the NEPA process for base line information and how that baseline information has been used in the ongoing water quality classifications for waters downstream from the mine, including the fact that fish have migrated into the project area where naturally there were none, or limited fish due to natural high metals loading of the streams.	The specific decisions are not as important as the point made in the existing discussion: applicants should document even subtle effects of mineralization so they can be considered in decision making.
80	Alaska Miners Association	B-4.4.2	Appendix B, page B-22 discusses QAPP being a potentially fatal flaw in using existing and historical data sets. In Alaska there are relatively few existing or historical data sets that meet QAPP standards. Accordingly, we recommend EPA construct a conceptual Figure, similar to Figure 1 on page 7, showing the steps and timing for an Applicant to obtain a data set that EPA Region 10 would reasonably accept for a mining operation in Alaska and for the other States in the Region.	EPA agrees with the commenter about existing and historical data sets. EPA QA/G-5 Guidance on Quality Assurance Project Plans (EPA/600/R-98/018, February 1998) provides guidance on developing Quality Assurance Project Plans (QAPPs) that will meet EPA expectations and requirements, and this guidance is now cited. This document provides a linkage between the Data Quality Objective (DQO) process and the QAPP. It contains tips, advice, and case studies to help users develop improved QAPPs.

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81	Alaska Miners Association	I-2.1	Appendix I, page I-3 discusses "riparian" plant communities within the context of being jurisdictional wetlands. We agree that most riparian plant communities are likely to be considered jurisdictional wetlands in Alaska because of permafrost induced soil saturated conditions or heavy precipitation along coastal rainforest. But since the source book also is intended to also cover semiarid high plateau, either include all NWI plant communities or delete the inference that "riparian plant communities are automatically jurisdictional	The discussion cited by the commenter does not state and is not intended to imply that "riparian plant communities are automatically jurisdictional wetlands."
82	AK Miners, FGMI	5.1.2	On page 31, Table 6 includes several facilities that are not considered point sources and included in Title V permits. Typically only emission units are included in Title V permits. Fugitive emissions from overburden piles, waste rock piles, tailing, and spent ore need only be evaluated to determine the HAP portion of the emissions when making a major source determination. Land applications, ore handling piles, heap and dump leaches, process ponds, mine pit, underground workings, blasting, construction, reclamation/post reclamation, and abandoned mines need only be included in the evaluation to determine if a source is a major source by Title V definition.	EPA has added a note in Table 6 to make the commenter's point that some of these fugitive sources are generally only evaluated when making a major source determination.
83	AK Miners, FGMI	5.1.2	Table 6 includes vehicle emissions that should not be included in a Title V permit. Table 6 should be revised to include emission units typically included in an air quality operating permit or the table should be removed from the source book..	The table does not purport to show emissions regulated in a Title V permit. Rather, it shows various potential emission sources and their regulatory status.
84	AK Miners, FGMI	6.0	Section 6.0 discusses EPA's requirements for the NEPA process. This section fails to discuss the scoping process that is required as part of NEPA. The scoping process is crucial to the process and defines the significant issues to be addressed in the NEPA document and should also determine the area to be studied. This needs to be spelled out along with the importance that all agencies (including EPA) and groups define their issues and concerns during scoping.	Scoping is generally an agency responsibility, often assisted by the applicant. The discussion of public participation in section 4.3 ("EPA Requirements for Environmental Review Under NEPA and the CWA") has been revised slightly to clarify the purpose of scoping.
85	AK Miners, FGMI	6.1	The first paragraph of section 6.1 includes a discussion of the need for long term meteorological and hydrological data collection to be used for facility design, water balances, and impacts analysis. Since most designs of storm water diversion channels, development of water balances, and impacts analysis require use of the 25 year or 100 year storm events, sentences four, five, and six of this paragraph should be deleted.	EPA believes that the fact cited by the commenter ("most designs ... require use of the 25 year or 50 year storm events,...") makes it even more important to establish a long-term meteorological and hydrological record. Thus, EPA did not delete the sentences.
86	AK Miners, FGMI	6.1.1	The third paragraph in section 6.1.1 discusses the extent of the hydrologic study. The extent of the hydrologic study should be defined during the scoping process.	EPA agrees in part, but notes that applicants would be prudent to consider conducting comprehensive hydrologic studies to avoid the need for additional information.

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87	AK Miners, FGMI	6.1.1	The list of data needs included in Table 7 should be refined during the scoping process. Not all of the data listed will be necessary to determine the impacts from every proposed mining project.	EPA agrees in part, and notes that this table is a generally comprehensive list of data needs. When scoping or other factors identify concerns about impacts to any specific resource area, then most or all of the data listed for that resource area should be provided.
88	AK Miners, FGMI	6.1.1	On page 40 Table 8 proctor moisture/density testing is listed for rock, soils, and sediment. However, this testing is for design and construction of facilities and it has little applicability to an impact analysis and should be removed from Table 8.	EPA agrees with the purpose of the testing, but disagrees as to the need for this information in an EID. It is common for on-site materials (rocks, soils, and sediment) to be used in construction, and EPA needs proctor moisture/density testing results to evaluate their suitability.
89	AK Miners, FGMI	6.1.1	On page 42 Table 10 references the need to predict the stability of piles, impoundments, and backfill. Backfill stability should not be an issue and should be removed from Table 10.	EPA disagrees that backfill stability should not be an issue.
90	AK Miners, FGMI	6.2.3	Section 6.2.3 on page 46 should be changed to clarify that the design described would apply only if the facility is expected to generate acid or mobilize metals. The discussion seems generic as if it should apply to all facilities.	EPA agrees, and has clarified the discussion.
91	AK Miners, FGMI	6.2.4	Section 6.2.4 on page 48 needs to include the option of blending in neutralizing material with acid generating material to neutralize the acid as it is formed. This is common practice throughout the world.	This option has been added.
92	AK Miners, FGMI	6.2.7	Section 6.2.7 regarding heap leach pads and capping is not science based but rather is quite subjective. The discussion should be changed to specify that leach pad effluent water quality at closure must be addressed and included in the NEPA analysis.	EPA notes that the discussion is very general, but disagrees that the discussion is subjective. EPA agrees with the commenter's last point (leach pad effluent water quality) and has added this concept to the paragraph.
93	AK Miners, FGMI	6.4	Section 6.4 discusses the impact analysis for wetlands but does not address the potential for mitigation. The discussion should include the potential to offset lost acres of wetlands with developed wetlands and to offset lost wetlands by upgrading/improving other wetlands.	EPA has added a discussion that makes the commenter's points.
94	Coeur d'Alene Mines Corporation	General	We believe that EPA can play an important role in improving the permitting process, and see the Source Book as an initial step in that direction.	EPA appreciates the recognition of its intent.

