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Resources, Community, and
Economic Development Division

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May 22, 1998

The Honorable Barbara Boxer
United States Senate

The Honorable George Miller
House of Representatives

Subject: Radioactive Waste: Answers to Questions Related to the Proposed Ward Valley Low-Level Radioactive Waste Disposal Facility

You asked us to answer a series of questions regarding a proposed facility for disposing of commercially generated low-level radioactive waste at a site in Ward Valley, California. The proposed site is on federal land under the jurisdiction of the Department of the Interior. In 1992, California's Department of Health Services asked Interior to sell the site to the state under the authority granted to the Secretary of the Interior by the Federal Land Policy and Management Act of 1976. By the fall of 1995, after Secretary Babbitt rescinded former Secretary Lujan's January 1993 decision to sell the land to California, negotiations on the land transfer had reached an impasse. California would not accept Interior's position that the transfer must be conditioned to authorize Interior to enforce, in the courts, the state's compliance with recommendations by the National Academy of Sciences for additional tests at the Ward Valley site. Then, in February 1996, Interior announced that it would conduct the tests recommended by the Academy and prepare a supplemental environmental impact statement before making a land-transfer decision.[1]

This report responds to the questions you raised in the following seven areas:

- the laws and regulations governing Interior's preparation of supplements to environmental impact statements;

[1]For additional information, see our report entitled *Radioactive Waste: Interior's Continuing Review of the Proposed Transfer of the Ward Valley Waste Site* (GAO/RCED-97-184, July 15, 1997).

- the laws and regulations on federal land transfers to states;
- a May 1995 report on Ward Valley issues by the National Academy of Sciences;
- a former low-level waste disposal facility at Beatty, Nevada;
- an investigation by Interior's Inspector General into the activities of the U.S. Geological Survey related to the Beatty facility;
- the plan and design for the proposed Ward Valley facility; and
- the track record of US Ecology (the company hired by California to develop the Ward Valley disposal facility) in operating disposal facilities.

In summary, we found the following about each of the questions:

- The National Environmental Policy Act (NEPA) of 1969, as amended, governs the preparation of environmental impact statements by federal agencies. Also, regulations issued by the Council on Environmental Quality, which was created by NEPA, provide federal agencies with direction for preparing environmental impact statements and supplements to these statements. These regulations require a federal agency to prepare a supplemental statement when (1) the agency makes substantial changes in the proposed action that are relevant to environmental concerns or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The regulations also give an agency the discretion to prepare a supplement when the agency determines that doing so will further the purposes of NEPA. In April 1991, Interior's Bureau of Land Management (BLM) and California's Department of Health Services jointly issued a final environmental impact statement on the proposed Ward Valley project.

  The final environmental impact statement recognizes the possibility of links between the aquifer beneath Ward Valley and neighboring acquifers but does not assess the potential for the contamination of the Colorado River by this means. The statement did not address the issues of the upward migration and release into the atmosphere of soluble radionuclides, the lateral migration of radioactive contaminants, and the potential for a significant quantity of water to collect on the tops of waste barrels in disposal trenches. California's Department of Health Services commented that the potential for the upward migration and release of soluble radionuclides was not considered because the science of soil physics and the mineralogy of the site demonstrate that this phenomenon is not occurring. The American

Ecology Corporation--US Ecology's parent company--added that its analysis showed that the upward migration and atmospheric release of soluble radionuclides do not exceed regulatory limits and are insignificant. California's department also stated that neither it nor the National Academy of Sciences believe that the lateral migration of radioactive contaminants is possible. Regarding water collecting on the tops of barrels, California stated that round barrels are incapable of collecting significant quantities of water above the barrels. American Ecology also stated that its intention to emplace waste barrels in burial trenches on their sides surrounded by free-draining material would prevent water from collecting above waste barrels.

Also, the final statement did not consider the reports and other documents listed in your letter because all of them were issued after the final statement was issued in April 1991. BLM is addressing the four issues and could consider some or all of the reports and documents issued since April 1991 in the supplemental environmental impact statement that it is now preparing.

- The Federal Land Policy and Management Act of 1976 is the principal statute applicable to the proposed transfer of land in Ward Valley. This act gives the Secretary of the Interior the authority to administer the use of public lands. Among other things, the act authorizes the Secretary to transfer public land by direct sale upon determining that the transfer would serve important public objectives that cannot be achieved elsewhere and that outweigh other public objectives and values served by retaining federal ownership of the land. After such a determination, the transfer must be made on terms that the Secretary deems necessary to ensure proper land use and the protection of the public interest. After the Academy had issued its report on Ward Valley, the Secretary of the Interior notified California's governor that he was prepared to transfer the Ward Valley site to the state if the latter would agree to make a legally enforceable commitment that the additional safeguards recommended by the Academy would be carried out. The governor of California committed the state, in writing, to implementing the substance, if not the letter, of the Academy's recommendations, but objected to the enforceable commitment.

  In subsequent negotiations between the two parties, Interior maintained its position that it would transfer the land if the state would accept, as a condition of the transfer, Interior's authority to enforce, in the courts, the state's compliance with the Academy's recommendations. California refused Interior's offer, asserting that the implementation of the Academy's recommendations falls in the area of radiological safety, which is the state's responsibility and is outside of Interior's authority and expertise. California also objected to what it characterized as Interior's insistence that third-party

"beneficiaries," including project opponents, would also have the right to independently enforce the state's implementation of the Academy's recommendations in court. (Interior commented that the provisions of the proposed land-transfer agreement would have been enforceable only by Interior and the state.) The state's final proposal to Interior in September 1995 explicitly stated that the state's commitments to carry out the Academy's recommendations were legally unenforceable. For that reason, the state's proposal was unacceptable to Interior. The resulting impasse on this issue contributed to Interior's decision to prepare a supplemental environmental impact statement and perform the tests at Ward Valley recommended by the Academy.

- At the request of the Secretary of the Interior, a 17-member committee of the National Academy of Sciences studied seven radiological and environmental issues pertaining to the proposed Ward Valley project that had been raised by three U.S. Geological Survey geologists in a report they had prepared as individuals rather than for an official Geological Survey report.[2] The Academy's committee stated that it did not evaluate the suitability of the Ward Valley site for a disposal facility and was neither endorsing nor condemning the use of the site for that purpose. The committee generally did not agree with the concerns about the safety of the Ward Valley site raised by the three Geological Survey scientists.[3] The committee did conclude, however, that there were significant limitations on the quantity, quality, and accuracy of the field data collected during the scientific investigation of the site. For example, the committee concluded that "inappropriate sampling procedures" probably accounted for the measurements of tritium 100 feet beneath the surface. The committee unanimously recommended that additional sampling for tritium be done to establish base levels for the monitoring program. According to the committee's chairman, the majority of the panel believed that the additional sampling could be done during the construction and operation of the disposal facility. Two committee members said that the tests should be completed and the results used in making a final decision on the site's suitability.

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[2]To avoid any appearance that management of the Geological Survey might be attempting to "gag" the three geologists, the director of the Survey directed the geologists to prepare the report on official time but as individuals. Thus, the report prepared by the geologists was not subjected to the Survey's technical review procedures and did not become an official Geological Survey report.

[3]Two of 17 members of the Academy's committee disagreed with the majority's conclusions about the movement of contaminants in unsaturated soil.

- Both California and US Ecology have considered the Beatty disposal site analagous to the Ward Valley site, but there are dissimilarities between the two sites. US Ecology, for example, used the Beatty site as a "conceptual analog" for screening potential sites and eventually selecting the Ward Valley site. The company also relied on analytical methods used for the Beatty site to help it support its analysis of groundwater at the Ward Valley site. Finally, in an analysis of possible reasons why radioactive contamination was detected in groundwater beneath the Beatty site in 1982, US Ecology concluded that the "rapid" migration of radionuclides at the Beatty site "abetted by natural site characteristics" would be of significant concern to the Ward Valley project. In commenting on our report, the company stated that the performance assessment of the Ward Valley site was based on site-specific data from Ward Valley, not Beatty.

  California's Department of Health Services, in supplemental licensing findings made in June 1994, found that "the Beatty site provides a good analog for the Ward Valley facility." The state's department also maintains, however, that the Beatty facility is severely limited for use as an analog to predict the performance of the Ward Valley facility because disposal practices at the Beatty facility, such as the disposal of waste in liquid form, did not meet many of the technical requirements that would apply to the Ward Valley facility and that would be enforced by stationing two inspectors at the site to observe disposal operations.[4]

  Finally, in a presentation to the National Academy of Sciences' committee on Ward Valley, the three Geological Survey geologists pointed out several "significant geologic differences" between the two sites. The geologists suggested that, without additional study of the Beatty site, the site has limited value as an analog for Ward Valley. For this reason, the three geologists recommended additional study to determine the extent to which conditions at Beatty can be used to help predict the performance of other potential disposal facilities in arid climates, such as the proposed Ward Valley facility.

- Interior's Inspector General is investigating three matters related to the Geological Survey's research activities adjacent to the Beatty disposal facility, such as whether the Geological Survey suppressed information in its possession that could have been important to the Academy in its review of Ward Valley issues.

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[4]Until 1976, the routine disposal of liquid waste at Beatty occurred despite a license condition prohibiting this practice.

- California and Texas have selected low-level radioactive waste disposal facility designs that do not include liners or do not have systems to capture contaminated liquids that might collect on the liner at the bottom of the trenches. The Nuclear Regulatory Commission (NRC), which has established regulations for disposal facilities for commercially generated low-level radioactive waste, concluded in 1990 that lined trenches are not always required to retard the movement of radioactive materials, meet performance objectives, or facilitate environmental monitoring. At the Ward Valley site, NRC found that liners might increase the long-term risk to human health and the environment by introducing the potential for water to accumulate within a disposal trench that would otherwise remain dry.

  Other organizations that have interests in, but not regulatory authority over, the design and construction of the proposed Ward Valley disposal facility, do not agree with NRC's position. Three California water quality boards recommended the use of trench liners at Ward Valley to provide (1) the most complete unsaturated-zone-monitoring system available, (2) immediate on-site knowledge of any unacceptable groundwater contamination, and (3) an early opportunity to select appropriate remedial measures. Also, the Environmental Protection Agency (EPA) concluded that liners should be considered at Ward Valley as a part of a monitoring system to detect and correct the potential migration of waste contaminants to the surrounding unsaturated zone and the groundwater.

- The Nuclear Engineering Company (a predecessor company to US Ecology) was one of three private companies licensed by the Atomic Energy Commission to perform ocean disposal operations. The Nuclear Engineering Company, disposed of low-level radioactive waste in the Pacific Ocean between 1961 and 1962; operated now-closed land disposal facilities at Sheffield, Illinois; Maxey Flats, Kentucky; and Beatty, Nevada; and continues to operate a disposal facility at Richland, Washington.

  According to the Geological Survey, there is no definitive information about the levels of radiation at the ocean disposal site, which is located off the coast of San Francisco Bay near the Farallon Islands. Visual observations using remote equipment show that many waste drums have ruptured and spilled their contents onto the sea floor.

  The Sheffield site has not contained wastes, as had been expected. Tritium was detected migrating toward nearby Trout Lake in 1976 and was detected in the lake in 1982. The tritium advanced about 5 feet per day, or about 600 times faster than had been predicted when the facility was licensed. According to the state, (1) the contamination remains localized and is diminishing, (2) off-site migration of radionuclides from the Sheffield site

has never exceeded the maximum permissible concentrations, and (3) no known contamination of nearby drinking water supplies has ever occurred.