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95	Coeur d'Alene Mines Corporation	Introduction	Coeur supports EPA's efforts to develop "guidance" on how the mine permitting process can be expedited and coordinated between EPA and other agencies. We agree that EPA requirements and expectations are all too frequently not presented early enough in the permitting process, and that this lack of communication has led to increased costs and delays. This has created confusion and controversy and we appreciate EPA's efforts in the development of this draft guidance document. However, it is not clear what this guidance means or how it will be used to streamline the permitting and NEPA review process. The footnote on page 1 states that the document does not provide Agency policy or guidance for meeting any regulatory requirements. How then does EPA see this document being utilized?	EPA has revised the Introduction to clarify the purpose and intent of the Source Book
96	Coeur d'Alene Mines Corporation	General	The draft report provides good general background on recommended permitting data needs, but it fails to provide specifics on how EPA will promote predictability and consistency within Region X. It also fails to clarify how EPA Region X intends for operators to proceed with permit development using the various methods of technical evaluation presented, which at times is inconsistent and subjective.	EPA acknowledges that the Source Book is relatively general at times and may even seem inconsistent due to the need to cover very diverse contingencies, but believes that the site-specific nature of mining impacts makes detailed guidance inappropriate. In general, applicants have the responsibility of satisfying EPA's (and the state's) information requirements, and this Source Book is intended to provide a rough road map to EPA's requirements.
97	Coeur d'Alene Mines Corporation	General	The document attempts to define where problems have been encountered in previous permitting efforts. The document would be more useful if the agency identified common problems and pitfalls more clearly, perhaps as short case studies, and made recommendations on how operators should proceed in these areas.	The text has been modified in section 1.2 Common pitfalls and problems include water balances that do not properly bracket high and low flow scenarios, underestimating water treatment needs, using detection limits that are too high, using inappropriate modeling approaches and assumptions, overall data quality problems (e.g., non-representative samples) and failure to consider temporary shut-downs and post-closure scenarios.
98	Coeur d'Alene Mines Corporation	General	An element lacking in this draft report is how EPA in the implementation of its authorities, will recognize and defer to other agencies, especially state authorities. For example, Coeur and EPA have successfully developed Memorandums of Understanding between EPA and other regulatory authorities to improve communication, coordination, and streamlining of the permitting process (e.g. Kensington). This process could be used to clarify EPA and state requirements and expectations early in the process. While this draft is silent on this type of approach we encourage EPA to use this type of a collaborative permitting process more often.	To the extent possible, EPA works collaboratively with applicable federal, state, and local agencies. That point has been added to the discussion of NEPA in section 4.0.
99	Coeur d'Alene, NWMA	2.1	The document refers to the broad definition of point source, but fails to include that a point source must be a "discharge of pollutants" as found in the Clean Water Act. This section also suggests that non-point sources could require an NPDES permit which is not the case.	EPA has clarified what a point source is. The section is not intended to imply that nonpoint sources may require an NPDES permit.

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100	Coeur d'Alene, NWMA	2.2	The document points out that the Effluent Limitation Guidelines (ELG) established technology based limits and that neither the ELGs nor other regulations require the use of any particular treatment technology. We agree, yet we question why then is EPA apparently pressuring mines within the region to install specific treatment technologies (e.g. sulfide precipitation).	EPA does not intend to "pressure" mines to select any particular technology, and does not believe that the Source Book does so. However, sulfide precipitation is a type of conventional treatment that has the capability of achieving a very high degree of metals removal from mine waste waters.
101	Coeur d'Alene, NWMA	2.3	Mixing zones are of critical importance to any discharge under the NPDES point source program. The document in this section states that discharge must show "where appropriate", dilution of the effluent in the receiving water (mixing zones) would meet the limitation. Given that the use of mixing zones are a state lead effort (CWA Section 101(b) the document fails to clarify how EPA will work with the states early in the permitting process to clearly establish how and where mixing zones can be utilized to meet water quality standards.	EPA consults with states early on in the NEPA process. Generally NEPA documents will display effluent criteria based on various dilution scenarios.
102	Coeur d'Alene, NWMA	2.3	The trend in effluent limitation establishment seems to be designed to set limits that cannot be routinely measured, are beyond reasonable treatment capabilities, or use overly conservative factors of safety. This results in deadlocked permitting. It would be very helpful if the document could provide clarification on how site-specific standards can be efficiently reviewed and processed.	EPA disagrees that there is any such "trend." It is beyond the scope of the Source Book to define the review and processing of site-specific standards.
103	Coeur d'Alene, NWMA	2.3	There are many ways in which a discharge may be regulated under the NPDES program. There are now over 8 different methods and measures of compliance including: effluent water quality tests, whole effluent toxicity tests (WET), receiving water quality tests, background comparisons, anti-degradation mon-degradation, bioassay tests, sediments and narrative tests. The present "policy" between states, permit writers or enforcement officers is not consistent. It would be helpful if EPA could clarify how discharge permits will be enforced and how applicants can better ensure compliance.	This type of discussion is beyond the scope of this Source Book.
104	Coeur d'Alene, NWMA	2.3	The document suggests that the TMDL program is for point sources, nonpoint sources, and natural background sources. The TMDL program is to regulate points sources that exceed 25% of the load into a particular stream. The document should clarify how the CWA categorizes streams under Section 303 (d)(I) and (d)(3);(d)(1) TMDL's are for waters impaired by point sources operating under effluent limitation guidelines developed under Section 301(b)(1)(A) & (B) of the CWA,(d)(3) TMDL's are for informational purposes only and do not require EPA oversight or approval. Waters impaired by nonpoint sources are required to be listed and addressed under CWA Section 19.	EPA has revised the paragraph on TMDLs to describe the intent and implementation of 303(d) more clearly. EPA does note that one goal of the TMDL process is to identify all sources of pollutant loadings, including nonpoint and background sources. However, this comment refers to a provision in Idaho state law (i.e., a TMDL is only required when the point source exceeds 25% of the load into a particular water body). It should be noted that this provision of Idaho law conflicts with CWA requirements under section 303 which does not limit TMDL's to only point sources.

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105	Coeur d'Alene, NWMA	4.1	Section 4.1 overviews various NEPA steps but fails to clarify how EPA can and is willing to expedite the process and how it will interact with other regulatory agencies.	EPA has added a brief discussion of the interactions with other agencies. The Source Book is part of EPA's attempts to expedite the process by clearly explaining process and information requirements to prospective permit applicants as well as other regulatory agencies.
106	Coeur d'Alene, NWMA	5.2	The document should clarify how and when EPA will coordinate with the National Marine Fishery Service and how their role in the permitting process can be streamlined.	Figures 3A and 3B illustrate how and when EPA coordinates with NMFS. To the extent possible, EPA streamlines other agencies' participation in the permitting process, but cannot control those agencies' processes and procedures.
107	Coeur d'Alene Mines Corporation	E-5.2	EPA discusses several potential cyanide destruction techniques. However, cyanide recovery has also been successfully used in Region X (DeLamar) and we strongly encourage EPA to add this approach to the document.	EPA has added a paragraph on cyanide recovery.
108	Coeur d'Alene Mines Corporation	E-5.2	There is a patented process called Cyanisorb that employs high efficiency packed towers to strip cyanide from either slurries or clear solutions at a near-neutral pH. Cyanisorb recovers both free cyanide and weak-acid complexes and returns the recovered cyanide back into the leaching cycle. This reduces consumption, transportation requirements, and cyanide concentrations remaining in the tailings impoundment. EPA should consider including a discussion of this technology.	A discussion of cyanide recovery technologies has been added to section E.5.
109	Fairbanks Gold Mining	2.2	The flow sheet on page 14 appears to have the "Yes" and "No" arrows switched for the step entitled; are pollutants discharged at levels well below benchmark threshold values? If the pollutants in runoff are below benchmark levels the water should be considered storm water and be covered by the multi-sector, general storm water permit.	The commenter is correct, and EPA has corrected this figure.
110	Fairbanks Gold Mining	3.0	Near the bottom of Page 22, EPA suggests evaluating alternatives and proposing mitigation on lands not owned or controlled by the proponent. This suggestion has many underlying considerations that may or may not be resolved to allow the acquisition of additional property. For most mine permitting processes the land acquisition involves mining claims that complicate the acquisition process, especially acquiring additional claims near a site that is active or actively acquiring permits. In most instances land acquisition is not an easy process and can be very time consuming. [The commenter] suggests the two sentences discussing alternatives and mitigation on land owned by others be removed from the document.	The sentences were not removed as suggested, but additional clarifying language has been added. The CWA 404(B)(1) guidelines (see 40 CFR 230) limit issuance of CWA 404 permits for non-water dependent projects (e.g., a mine) to the "least environmentally damaging practicable alternative". The term "practicable" is defined [40CFR230.3(q)] as "available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes." It is therefore appropriate to include in the discussion property that is not owned by the applicant.

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111	Fairbanks Gold Mining	4.3	The last sentence in the second bullet (first set of bullets) on Page 28 would more accurately reflect the language of 40 CFR 6.605(a) if written as follows: In this case, the broad cumulative impacts of the proposals would be addressed in an initial comprehensive document, while other EISs or EAs may have to be prepared to address issues associated with site-specific proposed actions or can be addressed in the cumulative document.	The meaning of the recommended revision is unclear, so no change has been made.
112	Fairbanks Gold Mining	4.3	The last bullet on Page 28 would better reflect the language in 40 CFR part 6.605(b) if it was written as follows: The environmental impacts of the issuance of a new source NPDES permit would have a significant direct adverse impact on a property listed or eligible for listing in the National Register of Historic Places.	The correction was made as suggested, except that the wording was changed to read: "The issuance of the new source permit would result in a significant direct adverse impact..."
113	Fairbanks Gold Mining	4.3	The first bullet on Page 29 would better reflect the language in 40 CFR part 6.605(b) if it was written as follows: Any major part of the new source will have significant adverse effects on parklands, wetlands, wild and scenic rivers, reservoirs or other important water bodies, navigation projects, or agricultural lands.	The correction was made as suggested, except that the wording was changed to read: "The issuance of the new source permit would result in significant adverse effects..."
114	Fairbanks Gold Mining	5.1	The last sentence in the second paragraph on Page 30 would be more concise if written as follows: Mines with complex oxidation processes or smelters generally trigger at least one of the threshold values for the six parameters and are typically sources subject to the PSD program.	The change was made as suggested.
115	Fairbanks Gold Mining	5.1	Section 5.1 Clean Air Act, intermingles the Title V and PSD permitting processes. A major source by definition in 40 CFR 70.2 is a source that emits more than 100 tons of a criteria pollutant or 10 tons of a specific HAP or 25 tons of total HAPs. Designating these facilities as minor is confusing to the reader.	While the processes are discussed together, EPA believes the discussion is clear as it is.
116	Fairbanks Gold Mining	5.1.1	The last sentence in the first paragraph under section 5.1.1 on Page 31 discusses the opacity standard for particular matter. [The commenter] believes EPA is discussing particulate matter.	The correction has been made.
117	Fairbanks Gold Mining	6.1.1	The second bullet on page 38 states that the hydrologic analysis should include any impacts due to current or historic mining activities. The hydrologic analysis should include any impacts from any activity relative to the proposed project.	The change was made as suggested.

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118	Fairbanks Gold Mining	6.1.2	At the top of Page 43 the source book discusses the extent of the groundwater study area. This should be defined during the scoping process. The last bullet on this page discusses the effects from current or historic mining activities. FGM believes all activities (current or historic) that may effect groundwater within the study area should be included.	EPA agrees that the scope of the groundwater study should be defined early in the process, ideally during scoping. EPA agrees with the second point and has revised the text accordingly.
119	Fairbanks Gold Mining	6.1	A general comment on section 6.1 - groundwater models used to assess impacts from mining operations should be updated annually throughout the operation of the mine and the impacts determination modified if the model changes significantly.	EPA agrees and has modified table 10 accordingly.
120	Fairbanks Gold Mining	6.2.4	At the top of page 48 the source book implies the use of a 40-week humidity cell test. Testing to date indicates most material will generate acid within eight to 14 weeks. Testing is only extended beyond the 20-week time frame on a case by case basis. The implication of a 40-week test should be removed unless EPA has data supporting the benefit of a 40-week test.	EPA does not necessarily recommend the use of 40-week tests, merely indicates that it would "be viewed favorably." EPA cited the source (Price et al. 1997) that does advocate a 40-week period. The commenter notes that "most" material will generate acid within 8 to 14 weeks; EPA is concerned with the difference between "most" and the actual number, and thus encourages longer studies and consequently reduced uncertainty. In general, the text is meant to convey EPA's belief that longer test times should be considered as necessary and to note that there is a growing body of evidence that longer test times are needed for samples that are on the borderline.
121	Fairbanks Gold Mining	6.3	Beginning with the fourth sentence in the first paragraph of section 6.3 on Page 50, the remainder of the paragraph reads like a predetermined impact analysis. These sentences should be re-written to state the issues that must be addressed and leave the impact analysis to the EIS preparers.	EPA disagrees. These sentences merely point out some of the impacts that can occur from mining and mining-related activities to help applicants identify the potential impacts for which information should be provided.
122	Fairbanks Gold Mining	6.3	The third full paragraph on page 51 discusses the study area for the aquatic resources. The study areas should be determined during the scoping process.	EPA generally agrees, but notes that scoping more often simply identifies potential impacts to aquatic resources as an area that must be assessed. The nature of the operation and of the aquatic resources in the area generally define the potential area where impacts might occur, and this area may or may not be defined during scoping.