The Maxey Flats site also has not contained wastes, as had been expected. Studies by Kentucky and others, beginning in the 1970s, measured several types of radioactive contaminants outside the disposal area. The state found that the measured levels did not create a public hazard but did require more intense monitoring. Studies by NRC and EPA concluded that the radioactive materials released into the groundwater and air did not appear to have caused significant public health problems, but the potential long-term effects of these contaminants are not known. In 1986, EPA designated Maxey Flats as a "Superfund" site for which trust funds, financed primarily by taxes on crude oil and certain chemicals, are used by EPA to conduct cleanups and other activities.[5] Kentucky has paid about $10 million to clean up the Maxey Flats site and also incurs site monitoring, maintenance, and related costs.

At Beatty, in 1994, the Geological Survey measured "greater than expected" amounts of tritium and carbon-14 in soil gas samples collected at 10 depths (ranging from 18 to 357 feet) within a borehole located about 350 feet south of the disposal facility. Then, in 1997, the Geological Survey found tritium concentrations at depths of 189 feet and, using other tests, confirmed that the Beatty facility is the source of the contamination. Also, a sample of groundwater taken from a (then) new well in 1982 contained 20 times more tritium than permitted in drinking water. Although subsequent sampling showed a continuing decline in the concentration of tritium until none was detected, the results of many other water, soil, and vegetation samples collected over the years at the site have exceeded levels designed to trigger additional analysis or other actions.[6] The reasons for these unexpected measurements of radioactive contaminants remain unexplained.

Furthermore, until 1976, some of US Ecology's employees at Beatty routinely disposed of liquid radioactive waste and removed materials intended for disposal for personal use or sale to others. Both of these practices violated US Ecology's license to operate the facility. In 1979, the Geological Survey, while digging a trench/tunnel toward disposal trenches for research purposes, encountered five containers of radioactive waste outside of the

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[5]Superfund is the common name for the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.

[6]In December 1997, Nevada accepted the transfer of US Ecology's license for the Beatty facility and the responsibility for the long-term care and control of the facility.

fenced disposal area that had been established on the basis of site maps. Following an investigation, the Geological Survey concluded that the maps of the trench boundaries were inaccurate. According to American Ecology, the fence around the disposal area had been constructed years after the trench had been closed–and apparently on the basis of inaccurate maps.

Finally, in the 1995 through 1997 annual reports of American Ecology, independent public accountants concluded that there was substantial doubt about the company's ability to continue as a going concern. According to the auditors, the company suffered recurring losses and an increasing working capital deficit in those years.

## AGENCY COMMENTS AND OUR EVALUATION

We provided an initial draft of this report to the Department of the Interior, California's Department of Health Services, and American Ecology for their review and comment. After obtaining their comments and obtaining and incorporating other new information into our report (see the discussion of our scope and methodology, below), we provided a revised draft report for their review and comment. The written comments on our revised report provided by the three organizations appear in enclosures II, III, and IV, respectively.

Interior said that it generally agreed with the findings in our report and that the report sheds valuable light on a number of important issues related to California's request to purchase federal land at Ward Valley for a low-level radioactive waste facility. Interior's specific comments primarily related to the negotiations on the land transfer between the Department and the state of California in 1995 and the laws and regulations governing land transfers. We incorporated Interior's specific comments, as appropriate, into the text of our report.

The Manager of the Low-Level Radioactive Waste Program within California's Department of Health Services provided technical comments, which we incorporated, as appropriate, into the text of our report.

American Ecology stated that in several cases our draft report (1) presented "specious" arguments offered by project opponents without also providing readily available scientific information discrediting those arguments and (2) selectively omitted relevant information in our possession that, if not included in the final report, will call into question the accuracy, objectivity, and credibility of that report. The company also provided technical comments and appended seven attachments to its comments. (See the table of contents at the end of the company's letter, enc. IV, for the identification of these attachments. We did not reproduce the attachments in this report.) Regarding the company's

general comments, our report responds to questions raised about a variety of issues. In some cases, the fact that experts had different interpretations of the same scientific facts necessitated that we present a range of views. Moreover, we relied on documentary evidence supporting the various viewpoints that are presented on these questions. Whether the views are specious or not was not for us to decide. Also, within the constraints that are inherent in distilling a large amount of information on many diverse questions into a report addressed to the general reader, we considered all of the information that we obtained from the numerous sources that we consulted during our review. Finally, we incorporated the company's specific comments, as appropriate, into the text of our report.

We also provided officials of the U.S. Geological Survey, the states of Illinois and Nevada, and the Commonwealth of Kentucky,with relevant portions of our initial draft report for their review and comment. As appropriate, we incorporated the comments of all of these officials in the final report.

## SCOPE AND METHODOLOGY

To respond to the questions about the laws and regulations on environmental impact statements and transfers of federal land to states, we reviewed federal statutes, regulations issued by the President's Council on Environmental Quality, and regulations and guidance issued by the Department of the Interior and BLM. We also relied on our recent report on Interior's review of the proposed transfer of the Ward Valley site to the state of California. To address questions about the environmental impact statement for the proposed disposal facility at Ward Valley, we reviewed the draft (June 1990) and final (Apr. 1991) joint environmental impact statements on the proposed Ward Valley facility, a September 1993 supplement to the final environmental impact statement, related sections of US Ecology's license application and supporting documents for the facility, the report prepared by the three Geological Survey geologists, and the National Academy of Sciences' report on its evaluation of the issues raised by the three geologists. We also reviewed other documents on issues that either were or were not addressed in the final environmental impact statement, such as written presentations to the Academy's panel by the three Geological Survey geologists in the summer of 1994, that we obtained from the Committee to Bridge the Gap, Los Angeles. The Committee, which opposes the Ward Valley project, is a nonprofit organization specializing in issues related to nuclear safety, environmental protection, and the prevention of nuclear terrorism and nuclear weapons proliferation.

To respond to the questions on the Academy's report on Ward Valley issues and the plans and designs for the proposed disposal facility, we reviewed (1) NRC's regulations covering disposal facilities for low-level radioactive waste; (2) the

Academy's May 1995 report; (3) the final environmental impact statement on the proposed facility, including correspondence from state water quality boards and EPA on the issue of using unlined trenches for disposing of wastes; and (4) US Ecology's license application and related supporting documents for the proposed facility. We also discussed plans and designs for the proposed facility with officials of California's Department of Health Services in Sacramento; American Ecology, Boise, Idaho; and the Committee to Bridge the Gap. In addition, we obtained and reviewed information on the plans and designs for low-level radioactive waste disposal facilities in other states from the Low-Level Waste Forum, Washington, D.C.[7]

To respond to the questions about the Beatty, Nevada, disposal facility and its relationship to the proposed Ward Valley facility, we interviewed officials and reviewed records at Nevada's Bureau of Health Protection Services, Department of Human Resources, in Carson City; California's Department of Health Services; American Ecology; and the Committee to Bridge the Gap. We also reviewed records on the Beatty facility maintained by Nevada's State Library and Archives in Carson City.

To respond to the question about the scope of an ongoing investigation by Interior's Inspector General related to the Geological Survey's monitoring activities at the Beatty facility, we discussed the scope of the investigation with a representative of the Inspector General's office.

To respond to the questions about US Ecology's track record in operating facilities for disposing of low-level radioactive waste at Sheffield, Illinois; Maxey Flats, Kentucky; and Beatty, Nevada; and disposing of low-level radioactive waste in the Pacific Ocean, we obtained and reviewed information from officials of NRC, EPA, the Commonwealth of Kentucky, the states of Illinois and Nevada, American Ecology, and the Committee to Bridge the Gap. On the issue of ocean dumping, we obtained information from the Geological Survey's Coastal and Marine Geology Team, Menlo Park, California, and the Hazardous Materials Response and Assessment Division (Seattle, Wash.) of the National Oceanographic and Atmospheric Agency.

We conducted our initial review from August through December 1997. In December, we obtained the written comments of Interior, California's Department of Health Services, and American Ecology on a draft of our report. Concurrent with the review and comment on the initial draft report by these

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[7]The Low-Level Waste Forum is an association of representatives from states and compacts of states established to facilitate the implementation of the Low-Level Radioactive Waste Policy Act of 1980, as amended.

organizations, however, the requesters asked us to address many of their questions in greater depth. Therefore, in January through March 1998, we obtained additional documentation on many of the questions and revised our proposed answers to many questions to incorporate the new documentation that we obtained and the initial written comments of the three organizations. In April 1998, we provided a draft of our revised report to the three organizations for their final review and comment. Concurrently, at the request of the California Radioactive Materials Management Forum, which supports development of a disposal facility at Ward Valley, we agreed to consider any additional documentation that the Forum might provide us that would help answer the requesters' questions.

We conducted our review in accordance with generally accepted government auditing standards.

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As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of this report to the Office of Management and Budget, the Department of the Interior, California's Department of Health Services, the American Ecology Corporation, and other interested parties. We will also make copies available to others upon request. Please call me at (202) 512-3991 if you or your staff have any questions. Major contributors to this report were John Bagnulo, Susan Irwin, and Dwayne Weigel.

(Ms.) Gary L. Jones
Associate Director
Energy, Resources, and
Science Issues

Enclosures - 4

## ANSWERS TO SPECIFIC QUESTIONS RELATED TO THE PROPOSED FACILITY AT WARD VALLEY FOR THE DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTES

### QUESTIONS ABOUT THE LAWS AND REGULATIONS GOVERNING THE SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PROCESS

1. *What laws, regulations, and guidance documents is the U.S. Department of the Interior subject to when considering whether it is appropriate to conduct an Environmental Impact Statement (EIS) or Supplemental Environmental Impact Statement (SEIS)? To what extent does the law leave it to the discretion of the Secretary of the Interior to decide to conduct an SEIS?*

   The National Environmental Policy Act (NEPA) of 1969, as amended , is the federal law governing the preparation of environmental impact statements. The act requires federal agencies to include, in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment, a detailed statement on, among other things, the environmental impacts of the proposed action. The act is silent on the subject of supplements to existing environmental impact statements.

   NEPA also established the President's Council on Environmental Quality (CEQ) to, among other things, develop and recommend to the President national policies to foster and promote the improvement of environmental quality. Regulations promulgated by CEQ established federal policies for preparing both environmental impact statements and supplements to existing environmental impact statements.[1] These regulations state that a federal agency shall prepare a supplement to an existing environmental impact statement (1) if the agency makes substantial changes in the proposed action that are relevant to environmental concerns or (2) if significant new circumstances or information is relevant to environmental concerns and has a bearing on the proposed action or its impacts. The regulations also give discretion to an agency–for example, the Secretary of the Interior–to prepare a supplement when the agency determines that doing so will further the purposes of NEPA.

2. *Once Interior has determined that an SEIS is appropriate, what laws, regulations, and guidance documents govern how an SEIS is conducted?*

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[1]40 C.F.R. part 1500.

CEQ's regulations apply. These regulations state that federal agencies shall prepare, circulate, and file a supplement to an environmental impact statement in the same fashion (exclusive of scoping) that it would for a draft or final environmental impact statement.

3. *Is Interior required by law to rely upon any particular types or sources of information in order to determine that an SEIS is necessary and appropriate? If so, what are they?*

No. As stated above, NEPA does not address supplements to environmental impact statements. Interior is required to follow CEQ's regulations described in our answers to questions 1 and 2. CEQ's regulations do not specify the types or sources of information for determining if a supplement is necessary and appropriate. Case law provides federal agencies with some guidance in making these fact-specific determinations.

4. *Once Interior decides to conduct an SEIS, are there any laws or regulations restricting the number or nature of issues it can address in the SEIS? If so, what are they?*

No.

5. *What are the requirements of the law, including regulations and the CEQ guidance, regarding the circumstances under which a federal agency must perform an SEIS?*

As discussed in our answer to question 1, CEQ's regulations state that a federal agency must prepare a supplement to an existing environmental impact statement (1) when the agency makes substantial changes in the proposed action that are relevant to environmental concerns or (2) if significant new circumstances or information is relevant to environmental concerns and has a bearing on the proposed action or its impacts. Also see our answer to question 3.