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123	Golder Associates	6.2.4	It is somewhat misleading to suggest that only "recently" we have come to the realization that the number of tested samples should reflect the material's variability. This concept has been around for a long time, as representative testing of material for environmental purposes is not fundamentally different from determining ore grade. Clearly, if an ore deposit is heterogeneous, more samples are required for resource characterization. In addition, it would be useful to point out that the volumetric distribution of the various materials should be taken into account. A material that is only present in minor quantities, will likely require less testing, unless it can be demonstrated that it may have a disproportionately large environmental impact despite its small volume. Conversely, materials that are present in large quantities generally require more testing, unless it can be demonstrated that they are very homogeneous. Ideally, therefore, the number of samples is a function of both compositional variability and volume. This issue is addressed in Appendix C, but the casual reader may not get that far.	EPA generally agrees with the commenter. However, EPA notes that many applicants, who clearly recognize the need for additional assays of ore with variable grades, still resist the idea that the same concept applies to environmental samples. The text in this section has been modified to make these points more clearly.
124	Golder Associates	6.2.4	Petrographic analysis is generally not considered cheap (in the order of \$500/sample). As a first step, mineralogical analysis by x-ray diffraction is commonly conducted, which is a truly inexpensive (\$50-100) and rapid method. Petrographic analysis is generally part of a second-stage mineralogical evaluation, when more detail is required (for instance w.r.t. weathering behavior or in the case of a large proportion of non-crystalline material).	EPA does not disagree, and has revised the text accordingly.
125	Golder Associates	6.2.4	Use of composite samples results in a "smoothing" of the characteristics of interest. In my opinion, compositing must be founded on a good understanding of the entire range of properties of the materials of interest. If compositing is performed without an understanding of the potential "extreme" behaviors, certain environmental impacts (e.g., those resulting from the presence of "hot spots") may not be adequately predicted.	EPA agrees with this comment.
126	Golder Associates	6.2.4	A commonly-used way to describe static vs. kinetic testing is that static testing provides information on the potential for acid generation, but not on the likelihood or rate at which this will take place. Although I realize this section represents a summary of Appendix C, it may be useful to point out in this paragraph that long-term information can also be obtained from on-site activities, such as monitoring of waste rock/tailings test pads specifically designed for this purpose.	A note has been added to this section to make this point.
127	Golder Associates	6.2.4	I would strengthen the wording w.r.t. the need for material characterization before and after kinetic testing. In my opinion, this is essential for understanding and predicting the long-term behavior.	While EPA agrees with the concept, we believe the wording is sufficiently strong.

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128	Golder Associates	6.2.4	I agree with the observation that interpretation of test results is not straightforward. This requires, therefore, considerable professional judgment, which can only be obtained through the necessary formal training and experience. Too often, ABA and other results are evaluated by novices, whose only frame of reference is the guidance provided by authors such as Mills and Price. Perhaps it would be wise to point out that specialized knowledge is required - and expected by EPA - for proper evaluation of the characterization results.	This point has been added to the text.
129	Golder Associates	6.2.4	It may be useful to point out that metals leaching can occur in the absence of acidic conditions. Too often it is thought that acid generation and metals leaching necessarily go hand in hand, but there are numerous instances in which metal leaching can occur in a neutral to alkaline environment. For instance, I am currently involved at a site where leaching of zinc from smithsonite (ZnCO ₃) in a limestone is a major problem, despite the fact that no acid is being generated and conditions are alkaline.	This point has been added to the text.
130	Golder Associates	B-4.5	PHREEQC Version 2 is now available at: http://www.brr.cr.usgs.gov/projects/GWC_couple/phreeqc . The new capabilities of Version 2 include (1) a general formulation for kinetically-controlled reactions, and (2) a complete formulation for ID diffusive or advective/dispersive transport with double porosity.	EPA has now cited the updated PHREEQC Version 2.
131	Golder Associates	C-4.3.1.3	Why are the Price (1997) guidelines for static test interpretation not used, as these guidelines have become widely used (to Bill's chagrin, I should add; I don't think he anticipated such proliferation of his guidelines). On a more general note, why the numerous references to a rather old guidance document (BC AMD Task Force, 1989) when Price's document represents a more updated version?	Price (1997) guidelines are now discussed in the text.
132	Golder Associates	C-4.4.1.2	I think it would be appropriate to point out that the TCLP test has little or no relevance w.r.t. characterization of mining wastes. Its goal is to provide a regulatory classification rather than be used for characterization. The TCLP test simulates conditions that are almost certain to be absent on mining sites. In addition, the Bevill amendment excludes most mining wastes from RCRA Subtitle C regulation, so the regulatory applicability of TCLP is limited.	EPA does not necessarily agree that the TCLP has little or no relevance on mining sites. We have clarified in the text that the Bevill exemption generally removes the regulatory applicability of the TCLP to extraction and beneficiation wastes.
133	Golder Associates	C-4.4.1.2	On a related note, I could not find any reference in the document to the role of the Bevill amendment (I fully admit that I only glanced at some pages, so I may have missed it. It might be appropriate to add a paragraph on Bevill if it's not already present).	There is now a section that briefly summarizes the Bevill Amendment and how mining wastes are addressed under RCRA.

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134	Golder Associates	H-4.4.2	The correct name for the model is "Sedimot-II" model, not "Sedimont-II".	The correction has been made as suggested.
135	Golder Associates	H-4.4.2	Why is the GSTARS2 model not included in the listing of models, in particular since EPA helped develop it?	EPA has added this model to the list.
136	PA Bureau of Mining & Reclamation	6.2.4	In coal mining we use other prediction tools in addition to "static" and "kinetic" tests. These tools include: results of previous mining, premining water quality, & geologic factors (such as rock type, effects of surface weathering, glaciation, etc.). These, along with laboratory tests, are described in our recent book "Coal Mine Drainage Prediction & Pollution Prevention in Pennsylvania." Although some of these methods may not be applicable to hard rock mining, others must certainly have parallels. As for geologic factors there has been some excellent work by Kathy Smith, Geoff Plumlee & Walter Ficklin at the USGS-Denver. Plumlee, GS, KS Smith, WH Ficklin, et al., 1993. Empirical studies of diverse mine drainages in Colorado--implications for the prediction of mine-drainage chemistry: Proceedings, 1993 Mined Land Reclamation Symposium, Billings MT, v.1, p.176-186. Smith, KS, GS Plumlee, & WH Ficklin, 1994. Predicting water contamination from metal mines and mining waste: Notes, Workshop No.2, International Land Reclamation & Mine Drainage Conference and 3rd International Conference on the Abatement of Acidic Drainage: US Geol. Survey Open-File Report 94-264, 112 p.	EPA agrees that these are important factors, and has modified section 6.2.4 and Appendix C accordingly.
137	PA Bureau of Mining & Reclamation	6.2.4	Over a decade ago, we circulated a paper that examined mine drainage prediction in Pennsylvania, and one of the primary criticisms was that it emphasised laboratory methods too heavily. I think the same criticism could be leveled at your Hard Rock Mining source book. Non-laboratory methods (i.e., field methods) should be examined and discussed. The USGS work should certainly be included, near-surface weathering (oxidation of pyrite & dissolution of carbonates) has to be a factor in many places, and results from previous mining must also occur. As with coal mining, I'm sure that there are plenty of caveats that must be considered for each of these, but there also have to be some useful rules of thumb. We have found that the best predictions are those that are made using a variety of tools. It's especially reassuring when the different methods of prediction all point in the same direction.	EPA agrees that non-laboratory methods are useful as complements to laboratory data, and has added discussions to 6.2.4 and Appendix C.