6. *What are the requirements of the law, including regulations and the CEQ guidance, regarding the circumstances under which a federal agency may perform an SEIS?*

As discussed in our answer to question 1, NEPA is silent on supplements to environmental impact statements. CEQ's regulations, however, state that a federal agency may prepare a supplement to an existing environmental impact statement when it determines that doing so will further the purposes of NEPA. In addition to establishing CEQ, the purposes of NEPA are to (1) encourage productive and

enjoyable harmony between humans and the environment, (2) promote efforts to prevent or eliminate damage to the environment and stimulate human health and welfare, and (3) enrich the understanding of important ecological systems and natural resources. Also see our answer to question 3.

7. *What laws and regulations is Interior subject to during an SEIS scoping process? Is the request for public comment on the scope of an SEIS standard procedure?*

As discussed in our answer to question 1, NEPA does not address supplements to environmental impact statements. CEQ's regulations, however, state that when preparing a supplement to an existing environmental impact statement, a federal agency shall prepare, circulate, and file the supplement in the same fashion (exclusive of scoping) that it would for a draft or final environmental impact statement. These regulations do not contain any explicit scoping requirements or limitations for supplemental environmental impact statements, such as requirements that agencies seek public comment on the scope of the supplement.

8. *If significant new information had become available and Interior had not decided to conduct an SEIS, could Interior have been vulnerable to a legal challenge? If so, on what basis?*

Had Interior decided to transfer the land in Ward Valley to California without preparing a second supplement to the Bureau of Land Management's (BLM) environmental impact statement as a part of making that decision, it is possible that Interior's decision could have been challenged in court. What the outcome of a legal challenge might have been is speculative.

According to CEQ's regulations, a federal agency must prepare a supplement when it makes substantial changes in the proposed action or when significant new circumstances or information is relevant to environmental concerns. Also, according to guidance provided by CEQ, "as a rule of thumb," if a proposed action has not yet been implemented, an environmental impact statement that is more than 5 years old should be carefully reexamined to determine if a substantial change has occurred or if there are significant new circumstances or information bearing on the proposed action or its impacts.[2] Case law provides federal agencies

[2]CEQ's guidance on reexamining environmental impact statements for proposed actions after 5 years appears in a memorandum to federal, state, and local agencies containing answers to the 40 most asked questions on NEPA regulations (46 *Fed. Reg.* 18026, 18036, Mar. 23, 1981)).

with some guidance in determining whether information is new and significant, and according to the guidance, each decision is to be based on the specific facts and circumstances of the particular case.

The more time that elapses between an agency's issuance of an environmental impact statement and the announcement of the agency's final decision on that action (which is supported, in part, by the environmental impact statement), the greater is the possibility that an interested party might challenge the agency in court for not addressing what the party perceives as one or more significant new circumstances or pieces of information that have become available since the agency prepared the original environmental impact statement.

In the case of Ward Valley, BLM and California's Department of Health Services had jointly issued a "Final Environmental Impact Report/Environmental Impact Statement" (environmental impact statement) in April 1991 to meet their respective environmental review requirements. Then, in September 1993, the Bureau issued a supplement to the environmental impact statement that was limited in scope to a proposed change in the method for transferring the Ward Valley site to the state. (See our answers to questions 1 and 2 regarding federal land transfers to states for discussion of the change in the land-transfer method.) In the supplement, the Bureau also responded to all substantive comments it had received on environmental issues. Most comment letters, BLM said, repeated environmental concerns that had been fully considered in the April 1991 final environmental impact statement jointly prepared by BLM and California.[3] In February 1996--almost 5 years after the original environmental impact statement was issued and 2-1/2 years after the first supplement was issued--Interior decided to prepare a second supplement to the environmental impact statement. Interior said it would address, in the second supplement, (1) the May 1995 study of Ward Valley by the National Academy of Sciences; (2) the detection of tritium in the soil adjacent to the Beatty, Nevada, disposal facility for low-level radioactive waste; (3) the effects

[3]In accordance with arrangements between BLM and California's Department of Health Services, the department drafted and provided BLM with suggested responses to comments on a draft of the supplemental environmental impact statement. BLM thereupon adopted and incorporated suggested comments in the supplement. In addition, a geologist in BLM's California office provided BLM's management with an independent analysis of studies conducted to determine the hydrogeologic character and setting of the proposed Ward Valley disposal facility. (Downing, K. G., *Hydrogeologic Evaluation of US Ecology Proposed Low-Level Radioactive Waste Disposal Facility, Ward Valley, California* [Aug. 18, 1993]).

the proposed Ward Valley facility might have on "nearby Indian sacred sites"; and (4) other environmental issues identified through a scoping process.

9. *When was the Ward Valley Final EIR/EIS issued?*

April 1991. Under state law, California was required to prepare an environmental impact report as part of its licensing proceeding for the Ward Valley facility. Also, as a part of Interior's land-transfer decision-making process, BLM was required to prepare an environmental impact statement addressing the proposed transfer of the Ward Valley site to the state. To satisfy their respective requirements, in June 1990, the state and BLM jointly issued a single draft environmental impact statement for public comment. The two agencies issued the final environmental impact statement in April 1991.

10. *Were the following issues considered or addressed in the Final EIR/EIS? If so, please provide references.*

(a). *Potential contamination of the Colorado River via hydrologic links between the Ward Valley aquifer and neighboring aquifers.*

Chapter 3 (Affected Environment), Section 3.1.2.2 (Ground water) of the final environmental impact statement recognizes the possibility of linkages between the aquifer beneath Ward Valley and neighboring aquifers. The statement states the following:

> "Groundwater basins in the site region generally comprise north-northeast trending, elongated, alluvial filled basins. Some of these basins are closed basins and ground water flows towards a dry lake whereas other basins discharge to an adjoining basin (Figure 3.1.2-1). In general, the depth to ground water in these basins is greater than 500 feet below ground surface (Figure 3.1.2-2). Recharge in these basins principally occurs as infiltration of rainfall and/or underflow from an adjacent basin. Due to the low annual rainfall in the site region, recharge to these basins is relatively minor and consequently flow through the groundwater system is minor.
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> "Ward Valley is a typical alluvial basin in the Mojave Desert subsection of the Sonoran Desert portion of the Basin and Range Province. Ground water is found several hundred feet beneath the land surface and the flow of ground water generally follows the slope of the land surface. While Ward Valley is a closed basin with respect to surface water flow, there is potential for underflow to occur in the alluvium between Ward Valley and either an up-gradient or a down-gradient basin."

The statement does not assess the potential for human exposure to radiation from the Ward Valley disposal facility by means of migration of radionuclides from the aquifer beneath the facility through a linked aquifer and into the Colorado River. According to the statement (section 4.1.4.6.14, Population Surface Water Scenario), the potential transport of radionuclides from the disposal facility to a body of surface water, such as a river, was not considered to be a credible event because there are no existing bodies of surface water in the Ward Valley Basin.

In its September 1993 supplement, BLM stated that "all available information shows that water resources will not be threatened by the proposed disposal facility." Regarding potential links between groundwater under Ward Valley and the Colorado River, the supplement states the following:

> "No evidence has been found of underground connections that would result in contamination of a water supply in the unanticipated event of groundwater contamination beneath the site. No underground connectors, springs, or other sources of connection outside the basin have been located through the extensive technical studies performed. . . . These studies conclude there is no route for contamination of the Colorado River or to any other surface water sources."

Three U.S. Geological Survey scientists (the Wilshire group) disagreed. They concluded that groundwater at the Ward Valley site likely connects hydrologically to the Colorado River.[4] According to the Wilshire group, its analysis of regional geology, supported by drilled wells, indicated that bedrock above a major fault system underlying the entire region of the disposal site is highly fractured and probably capable of transmitting water. Rather than being a barrier against water movement as assumed by the site evaluation, these rocks may act as aquifers. The group identified five possible hydrologic connections between the proposed Ward Valley site and the Colorado River.

The California Department of Health Services and its technical consultants reviewed the Wilshire group's report and concluded that the group's findings were based on the false or unsubstantiated assumptions that

- there will be significant releases of dissolved radionuclides that reach the ground water,

[4]See Howard, K. A.; D. M. Miller; and H. G. Wilshire, *Description of Earth-Science Concerns Regarding the Ward Valley Low-Level Radioactive Waste Site Plan and Evaluation* (1993).

- potential releases of radionuclides that hypothetically may reach the ground water would significantly affect the quality of the water,

- the concentration of any hypothetical releases of dissolved radionuclides to the ground water would be significant tens of miles away from the site of the disposal facility, and

- there is both a viable groundwater pathway and a prevailing hydraulic gradient under which groundwater from the Ward Valley aquifer could flow to any of four other aquifers.

The National Academy of Sciences committee concluded that (1) there are conceivable--but unlikely--flow paths for some of the groundwater under Ward Valley to the Colorado River and (2) the potential effects on the river water quality would be insignificant relative to present natural levels in the river and to accepted regulatory health standards. To conservatively assess the effects of conceivable flow paths, the Academy, relying on advice from NRC and the Congressional Research Service, assumed that 10 curies of plutonium might be disposed of at the site over a 30-year period and then assumed that all of the plutonium would reach the Colorado River at the same rate it was disposed of. The committee found that under these hypothetical conditions, the effects of the disposal of 10 curies of plutonium on the quality of the river water would be insignificant and the effects of 100 times more plutonium--1,000 curies--would approach, but remain within, regulatory criteria. The committee cautioned, however, that its calculated hypothetical discharge of plutonium in the river would require a combination of circumstances that has an incredibly low probability of occurring because

- much of the Ward Valley ground water likely discharges into a dry lake rather than into the Colorado River;

- significant chemical retardation of the plutonium in the soil would ultimately cause great delays in the migration (and thus concurrent decay) of plutonium;

- no credible mechanism has been identified that could dissolve and leach out all of the plutonium from the site over a few decades; therefore, releases, if any, to the aquifer would be much lower than the panel had assumed; and

- dispersion process over the long pathways would spread the plume out over a long period of time and dilute it to an extent that any potential impacts on the river would be significantly diminished below the impact's calculated by the panel.

BLM is reexamining this issue as a part of the second supplement to the environmental impact statement that it is now preparing.

(b). *Potential for upward migration of soluble radionuclides and release into the atmosphere.*

No. BLM and California did not explicitly address the possibility of the upward migration and release of soluble radionuclides in the final environmental impact statement's (Section 4.1.4.3, Pathway Analysis) discussion of the possible pathways for radionuclides to move by natural forces. The analysis stated that radionuclides in waste may be released into the atmosphere by various pathways, such as from decomposition of gases, evaporation, and the contamination of surfaces during maintenance, demolition, or construction activities at the site.

In commenting on our draft report, California's Department of Health Services told us that the potential for upward migration and release of soluble radionuclides was not considered because the science of soil physics and the mineralogy of the site demonstrate that this phenomenon is not occurring. Under the extremely low moisture conditions found at the site, the department said, any water in soil pores is very tightly bound on soil particles and upward migration of solutes is impossible. The department also pointed to what it considers a well-documented concentration of natural chemicals (e.g., chlorides) that occurs at a depth of approximately 6 feet. Were such materials being carried upward by a hydraulic gradient, it said, peak concentrations would be found at the surface, not a depth of 6 feet.

In commenting on our draft report, the American Ecology Corporation said that the final environmental impact statement considered a number of atmospheric release scenarios including the "bounding case" of an atmospheric release involving a hypothetical trench fire in which waste was burned. Potential radiological exposure from "upward migration and release to the atmosphere of soluble radionuclides" is well within the more conservative bounding case, which did not exceed regulatory limits. Also, the corporation said that an atmospheric release analysis conducted according to EPA guidelines confirmed that the atmospheric release of soluble radionuclides is insignificant.