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138	Mackay School of Mines	C	Appendix C is severely lacking in detailed guidance on sampling protocol to achieve adequate characterization of the waste rock. Typically mining companies are very interested in the mineralised rock which may be a resource or a reserve and under appropriate conditions it can be classified as ore (an often misused and misunderstood word). Usually proper attention is paid to the sampling process to minimise error and bias using Gy's sampling formula to determine size of sample, sample preparation protocol (crushing and splitting), assay protocol, and finally Geostatistics is used to characterize the regionalised variable i.e. the mineral grade/rock property, taking into account the geology of the area, rock type, structure, faulting, etc., using variograms and various kriging methods to interpolate/extrapolate between sample locations to arrive at a resource/reserve estimate.	Section 6.0 of Appendix C describes sampling programs. EPA has expanded the section somewhat.
139	Mackay School of Mines	C	This same approach (refer to comment 155) needs to be taken with the waste rock but the process/practice has not been so rigorous as with mineralised rock/ore and few guidelines are available on such matters as number of samples, size of samples, location of samples, sample preparation, etc. Appendix C is inadequate in this regard, Section 6.0 and Figure C-3 need to be considerably enhanced to include many of the procedures used by industry to appropriately characterize the mineralised rock. Unfortunately, there is little published on proper characterizing of waste and few studies have been undertaken on this topic. I think it is an area that EPA needs to consider, since nowadays waste characterization is as important as mineralised rock characterization and should be given equal attention starting at the exploration phase.	EPA agrees that this is an important area, and has expanded the section somewhat. EPA also agrees that a full examination of the issue is needed, but it is beyond the scope of this Source Book.
140	Northwest Mining Association	General	The [commenter] supports EPA efforts to develop "guidance" on how the mine permitting process can be expedited and coordinated between EPA and other agencies. We appreciate the effort to provide a reference document of use to both industry and agency personnel. We agree that EPA requirements and expectations are all too frequently not presented early enough in the permitting process, and that this lack of communication has led to increased costs and delays. This has created confusion and controversy and we appreciate EPA's efforts in the development of this draft guidance document. We also applaud EPA's efforts to respond to industry concerns raised in review of the Hardrock Mining Framework. The Mining Source Book is certainly comprehensive, and like other overview documents, could prove useful to those applying for environmental permits. It is especially useful as a literature review, providing citations to a cross section of the best available literature on the topic of mining environmental management.	EPA appreciates the recognition of the Source Book's intent.

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141	Northwest Mining Association	General	EPA has statutory authority over mining impacts to surface water, under the Clean Water Act; air, under the Clean Air Act; and wetlands, under the 404 provisions. EPA also has authority for CERCLA sites. The guidelines set forth in the Mining Source Book are much broader in scope, however, and offer guidance for aspects of non-CERCLA sites in areas where EPA does not have statutory authority. Operators and proponents should more properly be focused on meeting the requirements of the agencies that do have authority over the various resources.	EPA disagrees. The Source Book does not present "guidelines" <i>per se</i> . Rather, the Source Book describes the types of information and analyses that should be submitted to allow (a) permitting and approvals to proceed most efficiently and (b) impacts to be assessed under NEPA.
142	Northwest Mining Association	General	The draft document provides good general background on recommended permitting information, but it fails to provide specifics on how EPA will promote predictability and consistency within Region 10. It also fails to clarify how EPA Region 10 intends operators to proceed with permit development (e.g. how to choose from among the various methods of technical evaluation), given the site specific, subjective, and at times, vague or inconsistent guidance provided in the document. Further, such guidance is only meaningful if it enables an operator to meet a regulatory requirement.	As noted in section 1.1, mines are too site-specific to allow EPA to identify the precise technical evaluations that should be done. The Source Book is intended to provide applicants and others with an idea of the types of information and analysis that are needed.
143	Northwest Mining	General	The Mining Source Book guidance may be useful for larger mining companies, who have the resources to attempt the level of comprehensive characterization defined in the Mining Source Book. Ironically, these larger companies also possess much of the information presented in the document, which could literally serve as an introductory text to mine permitting. Paradoxically, it is these same companies who, after preparing permit applications that follow these guidelines closely at the cost of millions of dollars, have also been unable to permit significant mining operations in the Northwest in the past 5 years. Members of NWMA who have shared in this experience include Crown Butte Mines at New World, SPJV at McDonald Gold, and most recently, Battle Mountain at Crown Jewel.	EPA notes the comment (and also that the examples cited are outside of Region 10 except for the Crown Jewel project which was ultimately rejected by the State of Washington Pollution Control Hearings Board).
144	Northwest Mining	General	It seems likely that the guidance presented in the Mining Source Book would be particularly helpful for small business mine operators, who may lack the comprehensive expertise needed to address the range of issues presented in the source book. These smaller operations are likely, however, to struggle in attempting to meet the lofty and comprehensive goals of the programs defined in the guidance document. For this reason, it might be useful to present a focused "must do" section for small mine operators.	EPA believes that a small operator can use the Source Book to identify the approximate level of detail that is required, and with a knowledge of the operation and property at issue, should be able to identify the areas to focus on during data gathering.