BLM is examining this issue in the second supplement as a part of the scope of its review of the broader issues of (1) the National Academy of Sciences' May 1995 report on the proposed Ward Valley facility and (2) the movement of radioactive elements in the soil.

(c). *Potential for lateral migration of radionuclides.*

No. The April 1991 environmental impact statement did not discuss the potential for lateral migration of radionuclides in the final environmental impact statement.[5]

Subsequently, the Wilshire group concluded that the data show that shallow, low permeability layers may exist in the slope beneath the site and toward the main valley drainage (Homer Wash). These could promote lateral flow, leading to the leakage of excess water into trenches and the migration of contaminants from trenches to Homer Wash. Once in the wash, these contaminants could be redistributed into the general environment by wind and water erosion much faster than by percolation to the water table.

The National Academy of Sciences committee unanimously concluded that shallow subsurface (lateral) flow, as proposed by the Wilshire group, was not a significant issue at the Ward Valley site. According to the committee, under low-water fluxes, the soil carbonate is sufficiently permeable to allow water to move downward, and calculations show that lateral flow into trenches would be insignificant even under a worst-case scenario. To reach its conclusion on this issue, the committee relied on information about the Ward Valley site and other information collected and experiments performed at the Department of Energy's Nevada Test Site and Yucca Mountain, both located in southern Nevada, and at Las Cruces, New Mexico.

BLM is addressing this issue in the second supplement as a part of the scope of its review of the broader issues of (1) the National Academy of Sciences' May 1995 report on the proposed Ward Valley facility and (2) the movement of radioactive elements in the soil.

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[5]According to a contractor for California's Department of Health Services, US Ecology addressed lateral migration issues in the license application (sections 2410 [Surface Water Hydrology] and 2420 [Groundwater Characterization] and appendixes 2500, 6120.A, 6151.A, and 6151.B).

(d). *Potential for perched water tables forming above the waste barrels.*[6]

No. The April 1991 environmental impact statement did not discuss the potential for perched water tables forming above the waste barrels.

California's Department of Health Services commented that the potential for perched water tables forming above the waste barrels is "conceptually absurd." According to the department, the term "perched water table" implies a body of water at least tens of feet in size. Because waste barrels are round, the largest such perched water table that could form would be the size of the barrel–about 2 feet in diameter. This would not, the department said, constitute a perched water table in the common use of the term, nor would it affect the disposal facility's performance.

American Ecology Corporation commented that the implication of water collecting on top of waste barrels in a disposal facility at Ward Valley was not analyzed because it is not credible. Because barrels will be emplaced on their sides in lifts surrounded by free-draining, granular backfill, the corporation said, perching of water above the barrels cannot occur.

As requested by members of the public, BLM has included this issue among those environmental issues that it is addressing in its second supplemental environmental impact statement.

(e). *April 1992 Ward Valley Technical Review Panel report entitled* The Proposed Ward Valley Radioactive Waste Dumpsite: Report of the Ward Valley Technical Review Panel, *by Dr. Robert Cornog, co-discoverer of tritium, Professor James Warf, former head of the Manhattan Project's nuclear chemistry division, and other experts.*

(f). *January 1993 California Senate Office of Research report entitled* How Safe? Issues Raised by the Proposed Ward Valley Low-Level Radioactive Waste Facility: A Report to the Senate Rules Committee.

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[6]Perched water is accumulated water trapped in the unsaturated zone by either an impermeable layer of soil or some structural feature–in this case by the waste barrels in disposal trenches. The concern raised regarding the proposed Ward Valley disposal facility was that radioactive contaminants in the facility could be brought back to the surface through the roots of surface plants extended down into the perched water.

(g). *July 1993 Metropolitan Water District of Southern California draft report entitled "Issues Regarding the Proposed Ward Valley Low-Level Radioactive Waste Disposal Site" and August 1994 final report titled "Hydrologic Review of the Proposed Ward Valley Low-Level Radioactive Waste Facility."*

(h). *December 1993 Wilshire Report.*

(i). *U.S. Fish and Wildlife Service report entitled* Draft and Final Recovery Plan for the Desert Tortoise--Mojave Population *(Apr. 1993 and June 1994); Federal Register notice regarding designation of Ward Valley as Critical Habitat for the Desert Tortoise (Feb. 8, 1994) and National Biological Service report on the health of the Desert Tortoises in the Ward Valley area (Apr. 1995).*

(j). *US Ecology reports entitled* US Ecology Inc., Beatty, Nevada Facility, 1992 Annual Report and Annual Environmental Monitoring Report for 1993.

(k). *September 1994 U.S. Defense Nuclear Facilities Safety Board report entitled* Low-Level Waste Disposal Policy for Department of Energy Defense Nuclear Facilities.

(l). *October 1994 Conference of Radiation Control Program Directors report entitled* Environmental Monitoring Report for Commercial Low-Level Radioactive Disposal Sites.

(m). *Report by the Environmental Protection Agency (EPA) entitled* A Review of Organic Contaminants in the Unsaturated Zone and Groundwater Zones at the Beatty, Nevada, TSD Site, made public in 1995.

(n). *Nuclear Regulatory Commission (NRC) Report entitled* The Goode Memorandum *on contamination at Beatty, Nevada, made public in 1995.*

(o). *May 1995 Congressional Research Service report entitled* Update on Projected Radioactivity at Ward Valley Low-Level Waste Site.

(p). *May 1995 National Academy of Sciences panel report.*

(q). *October 1995-present U.S. Geological Survey data collections on migration of radioactivity at Beatty, Nevada, low-level waste facility.*

(r). *March 1996 report entitled* Financial Condition of American Ecology Corporation *(Owner of US Ecology) by Dr. Gregory Hayden, Nebraska Commissioner, Central Interstate Low Level Radioactive Waste Compact.*

(s). *1995 and 1996 SEC 10-K filings by American Ecology, including formal findings by the firm's independent auditors that it is "questionable" whether the company can continue as an "ongoing concern" in the face of the financial troubles associated largely with its purchases in Tennessee and Texas.*

(t). *November 1994 summary report by Nancy Alvarez, Resource, Conservation, Recovery Act Facility Branch, Bureau of Waste Management, Division of Environmental Protection, Department of Conservation and Natural Resources, State of Nevada, summarizing summary evidence of chemical groundwater contamination at the Beatty, Nevada, waste facility operation by US Ecology.*

No. All of these documents were published after the environmental impact statement was issued in April 1991. Members of the public used some of these documents to support their requests that Interior prepare a second supplement to the environmental impact statement. BLM could consider any of these documents as a part of the second supplement that it is now preparing.

Interior commented that other new documents and information have become available since 1991. It identified, for example, Executive Orders 13007 (Indian sacred sites) and 12898 (environmental justice), which were issued after the 1991 environmental impact statement was prepared. Interior added that in December 1997, Dr. F. Gregory Hayden, an economist and member of the Central Interstate Low-Level Radioactive Waste Commission, released a report concluding that the construction of the Ward Valley facility is unnecessary and uneconomic because of a steady drop in the volumes of low-level radioactive waste and a surplus of nationwide disposal capacity. According to Interior, Dr. Hayden's report raises questions to be addressed in the supplemental environmental impact statement.

California's Department of Health Services commented to us that it evaluated the issues raised in the documents listed above, to the extent that they are relevant to the Ward Valley project, and determined that these documents contain no significant new information regarding environmental impacts. The department added that it had formally transmitted this evaluation to BLM on November 18, 1996, as part of the scoping process for BLM's currently planned supplement. The department also stated that items (e) and (f) were specifically evaluated by BLM in preparing its 1993 supplement. Finally, the department stated that it has reviewed Dr. Hayden's report and has found its conclusions regarding the Ward Valley project to be invalid. According to the department, the financial aspects of the

project are the sole concern of the licensing agency--the department--and, thus are not legitimately within the purview of the Department of the Interior.

QUESTIONS REGARDING FEDERAL LAND TRANSFERS TO STATES

1. *When Interior considers a land transfer request by a state, such as the request by the state of California for federal land at Ward Valley to be transferred for the purposes of building a low-level nuclear waste facility, what statutory and regulatory requirements is Interior subject to in considering that request?*

The principal statute applicable to the proposed Ward Valley land transfer is the Federal Land Policy and Management Act (FLPMA) of 1976. Among other things, this act authorizes the Secretary of the Interior to transfer public land by direct sale upon determining that the transfer would

> ". . .serve important public objectives, including but not limited to, expansion of communities and economic development, which cannot be achieved prudently or feasibly on land other than public land and which outweigh other public objectives and values, including, but not limited to, recreation and scenic values, which would be served by maintaining such tract in Federal ownership."[7]

After such a determination, the transfer must be made on terms that the Secretary deems necessary to ensure proper land use and the protection of the public interest. In July 1992, California's Department of Health Services asked Interior to sell the Ward Valley site to the state under the authority granted to the Secretary by FLPMA.

Because the proposed transfer of the Ward Valley land to the state is considered a "major federal action" that may have a significant effect on the quality of the human environment, NEPA requires that an environmental impact statement accompany the record for the land-transfer decision. In addition, other statutes may apply depending upon the specifics of a proposed land transfer. For example, the Ward Valley site lies within the critical habitat for the desert tortoise, which is a species designated by the U.S. Fish and Wildlife Service as "threatened." Therefore, Interior's land-transfer decision-making process must include compliance with the Endangered Species Act. Also, Interior must comply with any applicable provisions of statutes pertaining to cultural resources and Native Americans.

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[7]FLPMA, sec. 203(a)(3), 43 U.S.C. 1713(a)(3).

Under FLPMA, federal public lands may be sold without competition, when the Secretary of the Interior determines it necessary and proper. BLM, which manages federal public lands, has issued regulations implementing the sale of these lands.[8] Under these regulations, when it would best serve the public interest, sale to a state may be authorized when the land is needed by a state or its local governments. Before completing a sale, the authorized officer (in the case of Ward Valley, the Secretary of the Interior) must determine, among other things, if the proposed sale would serve important public objectives, such as the expansion of communities and economic development, which cannot be achieved prudently or feasibly on nonpublic lands and which outweigh other public objectives and values that would be served by maintaining such land in federal ownership. The authorized officer must publish a "notice of realty action" not less than 60 days prior to the sale and provide 45 days for public comment. The notice shall include, among other things, the terms, covenants, conditions, and reservations that are to be included in the sale document to ensure proper land use and protection of the public interest.

In the case of Ward Valley, BLM published in the *Federal Register* on September 21, 1992, the Notice of Realty Action outlining the proposed direct sale, under FLPMA, of the Ward Valley site. The notice solicited comments and/or protests to the proposed sale for a period of 45 days, as required by BLM's regulations, or until November 5, 1992. BLM received nine letters and one petition (with 270 signatures) opposing the sale.

2. *Is Interior required under any law to transfer federal land to a state for any purpose? If so, for what purpose?*

Under FLPMA, Interior's authority to transfer federal land to a state is discretionary, not mandatory. Other federal legislation, enacted shortly after California received statehood, set aside certain sections of land in the state for public schools.[9] Where land sections later were found to be unavailable for that purpose, the state was given the right to select other, or "in lieu," lands of equal acreage to replace them.[10] In the case of the proposed disposal site in Ward Valley,

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[8]43 C.F.R. part 2710.

[9]Act of September 9, 1850, ch. 50, 9 Stat. 452 (an act admitting the state of California into the Union). Act of March 3, 1853, ch. 145, sec. 6, 10 Stat. 246; sec. 7, 10 Stat. 247 (providing for the survey of public lands in California).

[10]Act of July 23, 1866, ch. 219, sec 1, 14 Stat. 218 ; sec. 6, 14 Stat. 220 (an act to quiet land titles in California). 43 U.S.C. 865.

two separate agencies within California's government requested that Interior transfer the site to the state. One agency made its request under the in lieu selection legislation, and the other agency used FLPMA as the basis for its request.

In February 1987, California's State Lands Commission applied to BLM for a conveyance of the Ward Valley site to the state in lieu of federal land set aside for public schools. According to the commission, the state's Department of Health Services had asked the commission to use the in lieu process of acquiring the site to prevent the filing of mining claims and other forms of entry that could interfere with the project. Once acquired by the state, control of the site would be transferred to the department, which would be responsible for licensing and regulating the disposal facility at the site.

On July 2, 1991, the State Lands Commission asked BLM to suspend processing its application and stated the Department of Health Services must "decide how to acquire the property." Subsequently, on July 13, 1992, the department requested that BLM sell, using BLM's direct sale authority under FLPMA, the Ward Valley land to the state. BLM notified the commission that its in lieu application was deficient because of disparities in land values and, on August 13, 1992, rejected that application. On September 17, 1992, however, BLM received a new application from the commission under its statehood grant. Thus, Interior had two applications to acquire the Ward Valley site from two state agencies, each of which applied under separate federal laws.

On September 21, 1992, BLM published the Notice of Realty Action in the *Federal Register* outlining the proposed direct sale of the Ward Valley site under FLPMA and seeking comments for a period of 45 days. Concurrently, BLM was preparing a supplement to the April 1991 environmental impact statement limited to addressing the proposal for direct sale of the site to the state under FLPMA. Completing this supplemental statement, including obtaining and considering public comments, would not have permitted BLM to have reached a land-transfer decision by the end of the Bush Administration. On January 7, 1993, however, (then) Secretary Manuel Lujan determined that the supplemental statement should be redesignated as a supplemental environmental assessment because the change in land-transfer method had no effect on the environment. Then, in a January 19, 1993, Record of Decision approving the direct sale, former Secretary of the Interior Manuel Lujan, Jr., stated that the governor of California's expressed preference for acquiring the site under FLPMA was entitled to great weight when different methods of transferring the land to the state were considered.[11] In conjunction, the former

[11]This Record of Decision was subsequently rescinded by Secretary Babbitt.

Secretary dismissed a protest to the Notice of Realty Action of September 1992 on the grounds that, among other things, the selection of the direct sale proposal over the in lieu approach was a proper execution of Interior's discretionary authority.

3. *Has the Administration made it clear in writing to the state of California that it seeks no role in regulating the low-level waste facility after transfer of the land to the state of California? If so, when?*

In an August 11, 1993, letter to the Governor of California, the Secretary of the Interior acknowledged that the Low-Level Radioactive Waste Policy Act of 1980 left the states primarily responsible for making decisions about siting, licensing, and operating low-level radioactive waste disposal facilities. Then, in an October 20, 1995, letter to the Secretary of California's Health and Welfare Agency related to negotiations on the terms of a land-transfer agreement, Interior's Deputy Secretary stated the following:

> "The need for enforceable commitments from the State does not reflect, as you [sic] letter states, an intent that the Department of the Interior maintain continued control of the site after it is transferred. To the contrary, the Department's consistent position has been and remains that the State should retain full discretion in regulating the LLRW [low-level radioactive waste] facility, subject only to the specific commitments in the agreement."

4. *When Interior offered to transfer Ward Valley to the state of California, did Interior seek an enforceable assurance from the state that it would take the actions recommended by the National Academy of Sciences' panel, which the state had said it intended to take?*

Yes. In May 1995, the Academy recommended that additional tests be performed at the Ward Valley site to improve the program for monitoring the disposal facility's performance during and after the 30 years that the facility was expected to operate. Shortly after the release of the Academy's report in May 1995, Secretary Babbitt stated that a condition of transferring the land was "a binding commitment from the State of California that the additional safeguards recommended by the Academy panel be carried out." The Governor of California made a written commitment to the Secretary of the Interior that the state would implement the substance, if not the letter, of the Academy's recommendations, but objected to entering into a binding commitment.

In subsequent negotiations between the two parties, Interior maintained its position that it would transfer the land if the state would accept, as a condition of the transfer, Interior's authority to enforce in the courts the state's compliance with

the Academy's recommendations. California refused Interior's offer, asserting that the implementation of the Academy's recommendations falls in the area of radiological safety, which is the state's responsibility and is outside of Interior's authority and expertise. California also objected to what it characterized as Interior's insistence that third-party beneficiaries, including project opponents, would also have the right to independently enforce the state's implementation of the Academy's recommendations in court. (In commenting on this report, Interior stated that the provisions of the proposed land-transfer agreement would have been enforceable only by Interior and the state.) The state's final proposal to Interior in September 1995 explicitly provided that the state's commitments to carry out the Academy's recommendations were unenforceable. For that reason, the state's proposal was unacceptable to Interior.

## QUESTIONS REGARDING THE NATIONAL ACADEMY OF SCIENCES' REPORT ON WARD VALLEY

1. *Does the National Academy of Sciences' report constitute an endorsement or approval of the Ward Valley site?*

   No. According to the Academy's report on Ward Valley, none of its conclusions should be interpreted as either an endorsement or condemnation of the Ward Valley site.

2. *Does the Academy's report constitute a position on the overall suitability of the site?*

   No. The Academy agreed to review only the seven specific issues identified by the Wilshire group. The Academy's report on its review states that the Academy did not evaluate the suitability of the Ward Valley site for a low-level radioactive waste disposal facility.

3. *What did the Academy's report conclude about the quantity and quality of the data collected for site characterization?*

   The Academy's report states that monitoring hydraulic characteristics in dry soils like those at the Ward Valley site is very difficult and, therefore, leads to several limitations in collecting field data. The three main causes of the monitoring difficulties include the effects of (1) low water fluxes (the water's rate of flow), (2) the limitations of instruments in arid soils, and (3) unresolved inconsistencies in the data and/or project decisions on where and how deep to test.

According to the report, subsurface water fluxes in the upper 30 meters of the unsaturated zone are extremely low, making it difficult to determine the rate and direction of the water's movement with available equipment and sampling procedures. On the basis of the Academy's experience and understanding of the Ward Valley zone, it is not currently possible to definitively resolve the exact magnitude and direction of the water flux. The report also noted that monitoring hydraulic characteristics in arid unsaturated zones is very difficult because of the lack of methods, procedures, and reliable instruments to measure precisely the hydraulic and hydrochemical characteristics used to estimate the rate of water flow in dry desert soils and pointed out that some of the instruments used are not very robust and have a high failure rate.

4. *What did the Academy's report conclude about the desirability of getting more confirmatory information on spatial variability of hydraulic and hydrochemical attributes of the site?*[12]

According to the Academy's report, the number and distribution of observations and the quantity of data collected during site characterization were very limited because of instrumentation and sampling problems as well as decisions on where and how deep to test. In the Academy's view, more confirmatory information on the spatial variability of hydraulic and hydrochemical attributes is desired to provide further assurance that the limited data from which the site characteristics were determined are representative of the entire site.

In several instances, the Academy's report said, additional data and/or sampling will be required to correctly interpret data, particularly on tritium measurements in the unsaturated zone and the apparent vertical gradient in the groundwater beneath the site. The existing data on tritium and the apparent vertical gradient, the report states, are inconsistent with most other site characterization data. Similarly, uncertainties in the measurements of the soil-water potential and uncertainties generated by the limited hydraulic data from the unsaturated zone below 30 meters can be reduced only through additional characterization of the unsaturated zone.

5. *How did the Academy's report (majority opinion) explain the presence of tritium at 100 feet below the Ward Valley site?*

The Academy's panel on Ward Valley concluded that "inappropriate sampling procedures" probably introduced atmospheric tritium into the samples. According

[12]This issue relates to differences in water-level measurements and the chemical makeup of groundwater at various locations around the Ward Valley site.

to the panel, the results from the uppermost sampling depths may represent atmospheric contamination or may indicate small amounts of shallow infiltration. Because of these uncertainties, the tritium data are uncertain and are not adequate for the evaluation of infiltration. The panel concluded that resolution of the tritium measurement issue would be important to the development of reliable baseline data for the planned monitoring during site operations. Therefore, the panel unanimously recommended additional sampling for tritium to establish base levels for the monitoring program. According to the panel's chairman, the majority of the panel believed that the additional sampling could be done during construction and operation of the disposal facility.

6. *Did two of the hydrologists on the Academy's panel conclude that the presence of tritium at 100 feet below Ward Valley "prevents there being a reasonable assurance that there is minimal water flux at the [Ward Valley] site"; that "The validity of the data is unresolved and not resolvable without additional fieldwork"; that "Without a resolution of this uncertainty by showing the absence of tritium at depth and the absence of a downward vertical gradient . . . , there cannot be reasonable assurance that water and contaminants will not be rapidly transmitted to the water table"?*

   One member of the Academy's panel–Dr. Oberdorfer–made these statements as part of her dissenting opinion regarding the transfer of contaminants through the unsaturated zone and the potential for the contamination of groundwater. Dr. Oberdorfer and another panelist–Dr. Mifflin–concluded that the additional tests at Ward Valley recommended by the Academy, including the additional sampling for tritium, should be completed in time to use the results in a final decision on the site's suitability.

7. *Did one of the hydrologists, Dr. Mifflin, conclude that "the quantity and quality [of data] do not exist for Ward Valley to provide reasonable assurance that the site is suitable for long-term storage of radioactive wastes"?*

   Dr. Oberdorfer made this statement as part of her dissenting opinion regarding the transfer of contaminants through the unsaturated zone and the potential for the contamination of groundwater. Dr. Mifflin concurred with Dr. Oberdorfer's view that the results of additional testing recommended by the Academy should be considered in a final decision on the suitability of the site for a disposal facility. Specifically, Dr. Mifflin said that the site characterization failed to establish a reasonable assurance of vadose zone hydrology of the site area. According to Dr. Mifflin, two site-specific data bases suggest deep percolation, whereas other data bases suggest little or no deep percolation at the borehole.

QUESTIONS REGARDING US ECOLOGY'S LOW-LEVEL WASTE SITE AT BEATTY, NEVADA

1. *Our documents show that the two prime proponents of the Ward Valley facility, US Ecology, and the California Department of Health Services, the proposed facility operator and owner, respectively, have repeatedly declared the Beatty, Nevada, site to be analogous to the Ward Valley Site.*

   *For example, the California Department of Health Services issued formal findings on June 22, 1994 pursuant to a court order, finding that "the Beatty site provides a good analog for the Ward Valley facility."*

   *A November 7, 1994, letter by US Ecology says, "In statements and representations regarding the performance of the Ward Valley site, we have relied, in part, on comparison with the Beatty site because it has been studied extensively by the U.S. Geological Survey and has many characteristics similar to Ward Valley. Any rapid migration of radionuclides at the site abetted by natural site characteristics, would be of significant concern and relevant to the Ward Valley Project."*

   *Is it not true that, at least until the disclosure of the Geological Survey findings of leakage at Beatty, both US Ecology and the California Department of Health Services had declared Beatty to be an analog for Ward Valley, with any migration at Beatty being of significant concern and relevant to the Ward Valley project?*

   The record is clear that both US Ecology and California's Department of Health Services have considered the Beatty, Nevada, site (where US Ecology operated a disposal facility for commercially generated low-level radioactive wastes from 1962 through 1992) as analogous, or similar, to the Ward Valley site. What is less clear is how similar the two sites may be. The following are four examples in which California and/or US Ecology considered the Beatty site analogous to Ward Valley.

   First, according to the state's Department of Health Services, in the 1980s US Ecology used the Beatty site as a "conceptual analog" for the purpose of screening and selecting candidate sites and eventually selecting the Ward Valley site as the preferred site for the disposal facility.