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145	Northwest Mining	General	An element lacking in this draft report is how EPA, in the implementation of its authorities, will recognize and defer to other agencies, especially state authorities. We are aware of cases within the region where Memorandums of Understanding have been developed between EPA and other regulatory authorities to improve communication, coordination and streamlining of the permitting process (e.g. Kensington). This process could be used to clarify EPA requirements and expectations early in the process. While this draft is silent on this type of approach we encourage EPA in doing more of this type of collaborative permitting.	EPA does indeed collaborate as much as feasible. The Source Book acknowledges the role of other agencies, but the intent of the Source Book is to assist applicants in dealing with EPA, not necessarily other agencies.
146	Northwest Mining	1.3	EPA refers to a problem of "metal constituents in surface water samples may be measured using methods with detection limits that are higher than water quality standard values." However, this statement is disingenuous because it completely disregards the fact that EPA has been setting the water quality values for many metals below the reliable limits of detection of any currently available testing method. We believe that this constitutes an arbitrary and capricious approach to setting compliance standards. Thus, the real problem often lies not with the applicants, but with EPA.	EPA notes that water quality standards are not based on compliance, but rather on science (specifically, toxicology, aquatic and benthic biology, and other disciplines relevant to identifying and evaluating effects of pollutants on organisms and other receptors). State water quality standards are reviewed every three years with the understanding that the science upon which they are based, and corresponding detection methods and limits, is continually improving.
147	Northwest Mining	1.3	...we do agree that many in the mining community need to be more cognizant of the limitations to water sampling protocols, parameters, and precision that are completely suitable for mineral exploration. As discussed in the draft document, this information has often fallen short of what is needed to properly analyze and evaluate water quality from an environmental viewpoint. Our experience has shown that the difference in time and cost between having information useful for both environmental and geologic purposes and single purpose data sets is relatively small, if the need is fully considered early in the project.	EPA generally agrees with the comment, and encourages applicants to bring the same rigor to evaluating water quality as it does to evaluating ore bodies.
148	Northwest Mining	1.3	[The commenter] notes that EPA raised the "chain of custody" issue in its discussion of gathering water quality samples. To the degree that accurate tracking of samples is intended to maintain good quality control, we would agree that maintaining records documenting the who, when, where, and how's of sampling, storage, transport, and analysis is both useful and necessary. However, based on direct experience, we are convinced that EPA desires what could be turned into a very cumbersome mechanism, if the purpose evolved into a making sure the resulting data was absolutely "bulletproof" in court.	EPA made the point because it is common for EPA to have serious questions about various aspects of data collection, and in some cases such straightforward procedures such as maintaining chain-of-custody could resolve any questions and disputes. Thus, a seemingly "cumbersome" procedure can save applicants time and money.

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149	Northwest Mining	A-3.1	Page A-3 - Paragraph 3 "Increases in constituent concentrations will be highest for those areas with the largest amount of surface runoff. This would not be expected in there is a negative correlation between stream flow and constituent concentration. It should be noted that the relationship between streamflow and constituent concentration is not limited to positive and negative as the text implies.	EPA has rewritten this paragraph to be more clear.
150	Northwest Mining	A-4.1	Section 4.1 - The authors correctly indicate the problems associated with the measurement of precipitation at remote sites. The discussion of point estimation techniques is inappropriate. The precise technique for estimation should begin first with an understanding of the purpose for the prediction. If the data is to be used to simply characterize mean annual conditions at the site, the exact method is probably not critical. If the precipitation estimate is to be used to size a storage pond in an area where human life or property would be threatened if the structure fails, the selection of the appropriate prediction method may be more critical.	In general, EPA agrees with the concepts raised by the commenter and has clarified the discussion.
151	Northwest Mining	A-4.1	Section 4.1 - It should also be noted that techniques like Thiessen do not necessarily produce less accurate results than contouring or kriging (see, for example, Applied Geostatistics). Rather, the Thiessen method makes some assumptions about conditions within a polygon and that the edges of polygons that may be unrealistic. There are other methods that may be appropriate as well. It is probably most important that no single method be relied upon blindly. It is critical that the values obtained using one method be compared to values obtained using other methods. If the predicted values agree relatively well, then a greater degree of confidence can be assigned to this prediction. If, on the other hand, the values obtained using different methods vary significantly, it is important to understand why the predictions are different and to then use professional judgement to select the most appropriate value for the task at hand. It is incorrect to assume that this is "prescribed" process.	EPA will clarify the discussion to indicate that the method used should be dependent on specific objectives and that no method is specifically prescribed.

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152	Northwest Mining	A-4.3	Page A- 15 - the authors feel that prediction methods that use the SCS number approach are inherently inferior. Given the level of detail available for most design projects in general, this is not necessarily true. The estimation of an SCS curve number for a project certainly involves professional judgement but it is at least as reasonable as the rational method. Again, several prediction methods should be used and compared rather than relying on the conventional EPA prescriptive approach. It should also be remembered that approaches like water balance models and some unsaturated flow numeric models use the SCS approach as well. Depending on the situation and the nature of the prediction, the multiple uses for the curve number approach may have a great deal of merit.	EPA agrees that the SCS approach may be appropriate given specific project objectives. EPA will revise the discussion to emphasize that no method, including the SCS number approach, is prescribed, but instead should depend on project objectives.
153	Northwest Mining	A-4.3	Page A- 18, paragraph 2- This paragraph is really the key to this section and the other information is less relevant. However, it should be noted that it is not simply the time-consuming nature of some of the predictive methods that makes them unattractive. Often, the lack of realistic input data and the uses of the predictive results makes more sophisticated methods unattractive. In many cases, sufficient information is missing not because the applicants neglected to collect it but simply because it is impossible to accurately measure the parameters over a reasonable period of time. This problem is not unique to mining projects but is equally true of all development projects. In addition to attempting to bound critical estimates with stochastic approaches, it is also wise to make sure that the final designs include relatively conservative factors of safety.	EPA agrees.
154	Northwest Mining	A-4.5	Page A- 19 - Paragraph 1..." Aquifer pump tests and drawdown tests of wells need to be conducted under steady-state or transient conditions..." Are there any other conditions???	This should have read "...steady-state and transient conditions..." and has been corrected.
155	Northwest Mining	A-4.5	Page A- 19 paragraph 1 "... It is important that these tests be performed at the pumping rates that would be used by a mining operation...". This is often difficult to estimate and is even more difficult to replicate. In general, it is not necessary if sufficient baseline information is available and predictive strategies can be used.	EPA does not entirely agree, but does acknowledge there is some uncertainty in future pumping rates. However, EPA emphasizes the need for the tests in most if not all cases.
156	Northwest Mining	A-5.0	Page A-20 - Paragraph 3 - We know of no operation that is in a constant need of adding make-up water.	EPA's point was that make-up water flows are often relatively constant over time, but neglected to include "over time." The sentence has been clarified.
157	Northwest Mining	A-6.2	Page A-26 drop all reference to specific models since the list is by nature incomplete and again, the specific software should be selected based on the available input data and the model purposes.	EPA believes it is appropriate to mention a few of the models. EPA has clarified that the models mentioned do not constitute a comprehensive list.

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158	Northwest Mining	B-2.4	Appendix B - pages 11-16. EPA correctly points out that applicants need to evaluate an area of appropriate size when assessing surface hydrology. However, while noting that the term "watershed" goes undefined in the draft document, the statement that using a "watershed perspective" is a common approach is not supported by information provided by our members. We are especially concerned since it is apparent that the "watershed" being referred to by EPA is not just the local drainage or drainages that could be potentially affected by the proposed mining operation. EPA is clearly referring to a much larger geographic area, such as those increasingly described in federal documents pertaining to "ecosystem management" or more recently in the so-called "clean water initiative."	In general, the "watershed" of concern is the upstream portion of a drainage basin that contributes surface and shallow ground water flows to the project area and the downstream portion(s) whose water quality or quantity may be affected by mining-related activities. EPA did not mean to refer to an enormous expanse beyond the reach of the operation. This is clarified in the text.
159	Northwest Mining	B-2.4	Appendix B - pages 11-16. Thus, NWMA objects to the assertion by EPA that mining companies applying for an NPDES permit always should start at the "watershed" level. While a very few projects may need to evaluate a larger than normal area, such should hardly be the norm. Our member support the use of good science, but the community of natural resource industries should not be subsidizing other activities or public entities by paying for expensive research projects that have nothing to do with project impacts.	EPA does not intend, and has not suggested, that the mining industry should "subsidize" any other entity. EPA's intent also is to emphasize good science. See the changes made in response to comment 158.
160	Northwest Mining	B-2.4	Appendix B - pages 11-16. Based on past experience with EPA in general, and NMFS and USFWS in particular, the Association is deeply concerned the Agency may soon force NPDES applicants into evaluating much larger areas than is justified by the science to fulfill other agendas. This view is substantiated by statements made on the record of high level Forest Service and BLM officials to NWMA staff during hearings in Spokane on the Columbia Basin Ecosystem Management Project. Needless to say, we are definitely seeking "clarification" of EPA's intent and specifics on the definition of what a "watershed" is in the context of NPDES permitting.	As noted in other responses, the "watershed" of general concern to EPA is the upstream portion(s) of a drainage basin that contributes surface and shallow ground water flows to the project area and the downstream portion(s) whose water quality or quantity may be affected by mining-related activities. EPA did not mean to refer to an enormous expanse beyond the reach of the operation. This has been stated explicitly in section B.2.4.
161	Northwest Mining	B-2.4	Appendix B - pages 11-16. At the minimum, [the commenter] urges EPA to be very specific in defining what constitutes a "watershed." We strongly recommend that the agency use the existing accepted clarification system established by the U.S. Geological Survey (USGS). The USGS has already divided the United States into hydrologic units which are the standard reference for reporting and tracking water related data.	Under this system, cataloging units appear to be the most appropriate size of "watershed" that may need to be evaluated for the majority of mining projects (see the USGS Information Sheet Hydrologic Units, February 1999). As noted in other responses, the "watershed" of general concern to EPA is the upstream portion(s) of a drainage basin that contributes surface and shallow ground water flows to the project area and the downstream portion(s) whose water quality or quantity may be affected by mining-related activities. EPA did not mean to refer to an enormous expanse beyond the reach of the operation.

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162	Northwest Mining	B-2.4	Appendix B - pages 11-16. If filling data gaps is a motivating factor for EPA and the other agencies, [the commenter] urges a collaborative basin wide approach, a position we have advocated for a decade. Under such circumstances, [we] would consider supporting cooperative studies conducted jointly between mining project proponents and agencies to expand the water quality database, as long as an equitable cost-sharing approach was utilized. Involving other interested parties would be highly desirable.	EPA generally agrees with this comment.
163	Northwest Mining	B-2.4	Appendix B - pages 11-16. Another approach to this conundrum is to make sure all users of data gathered by industry pay for the privilege of using that data, and any related analysis. We will suggest to our member companies that they copyright all reports in the future, as they qualify as intellectual property with a market value. Of course, a license will be granted to the lead permitting agency to use the data and related analysis as needed for that specific permit. Any other use by the lead agency or anyone else would require the payment of an additional fee. The principal is exactly the same as with geophysical companies that gather extensive data over wide areas and then sell it. Naturally, anyone is free to duplicate the work if they do not wish to buy the information from the vendor.	EPA notes the concept.
164	Northwest Mining	B-2.4	Appendix B - pages 11-16. The licensing fee (for protected data) also would be waived for any entity that acted as a partner in the original data gathering and analysis phase. This would be a fair and equitable approach. For example, if the science required a company to assess a number of drainages in one or more watersheds, it could be to the advantage of federal, state, local, or tribal entities to contribute resources to complete the picture. Such cooperative cost sharing is an approach long espoused by the Association, an publicly endorsed by several state and federal agencies in the past.	EPA notes the commenter's intent.

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165	Northwest Mining	B-2.4	Appendix B - pages 11-16. Our final point on EPA imposing "watershed" analysis as the standard for gathering data for future NPDES permits is procedural. While basing government planning efforts on a "watershed" approach may have some merit, at least conceptually, we would question the legality of imposing a host of expensive new requirements on industry without prior notice or rulemaking. This general concern is heightened by recent EPA efforts to expand the definition of "point source" to include virtually all-human created soil disturbances, contrary to the clear intent of Congress in drafting Sec 319 of the Clean Water Act. Thus, we caution EPA about moving in this direction without meaningful dialogue with the affected public. Absent this, the mining community would have little recourse but to vigorously oppose the imposition of new regulatory requirements created outside of the legally mandated process.	EPA notes that it is not "imposing" a watershed analysis as a "standard for gathering data for future NPDES permits." Rather, the Source Book recognizes that a watershed approach provides a useful scale on which to assess impacts and to remediate past problems.
166	Northwest Mining	C-4.4.5	This section discusses the utility of various extraction methods and indicates that EPA method 13 12 (SPLP) is best suited to mining wastes. The text provided in the Mining Source book then discusses ways to modify this standard method. In 1995, EPA published Applicability of the TCLP to Mineral Processing Wastes, in which it identifies TCLP as superior to SPLP in characterizing mine wastes. This issue is the subject of ongoing regulatory discussion. If the SPLP is the appropriate method, why does the document offer means of altering it? The guidance is unclear within the document and inconsistent with other EPA guidance.	EPA has modified the text to clarify the recommendation of SPLP. As noted in the text, in some areas, precipitation can be more acid than in others, and this may make a more acid lixiviant appropriate.
167	Northwest Mining	C-6.2	All of the possible approaches to determining a representative level of sampling are discussed, but guidance is not offered to the operator on which approach to use. Why does EPA present the BC sampling nomograph if it agrees that the level of sampling for larger projects is unrealistic and in its words, prohibitive? Experience of many operators shows that regardless of which method they choose, the regulatory community will suggest that the alternative method might have been preferable. Specific, consistent guidelines on how sampling are needed, not an academic discussion of possible means of determining the number of samples.	The text has been clarified somewhat, but the variety of approaches that are used simply emphasizes that there is no simple answer to the complex questions regarding a representative level of sampling.
168	Northwest Mining	F-3.0	Section 3.0 references recent contaminant releases that emphasize the importance of comprehensive geochemical testing. What contaminant release in Region 10 is EPA referring to?	At mines in Region 10 and elsewhere in the country, contaminants have been released via seepage from waste rock piles, seepage through tailings dams, leaks in liners, and other mechanisms.