   Second, in US Ecology's 1989 license application for the Ward Valley facility, the company estimated the amounts of groundwater recharge and deep percolation at the Ward Valley site using methods that a Geological Survey scientist had used to make similar estimates for the Beatty site and the U.S. Department of Energy's

Nevada test site.[13] US Ecology stated that the method used at the latter two sites may be applicable to Ward Valley because all three sites are in a desert environment and have similar soil materials.

Third, on June 22, 1994, California's Department of Health Services, pursuant to court order, made supplemental licensing findings related to the findings, conclusions, and recommendations of the Wilshire Group's report. One of the group's recommendations was for an "analog study" of the arid-environment Beatty site. Studying the distribution of various contaminants (if any) in the soils beneath and around the trenches and in the groundwater beneath and down-gradient from the site, the Group said, could provide an extremely useful check on current siting procedures for the disposal of low-level radioactive waste. In response to this recommendation, the department made a supplemental finding that "the Beatty site provides a good analog for the Ward Valley facility."

And fourth, in a November 7, 1994, intra-company memorandum, an official of US Ecology underscored the perceived similarity between the Beatty and Ward Valley sites. In reference to the detection of elevated tritium concentration in a well at the Beatty facility, the official stated that the "rapid" migration of radionuclides at the Beatty site "abetted by natural site characteristics" would be of significant concern to the Ward Valley project. However, in commenting on our draft report, US Ecology said that it does not now nor did it ever consider the Beatty site as an analog for the proposed Ward Valley facility. Instead, the Beatty site was used as a conceptual analog for site selection purposes.

On the other hand, there is some question about the degree to which the two sites are similar. For example, in a written presentation before the Ward Valley review panel of the National Academy of Sciences, a member of the Wilshire Group identified ". . . significant geologic differences between the sites and unresolved hydrologic issues at the Beatty site[.]" According to this member of the group, significant differences between the two sites exist in (1) structural events, such as the age and nature of faulting; (2) the composition of materials in the unsaturated zone; and (3) buried soils. Also, the group's member said, the principal rocks underlying the two sites "differ greatly." The differences between the sites, the group's member said, ". . . likely contribute to differences in water transport processes, suggesting that at present [in 1994] Beatty has limited value as an analog for Ward Valley."

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[13]See section 2420, Groundwater Characterization (p. 2420-10), Revision 1 (Dec. 1989).

2. *Lack of evidence of contamination at US Ecology's Beatty site has consistently been used as "proof" that Ward Valley will likewise be safe. It appears that once information became public about leakage at Beatty, proponents of Ward Valley have attempted to back off their prior claims that the Beatty site is analogous to the Ward Valley site. Please review the available documentation to determine whether this is the case.*

A thorough review of California's administrative record for the proposed Ward Valley disposal facility to identify all references by the state and US Ecology to the Beatty site as an analog to the Ward Valley site was not practicable. The full administrative record comprises more than 300 bound volumes occupying 48 linear feet. Both US Ecology and California's Department of Health Services, however, continue to consider the Beatty, Nevada, site as analogous to the Ward Valley site because the two sites are located in a desert environment in similar hydrogeological settings.

The position of California's department on the Beatty site as analogy for the Ward Valley site is stated in the department's response to the Wilshire Group's report. In that response, the department acknowledged the similar characteristics of the two sites. The department also stated that the results of the U.S. Geological Survey's research on the hydrogeology of the unsaturated zone at the Beatty site are largely applicable to the Ward Valley site and conclusively demonstrate the technical excellence of the arid environment for the disposal of low-level radioactive waste. The department also stated, however, that the Beatty facility is severely limited for use as an analog for the predicted performance of the proposed Ward Valley facility because commonly accepted disposal practices at the Beatty facility, especially in its early years, did not meet many of the present technical requirements of current regulations.

The manager of California's low-level radioactive waste program told us that the key difference between the Beatty and proposed Ward Valley facilities lies in how the former facility was operated in its early years and how the latter facility would be operated. Specifically, he stated that, for some time period ending in the mid-1970s, a significant volume of bulk liquid waste was disposed of at the Beatty facility.[14] In contrast, California's manager added, condition 56 of the Ward Valley license expressly prohibits the receipt and disposal of waste in liquid form at the Ward Valley facility. He added that the state plans to station two inspectors at the

[14]As discussed in our answer to question 3, below, the disposal of liquid waste occurred despite a condition that prohibited the disposal of radioactive waste in liquid form in US Ecology's license to operate the Beatty facility.

facility at all times to ensure compliance with this and other conditions of US Ecology's license to operate the Ward Valley facility.

According to US Ecology, the performance assessment of the Ward Valley site is based on site-specific data from Ward Valley, not Beatty. In US Ecology's view, therefore, the Geological Survey's detection, in 1994 and 1995, of radionuclides in the soil adjacent to the Beatty facility has no relevance to the performance of the proposed Ward Valley facility.

3. *Liquid wastes (aside from 0.5% free standing liquid in waste containers) are to be prohibited at Ward Valley. Were liquid wastes ever permitted to be disposed of at Beatty, Nevada?*

No. The license issued by the Atomic Energy Commission–now the Nuclear Regulatory Commission–to the Nuclear Engineering Company (NECO)–now US Ecology–to dispose of low-level radioactive waste at the Beatty facility prohibited the disposal of waste in liquid form. Until 1976, however, NECO employees at Beatty routinely disposed of liquid wastes in trenches at the Beatty facility.

Until the mid-1970s, generators of liquid radioactive wastes were permitted to ship these wastes to Beatty, where NECO was supposed to convert the wastes into solid forms before disposing of the wastes. For some or all of the period 1966-76, however, NECO employees picked up liquid wastes from generators, using a 2,600-gallon tank-truck, and directly drained the liquid waste from the truck tank into a disposal trench. There was no operable means of solidifying liquid radioactive wastes at Beatty until the spring of 1975. According to (then) employees of NECO at Beatty, NECO's corporate management in Kentucky was aware that liquid wastes were being shipped to Beatty and that no working solidification system was present at the site.

In the spring of 1975, a liquid waste solidification system was installed at Beatty and began operating in May 1976. In the late 1970s, Nevada, which had succeeded the NRC as the regulator of the Beatty facility, phased out NECO's authority to receive low-level radioactive wastes in liquid form. From that time on, all liquid wastes (except as noted in question No. 3) to be disposed of at the facility had to be converted to a solid form before being shipped to the facility for disposal.

4. *Did US Ecology plead guilty to criminal charges--the first criminal charges ever brought by the NRC--for illegal waste disposal at its Beatty site? Over how many years did the illegal activity continue?*

During the same time period that liquid radioactive waste was disposed of at Beatty, some of NECO's employees at that facility had also been regularly removing materials--tools, clocks, and other instruments containing radium dials, plywood, and other materials–from the facility that were supposed to have been disposed of at the facility. As a result, in 1976 both the state and NRC suspended their respective licenses issued to NECO to operate the Beatty site. According to the minutes of the November 27, 1979, meeting of Nevada's State Board of Health, NRC also referred this matter to the Justice Department for prosecution for criminal violations related to the Atomic Energy Act.[15] NECO subsequently pleaded "no contest" to two criminal counts (and was fined $5,000 on each count) related to its employees' opening of disposal containers and removing materials that were intended for disposal from the facility.

Also, in 1979, Nevada's Governor temporarily closed the Beatty disposal facility because of a number of shipments of radioactive waste that were found to have leaking containers after being received at the site. These packaging problems were the fault of the waste generators and/or shippers, rather than NECO. Then, in September 1979, Nevada's Department of Human Resources filed a state petition to revoke NECO's license for the Beatty disposal facility for low-level radioactive waste (not the adjacent hazardous waste disposal facility) because, the department stated, NECO had committed seven violations of the conditions and regulations tied to its license. One month later, the state again closed the disposal facility after the discovery of barrels of radioactive waste buried outside of the fence surrounding a filled disposal trench. In December 1979, the state rescinded the order closing the facility.

From 1979 through 1990, according to Nevada's Bureau of Regulatory Health Services, US Ecology was generally in substantial compliance with state statutes and regulations that are concerned with the control of exposure to radiation.[16] In June 1980, however, the state's Department of Human Resources had advised NECO that its license to operate the disposal facility for low-level radioactive waste would not be renewed because of 12 instances in which shipments of radioactive waste received at the facility were in violation of state or federal regulations. However, the facility continued to operate until the end of 1992.

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[15]The violations had occurred while NECO operated Beatty under license from the Atomic Energy Commission (until Jan. 1975) and NRC (beginning in Jan. 1975). In 1977, the state assumed responsibility for regulating the disposal of radioactive materials classified as source and byproduct materials.

[16]Letter of August 29, 1990, from Nevada's (then) Bureau of Regulatory Health Services to California's Department of Health Services.

QUESTIONS REGARDING THE INTERIOR INSPECTOR GENERAL'S INVESTIGATION INTO THE U.S. GEOLOGICAL SURVEY'S ACTIVITIES

1. *Interior's Inspector General's office is currently investigating the U.S. Geological Survey's monitoring activities at the Beatty, Nevada, facility. What allegations are being investigated?*

According to an investigator in the Department of the Interior's Office of the Inspector General, the Inspector General is investigating the following allegations raised by a group called "Public Employees for Environmental Responsibility":

- The Geological Survey intentionally suppressed information in its possession that could have been of major importance to the National Academy of Sciences' recent review of technical concerns about the proposed low-level radioactive waste disposal facility at Ward Valley.

- The private disclosure of the information to the company licensed to operate a disposal facility at Ward Valley and a state agency that has a pending application to acquire the Ward Valley land violated the Geological Survey's rules and policies.

- The disclosure of the information to parties with a vested interest in Ward Valley and to California's Department of Health Services constituted a conflict of interest.

The Inspector General does not expect to complete the report of this investigation for at least several more months.

QUESTIONS ABOUT THE PROPOSED WARD VALLEY FACILITY PLAN AND DESIGN

1. *Are there any low-level waste facilities currently in the planning process (other than Ward Valley) that plan to store the low-level waste in trenches with no lining or other engineered barriers like concrete vaults?*

No. The Low-Level Radioactive Waste Policy Act of 1980, as amended, made states responsible for managing and disposing of commercially generated low-level radioactive wastes. To do this, the act encouraged states to form interstate compacts and cooperate in managing and disposing of waste on a regional basis.

There are 10 compacts of states.[17] In addition, three states that are not affiliated with compacts are in various stages of planning disposal facilities. California and Texas currently plan to dispose of commercially generated low-level radioactive wastes in unlined trenches.

The issue of whether a liner should be incorporated in the Ward Valley project design was raised in comments on the draft environmental impact statement. The EPA commented that the BLM and California's Department of Health Services should seriously consider using a liner for the collection and detection of leachate as part of the facility's monitoring system. The department believed that the potentially significant adverse impacts to groundwater and the vadose zone would be sufficiently reduced if an adequate monitoring system to ensure the early detection and correction of potential radionuclide migration was identified in the environmental statement as part of the proposed project. In addition, three California boards--the Regional Water Quality Control Board for the Colorado River Basin, the Water Resources Control Board, and the Integrated Waste Management Board--recommended the use of liners in disposal trenches as part of the Ward Valley monitoring system. According to these agencies, such a system would provide the most complete vadose zone monitoring system available, ensure immediate on-site knowledge of potentially unacceptable releases of radionuclides to groundwater, and provide an early opportunity to select appropriate remedial measures. However, the state's Department of Health Services concluded that such features (1) are not required by regulations, (2) could be detrimental to the site's ability to meet the performance objectives, (3) are not consistent with the philosophy of the low-level waste regulations, and (4) are unnecessary because of the favorable natural characteristics of the Ward Valley site. According to US Ecology, the incremental increase in cost of a liner system for the Ward Valley project is $25 million.

Under the terms of the Agreement State program , through which NRC relinquished regulatory authority over the disposal of low-level radioactive waste to California, the state must adopt and implement regulations that are compatible with NRC's regulations for these disposal facilities.[18] Although agreement states may adopt regulations that are more stringent than NRC's regulations, California adopted NRC's regulations. In a 1990 letter to California's Department of Health Services, NRC concluded that liners are not required either for the mitigation of radionuclide

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[17]One of these compacts, consisting of Maine, Texas, and Vermont, has been passed by the three states but is awaiting congressional approval.

[18]NRC's regulations governing the siting, design, operation, and closure of disposal facilities for low-level radioactive waste are found in 10 C.F.R. part 61.

migration or for environmental monitoring, nor are liners considered necessary to meet performance objectives of its regulations. In that letter, NRC stated that it takes exception to any design that relies on a leachate collection and treatment system to reduce migration of radionuclides. Such a design, NRC said, is expected to result in a requirement for continued active site maintenance. Regarding Ward Valley, NRC found that a liner may be counterproductive in that it would introduce the potential for the accumulation of water within the disposal unit, which would otherwise not likely occur at an arid site and could increase long-term risk to human health and the environment.

According to California's Department of Health Services, the regulatory basis for solid and hazardous wastes facilities is derived from a different philosophical approach than that taken in the design requirements developed by NRC for the disposal of low-level radioactive waste. For example, the regulations for solid and hazardous wastes that require dual liners and leachate collection features are concerned primarily with the operating life of the disposal facility plus a nominal 30 years of post-closure observation and active maintenance. If leachate appears in the disposal facility during this period, it will be removed by such measures as pumping. In contrast, NRC's regulations for low-level radioactive waste disposal facilities require that facilities be located, designed, constructed, operated, and closed so that they will isolate wastes without ongoing active maintenance. This regulatory system is concerned with the long-term isolation of waste for up to 500 years.

2. *How many states have outlawed shallow land burial of low-level waste?*

According to documents that the Low-Level Radioactive Waste Forum provided us with,[19] Massachusetts, New Jersey, and New York preclude shallow land burial by state law. In Michigan, state law limits disposal technologies to above- or below-ground vaults or above- or below-ground modular canisters. Finally, in Connecticut, the agency that is responsible for identifying a site for a low-level radioactive waste disposal facility has decided not to consider shallow land burial.

In commenting on a draft of this report, California's Department of Health Services said that most states plan to continue to use the existing disposal facilities that do not use liners for their disposal trenches or bury waste in internally monitored

[19]The Forum is an association of states and compacts representatives established to facilitate state's and compact's implementation of the Low-Level Radioactive Waste Policy Act of 1980, as amended, and to promote the objectives of low-level radioactive waste regional compacts.

vaults. For example, the 11 member states of the Northwest and Rocky Mountain compacts plan to use the state of Washington's disposal facility, which uses unlined trenches, for the foreseeable future. Also, according to US Ecology, Texas is planning an arid region facility that will not employ unit liners.

Texas plans to build a low-level radioactive waste disposal facility in Hudspeth County. While the facility will not have synthetic liners, it will have several design features intended to isolate waste and minimize the potential for off-site exposure. For example, all waste will be placed in steel-reinforced concrete canisters that have a minimum wall thickness of 10 inches. According to documents from the Texas Low-Level Radioactive Waste Disposal Authority, the canisters will be watertight, engineered to last for at least 500 years and designed to withstand the most powerful earthquake ever measured in the state.

QUESTIONS ABOUT THE TRACK RECORD OF US ECOLOGY'S NUCLEAR WASTE--DUMPING OPERATIONS

1. *Is it true that US Ecology, operating under a prior name, disposed of a large number of barrels of radioactive waste by dumping them near the Farallon Islands off San Francisco? Is it true that the EPA's monitoring data found a significant fraction of the US Ecology radioactive waste barrels were breached and leaking radioactivity?*

From 1946 through 1970, about 47,800 55-gallon drums and other containers of low-level radioactive wastes were dumped in the Gulf of the Farallones, west of San Francisco, California. According to a 1992 report prepared for the National Oceanic and Atmospheric Administration, NECO was one of three private companies licensed by the Atomic Energy Commission to dispose of radioactive waste in this manner.[20] The report also listed the sources of the waste as research organizations, universities, and federal defense facilities.[21] The contents of the waste containers consisted of material contaminated with radionuclides, including

[20]The report identified the U.S. Naval Radiological Defense Laboratory and two other private companies--California/Chevron Research Corporation and Ocean Transport Company--as others licensed to dispose of radioactive wastes at sea.

[21]The 1992 report lists the following organizations as sources of radioactive wastes for ocean disposal: California Research and Development Company; Lathrop Air Force Base; McClellan Air Force Base; Mare Island Naval Shipyard; Naval Air Station, Alameda; Naval Supply Annex, Stockton; Naval Supply Center, Oakland; Naval Radiological Defense Laboratory; San Francisco Naval Shipyard; Stanford Research Institute; and the University of California Radiation Laboratories at Berkeley and Livermore.

plutonium and cesium. The exact location and distribution of the drums on the sea floor is unknown because of inclement weather and navigational uncertainties.

According to the Geological Survey, there is apparently no definitive information about the levels of radiation at the site. Visual observations using remotely operated vehicles and submersibles show that many of the drums have ruptured and spilled their contents onto the sea floor. The conclusions of the studies that have been conducted to determine the levels of radioactivity vary on the significance of the contamination. Geological Survey officials told us it is impossible to evaluate the degree of risk from the limited data that are available. The Geological Survey, in cooperation with the British Geological Survey, the EPA, and the Gulf of Farallones National Marine Sanctuary, plans to measure the levels of radiation at the sea floor in the summer of 1998. The results from this project, the Geological Survey says, will allow EPA and the National Oceanic and Atmospheric Administration to assess the risk to resources and human health.

2. *Is it true that US Ecology, operating under a prior name, managed a radioactive waste facility at Maxey Flats, Kentucky? Did the design involve unlined trenches? Is it true that, despite predictions that migration would not occur for thousands of years, radioactivity migrated out of the trenches in approximately a decade? Is it true the facility is now closed and is a superfund site? Is it true that the taxpayers of Kentucky ended up paying for a large portion of the cleanup costs?*

In January 1963, NECO, (now known as US Ecology) entered into a lease agreement, wherein the Commonwealth of Kentucky leased the Maxey Flats property to NECO for 25 years, under an option to renew the lease for an additional 25 years. The state also granted NECO a license to operate the site. Waste was buried in 52 unlined trenches from May 1963 until December 1977.

During congressional hearings in 1976, the Geological Survey's Chief of the Office of Radiohydrology testified that waste managers at 3 of the 11 disposal facilities for radioactive waste, including Maxey Flats, reported radionuclide migration in excess of predictions.[22] According to the official, sites were intended to contain radionuclides for thousands of years, yet, in the first 12 years of operations, migration beyond expectations had been detected at several sites. At that time, he said, releases were not known to constitute a major health problem, but they did indicate that something had not worked as planned.

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[22]Hearings before a subcommittee of the House Committee on Government Operations, February 23, March 12, and April 6, 1976.

In 1976, the Kentucky legislature, in response to the Governor's growing concern over the press's characterization that the Maxey Flats facility represented a hazard to local people and the environment, imposed a tax on all waste received for burial. The purpose of the tax was to build a perpetual care and maintenance fund. According to the state, however, the tax made it uneconomical for most waste generators to ship their wastes to Maxey Flats for disposal. As a result, over 90 percent of the waste volume previously sent to Maxey Flats was diverted by shippers to other burial sites. The remaining waste was low-volume, high-activity waste that required large lead casks for shipment. As a result, the site continued to receive most of the curies of radioactivity that it received prior to the tax (from the low volume of relatively high-activity waste); however, the income from disposal operations dropped below operating costs, and the state received little related tax revenue.

Kentucky closed the site in 1977 and then purchased the remaining lease to the disposal operation from NECO. To stabilize the site, the state took several steps, including installing a plastic surface cover to limit rainfall into the trenches and intensive environmental monitoring to ensure that contaminants leaving the site posed no threat to human health and environment. The state considered these steps as temporary measures pending more permanent steps to correct the problems at Maxey Flats.

In 1986, EPA added the Maxey Flats disposal site to the National Priorities List of highly contaminated hazardous wastes sites under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended . CERCLA, commonly called Superfund, established a trust fund (also called the Superfund), financed primarily by taxes on crude oil and certain chemicals, for EPA to use to conduct cleanups and other activities. In general, when EPA uses funds in the Superfund for a remedial action (long-term cleanup), the state in which the cleanup occurs is responsible for 10 percent of the remedial action's costs, including all future maintenance. EPA estimates that Kentucky has paid about $10 million to clean up the Maxey Flats site. A Kentucky state official told us that the actual cost is greater than $10 million if monitoring, maintenance, and other costs are added.

Kentucky and others have conducted environmental-monitoring programs on and around the Maxey Flats site since before the start of the facility's operations. Some of the studies include the following:

- In 1972, state and federal agency tests detected an increased level of radioactivity at the site, and it was determined that a "release" had occurred.

- In 1974, Kentucky measured tritium, cobalt-60, strontium-89 and strontium-90, cesium-134 and cesium-137, plutonium-238 and plutonium-239 in the unrestricted area of the Maxey Flats site. The general conclusions of a report on these measurements were that (1) waste disposal operations were contributing radioactivity to the environment, (2) the radioactivity was not creating a public hazard, but (3) more intense monitoring activities were needed to determine the long-term significance of the findings.

- At the request of Kentucky's Governor, NRC conducted an independent radiological and hydrological assessment of Maxey Flats. In 1975, NRC reported that tritium and other radioactive materials were being released into the groundwater and the atmosphere, but the situation did not appear to have caused a significant public health problem.

- In a 1976 study, EPA concluded that plutonium had moved hundreds of feet from its original burial site in less than 10 years. According to the agency, samples collected in the unrestricted environment contained tritium, cobalt-60, strontium-89, strontium-90, cesium-134, cesium-137, plutonium-238, and plutonium-239 in concentrations greater than can be attributed to background radiation or fallout. The agency also concluded that, at that time, the movement of plutonium and other radioactive materials did not present a public health hazard and that the potential long-term effects of these contaminants is not known.

- Studies conducted by Kentucky and its contractors, NRC, and the Department of Energy since the 1970s identified at least four pathways to the off-site environment. The pathways include surface water runoff, atmospheric fallout, lateral movement of liquids from trenches through the soil, and the movement of liquids from the trenches through fractures in the surrounding rock.

- In 1992 and 1996, Kentucky's Radiation Control Branch concluded that analyses of test wells, soil moisture, seeps, and surface water indicated that water continues to accumulate in the trenches and exfiltration from the trenches continues to occur. The branch used computer models to evaluate the pathways that these materials follow to humans and calculated the related potential doses of radiation to humans. According to the state, the branch's calculations have shown very low exposures for all pathways and no exposures to the general public that exceed federal or Kentucky regulatory standards.

3. *Is it true that US Ecology, as the Nuclear Engineering Company, operated a radioactive waste facility at Sheffield, Illinois? Is it true that despite predictions that no migration could occur for thousands of years, the responsible*

*agencies found tritium migrating from the dump and contaminating nearby Trout Lake within a decade or so of the facility opening? Is it true that when the finding of contamination resulted in the company not receiving permission to expand operations, it abandoned the radioactive waste site, requiring the NRC and the state of Illinois to take legal action to force the company to return to the site and attempt to stabilize the leaking wastes? Is it true that the facility is also now closed? Is there ongoing remediation work at the site?*

According to the state of Illinois, in 1965, it selected California Nuclear, Inc., to build and operate a low-level radioactive waste facility in the state. California Nuclear operated the Sheffield facility until May 1968, at which time the company merged with NECO, and in 1981, NECO changed its name to US Ecology. Today, US Ecology, which is a subsidiary of American Ecology, Inc., is responsible for monitoring and maintaining the closed Sheffield waste disposal facility.