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169	Northwest Mining	General	The commenter, which represents many companies, expressed the concern that EPA staff takes an overly academic approach to developing discharge limits and setting water quality standards. For example, a long standing, major concern is the "ridiculously low detection limits" being mandated by EPA in an attempt to "measure" a discharge limit that is immeasurable. We are unaware of any competent practitioner outside of EPA who thinks much of this really makes any practical sense.	EPA notes the comment.
170	Northwest Mining	General	[The commenter] desires additional opportunities to work constructively with EPA on water quality issues, among others. [They] must encourage EPA to make its processes for developing policy and technical standards more transparent. Not only would this strengthen the science, but it would help to enhance the working relationship between the Agency and those in the regulated community.	EPA notes the comment and appreciates the comments on this Source Book. This is one way in which EPA makes its procedures more transparent, as the commenter encourages.
171	Center for Science in Public Policy	A-4.1	<p>The number of modern mines with water balance problems, many of which led to major environmental problems, are too numerous to quote. One of the most common problems that has led to miscalculating water balance is assuming, rather than actually measuring, the precipitation at the minesite.</p> <p>In section 4.1 it is stated "Actual measurements of precipitation and runoff within the specific watershed of a mine <i>are preferred and should be used whenever possible</i> to develop probabilistic storm frequency and design hydrological structures." [p. A-6, <i>emphasis added</i>] Taking this 'soft' approach is not likely to prevent the worst cases of miscalculation, e.g. where a mine proponent is trying to save money, or is using an inexperienced contractor.</p> <p>EPA should take a stronger and proactive position with regard to data collection, e.g. requiring a minimum of one year's data at the minesite, which can then be correlated to longer term precipitation records from nearby stations. Data should be collected at the minesite, not just in the watershed. (See Section 4.5 Groundwater, where the basic requirements for data collection are clearly laid out.)</p>	EPA believes that such a prescriptive approach is not necessary in all cases. EPA recognizes that there may be "cases of miscalculation" but emphasizes that data and evaluations are reviewed and assessed for adequacy.
172	Center for Science in Public Policy	B Table B-2	You might consider adding thallium to the list of "Other Metals." There is a water quality standard for thallium, and exceedance of the human health standard is a problem at the Kendall Mine in Montana.	EPA has added thallium to the list.

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173	Center for Science in Public Policy	C-6.2.1	<p>In the discussion of the BC AMD Task Force recommended minimum number of samples appropriate for a rock unit, the following statement is made: "This approach can lead to extensive sampling requirements for large facilities and result in inordinately high sampling costs." [pp. C-33, 34].</p> <p>I believe it would be more correct to say that "This approach can lead to ... inordinately high sampling costs." The key is in demonstrating the statistical-geochemical uniformity of a "rock unit." I believe that the sampling guideline is projecting that with the recommended number of samples, the statistical uniformity of the resulting data should be demonstrated. If it can be demonstrated that an acceptable level of statistical uniformity can be demonstrated with fewer samples (i.e. the defined geologic unit has a higher-than-expected degree of uniformity), then fewer total samples will be needed to define the geochemical characteristics of the material.</p> <p>EPA could perhaps offer more guidance in this Appendix as to when it expects the Runnells approach, or the BC AMD Task Force approach, to be utilized.</p>	EPA has revised the discussion concerning sampling cost. EPA leaves it to applicants to choose the appropriate approach.
174	Center for Science in Public Policy	E-8.2	<p>Suggest you add several additional points to the discussion here:</p> <ol style="list-style-type: none"> 1. Application Rate The land application of mine effluent will be managed so that the amount of water applied would be tied to the agronomic rate of uptake of the plants (plus evaporative loss). It should be stated that land application will be governed by the agronomic uptake – this information is commonly available through agricultural support agencies. The land application plan should specify exactly how this would be accomplished. 2. Use of lysimeters to monitor application rates. We are finding that it is appropriate to use lysimeters to check the theoretical application rate to insure that the applied solution is not migrating down into groundwater. 3. Cation Exchange Capacity EPA has recommendation for total loading for metals of concern for land application of municipal sludge. If these are matched with loading rates calculated from the geochemical makeup of the land application solution, and the cation exchange capacity of the soil, which can be determined from soil samples, metal loading for the soils for the life of the LAD operation can be determined. This analysis should be performed as a part of land application planning. 	EPA agrees and has added these points to the list of information needs.

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175	Center for Science in Public Policy	F-3.0	After working on a number of reclamation projects, it has become evident that an accurate record of the timing and source of waste rock that is placed in a waste rock dump or heap leach pad is often essential to designing the reclamation plan for a mining facility. This is especially relevant when problems arise with acid mine drainage in waste piles or heaps. EPA should, at a minimum, strongly recommend that mine operators keep accurate and easily interpretable records of the source, amount, and location of all waste placed in waste storage facilities, and for ore material placed on heap leach pads. Reclamation design can then be facilitated, especially if it is shown that the original geochemical characterization of the waste (or the altered state of leached ore) is different than predicted.	EPA agrees and has added this recommendation.
176	Center for Science in Public Policy	F-4.1.2	In the discussion on the different types of embankments on page F-12, it might be appropriate to mention that upstream construction is virtually used [unused?] in modern mine design because of the risks associated with seismic failure.	EPA has added a statement concerning seismic failure risks.
177	Center for Science in Public Policy	F-4.1.3	This section mentions cyanide and radioactive materials as substances that might require a liner. Metals might also be considered if they pose a risk to groundwater resources.	EPA has revised the text accordingly.
178	Center for Science in Public Policy	F-4.1.3	a sentence in this section says: "Tailings pond liners can be composed of compacted clay, synthetic materials, or <i>tailings slimes</i> ." [p. F-18, <i>emphasis added</i>] Using non-engineered material, e.g. tailings slimes, has failed to produce the desired liner-effect in many instances. It would be better to stay away from suggesting tailings slimes in particular, and non-engineered materials in general, for use as a liner material.	EPA does not believe this "suggests" tailings slimes as a liner material, but rather identifies slimes as a material that has been and is used. EPA notes that clay and synthetic liners have also failed to produce the desired liner-effect in many instances. The point that should be emphasized is that liners should be selected and evaluated carefully.