The Illinois Department of Nuclear Safety, which is responsible for radiation safety in the state, said that it is not aware of predictions that tritium migration would not occur for thousands of years at the Sheffield facility. In fact, the site criteria issued by the state's Department of Public Health in 1965 did not prohibit off-site discharges provided that maximum permissible concentration limits were not exceeded.

According to Illinois, the environmental monitoring of the Sheffield site started in 1967, and no radioactive material above natural background levels was found in any of the monitoring wells until 1976. At that time, tritium migrating in a narrow pathway extending to the northeast and terminating in Trout Lake was detected. Above-background levels of tritium were detected in Trout Lake in 1982. The movement of tritium in groundwater from beneath the site to Trout Lake was measured at a velocity of about 5 feet per day–about 600 times faster than California Nuclear, Inc., had predicted. According to the state, (1) the contamination remains localized and is diminishing, (2) the off-site migration of radionuclides from the Sheffield site has never exceeded the maximum permissible concentration limits, and (3) no known contamination of nearby drinking water supplies has ever occurred (and none is anticipated).

In 1975, NECO requested that NRC modify its license to permit compacted-fill trenches and, thereby, increase the capacity and lifetime of the 20-acre tract. In August 1977, while the modification application was being reviewed, NECO requested that its license be amended to permit the construction of a new trench–Trench 15–in the original tract. Subsequently, NRC denied NECO's request to expand disposal operations primarily because of the discovery of saturated and highly permeable sand and gravel deposits beneath the proposed location of

Trench 15 and additional disposal trenches. With the expansion application pending before, but not approved by, NRC and no disposal capacity available in other trenches, NRC's ruling on Trench 15 effectively led to the site's closure.

In 1979, NECO attempted to unilaterally terminate its state and federal licenses and the state lease.[23] According to Illinois, NECO also physically abandoned the low-level radioactive waste disposal site at that time. (A former official of US Ecology told us that the company never physically abandoned the Sheffield site because it continued to operate an adjacent hazardous waste disposal facility. Nevertheless, while US Ecology was not operating and maintaining the disposal site for radioactive waste, water from spring rains infiltrated disposal trenches.)[24] Both the state and federal regulators objected to the terminations of licenses and the state lease, arguing that NECO must first safely close the site. In addition, the state argued that its lease with the operator would expire in 2065 and that the lease could not be unilaterally terminated until then. This resulted in both federal and state litigation.

According to Illinois, NRC began an administrative proceeding that resulted in a decision that NECO must obtain NRC's approval to terminate the license. Also, Illinois brought a civil action against NECO in Bureau County, Illinois. In April 1979, the state obtained a preliminary injunction requiring NECO to return to and remain at the site until the litigation was finally resolved. The injunction also required NECO to take immediate action to pump and properly dispose of all water that had infiltrated the trenches and to restore and maintain the site. NECO complied with this order.

After about 10 years of negotiations, the state and US Ecology entered into a settlement agreement, approved in an order signed by the court effective May 25, 1988, that governed all of the company's responsibilities to the state regarding the Sheffield facility. According to Illinois, the agreed order specified that the facility operator purchase a buffer zone around the low-level radioactive waste site. The buffer zone is designed to impound the vast majority of radioactive material moving away from the site and restrict any movement beyond the buffer zone to

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[23]Disposal operations were regulated under the provisions of a license issued by the Atomic Energy Commission (NRC beginning in Jan. 1975). Illinois regulated the site under the provisions of a license and lease issued by its Department of Public Health.

[24]American Ecology commented that the problems with subsidence and localized infiltration of water at Sheffield were a consequence of soil instability, spring melting of snow, and rain, rather than neglect by the company. As soon as soil conditions allowed, it added, the conditions were corrected and the problems have not recurred.

levels below limits for discharge to unrestricted areas. The buffer zone at Sheffield includes Trout Lake. NRC's jurisdiction over the disposal facility ended on June 1, 1987, when Illinois became an agreement state. According to Illinois, the company has undertaken extensive actions to stabilize the leaking of wastes in accordance with the settlement agreement.

The last waste was buried at Sheffield in April 1978. In 1989, US Ecology began remediation and stabilization activities to prepare the site for long-term closure. In the fall of 1989, for example, US Ecology installed a new, low-permeability clay cap over all the waste trenches. According to the state, only minor maintenance activities have occurred since the completion of the work items addressed in the settlement agreement. There is no ongoing remediation work at the low-level radioactive waste facility, although remediation continues at the adjacent hazardous waste disposal sites.

Data collected by the state as of January 1997 indicate that closure activities specified in the agreed order are functioning as designed. According to the state, for example, the vast majority of the residual contamination is being contained within the buffer zone around the site where levels of contamination in both ground and surface water are decreasing. In addition, the slight levels of contamination that occasionally escape the buffer zone are rapidly diluted to levels indistinguishable from natural background. Hypothetical off-site doses, calculated by the state, are trivial and inconsequential. Actual off-site doses are non-existent.

Finally, according to the state, it sued American Ecology and US Ecology in November 1997 to enforce the terms of the 1988 settlement agreement. In particular, the state has asserted that the defendants' failure, since 1996, to comply with the monetary conditions of the settlement agreement precludes the defendants from leaving the site at the end of the interim maintenance period in May 1998. According to the state, American Ecology and US Ecology have admitted noncompliance with monetary conditions but have contested whether such noncompliance requires them to continue to maintain the site after May 1998. The companies have also asserted that should they be required to maintain the site beyond May 1998, the state must return $2.5 million paid by the defendants to the state under the settlement agreement, plus any accrued interest. Illinois opposes returning any money to the defendants. According to American Ecology, the judge hearing the state's suit has ruled that the companies must continue to maintain the site until they meet the monetary conditions of the settlement agreement. The judge also suggested, however, interest available on moneys the companies paid the state over the last 10 years should be used to defray the companies' costs.

4. *Is it true that US Ecology operated until 1992 a radioactive waste facility at Beatty, Nevada, utilizing unlined trenches?*

Yes. From September 1962 through December 1992, California Nuclear, Inc.--which became NECO and then US Ecology--received and disposed of in unlined trenches at the Beatty facility almost 5 million cubic feet of low-level radioactive waste.

*Is it true that despite predictions that no migration could occur for thousands of years, radioactive contamination has been found to have*

- *migrated off the property and all the way down to near groundwater?*

Radioactive contamination from the Beatty facility has been detected by the Geological Survey, which has been conducting basic research on arid soils at BLM-managed federal land adjacent to the southeast corner of the Beatty facility.

In 1994, the Geological Survey observed "greater than expected" amounts of tritium and carbon-14 in soils collected from a test hole about 350 feet south of the Beatty facility.[25] The Geological Survey confirmed these results by follow-up laboratory tests conducted in the summer of 1995.[26] According to the Geological Survey, the concentrations of tritium were well above the surrounding background levels at each of the 10 different depths measured from 18 to 357 feet below the surface and within the upper 112 feet for carbon-14. (The depth of the groundwater beneath the Beatty site is up to 370 feet.) Moreover, the Geological Survey said, both tritium and carbon-14 amounts from samples collected in 1995 were similar to, but consistently greater than, 1994 results where measurements at the same depths were made in both years.

The Geological Survey concluded that the detected tritium and carbon-14 could not be explained by fallout from atmospheric (atomic) bomb testing or natural generation from cosmic rays. The most obvious and plausible source of these radionuclides, the Geological Survey concluded, was the Beatty site. According to

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[25]According to the Geological Survey, a sample of groundwater collected from the test hole in September 1993, when the hole was drilled, had no measurable concentration of tritium.

[26]According to the Geological Survey, detected tritium concentrations in soil vapor were in the range of 100-3,000 picocuries per liter, except for larger concentrations (20,000-100,000 picocuries per liter) in shallow soils just outside the fenced southwest corner of the site. Although there is no regulatory limit on concentrations in soils, by way of comparison, EPA's drinking water limits for tritium are 20,000 picocuries per liter.

the Geological Survey, carbon-14 could have migrated in gaseous form through the soil from the Beatty facility; however, the evidence indicated that the tritium could not have migrated in this fashion but, more likely, migrated in liquid form. The Geological Survey speculated that the detected concentrations of tritium may be the result of the disposal of liquid wastes in trenches at Beatty and the practice of leaving some disposal trenches open for years until filled, allowing the accumulation and infiltration of precipitation. However, a review of records by one of the scientists conducting the Geological Survey's research showed that only 7 of the 22 trenches at Beatty were left open for more than 2 years. Nevertheless, the Geological Survey concluded that, because of the incomplete accounting of liquid waste disposal at Beatty, it is unlikely that the current tritium distribution and its evolution through time will ever be understood in detail.

Early in 1998, the Geological Survey released another report that, in part, stated that tritium concentrations in samples collected in May 1997 from the aforementioned test hole had increased substantially at depths of 189 feet and lower since the earlier samples had been collected. This report also described the results of 58 samples collected at a depth of about 5 feet beneath the surface from a grid within an area measuring about 820 feet by 820 feet. The Geological Survey found tritium concentrations above expected natural background levels throughout the grid, with the highest concentrations generally closer to the boundary of the Beatty facility. According to the Geological Survey, the combined lateral and vertical movements of tritium to deeper locations are not yet understood.

Since 1977, Nevada's Radiological Health Section, Health Division, has regulated the Beatty facility to ensure the site's safety. In December 1997, the health division accepted the transfer of US Ecology's license for the Beatty facility and the responsibility for long-term care and control of the facility. In preparation for this transfer, the radiological health section analyzed data on water samples, soil and vegetation, air, and gamma radiation-monitoring activities. According to the radiological health section, its review of 2,700 environmental samples collected by US Ecology, EPA, and other sources does not support the Geological Survey's findings of migration of radioactive materials in the vicinity of the Beatty site.

The radiological health section's analysis of over 1,300 water samples collected at the site from 1962 through 1997 led it to conclude, with one exception (see our answer to the next part of question 4), that there is no statistically significant indication of radioactive material from the buried waste or other man-made sources in any of the samples. The radiological health section concluded that the Beatty facility had not exceeded the applicable standard that releases of radioactive materials from the facility must not result in a dose to the general public in excess of 25 millirem per year. However, essentially throughout the

operating life of the Beatty facility from 1962 through 1992, measurements of groundwater, soils, or vegetation have periodically revealed levels of radionuclides that, while not exceeding applicable health standards, have been above levels established to serve as mechanisms to trigger further review and analyses.

– *and separately that groundwater contamination has been reported during various years as well?*

A water sample collected in October 1982 from a **new** well drilled near the southern border of the Beatty facility contained about 410,000 picocuries of tritium per liter of water. This amount is about 20 times more than EPA's drinking water limit of 20,000 picocuries per liter for tritium. Subsequent sampling, however, showed a continual decline in the concentration of tritium. Three months after the initial sampling, another water sample contained about 48,900 picocuries per liter. This measurement is more than twice the limit for the drinking water standard but is also more than an eight-fold reduction from the previous sample. After 18 months, a new sample had declined to 2,100 picocuries per liter, and by the end of January 1985--27 months later--no tritium was detected in a new water sample.

The reason for the detection of the tritium in such an amount followed by a steady decline in the amount detected remains unexplained. Various--but inconclusive--explanations for these measurements have been offered. For example, an October 1994 draft report prepared by an organization of state radiation control officials stated that "[t]he most probable hypothetical cause for the presence of tritium in groundwater includes the migration of tritiated water down to the groundwater from disposed waste as either a liquid or vapor . . . . "[27] In contrast, the view of Nevada's radiological health section is that the detected tritium was most likely introduced into the well through the well casing and that, however the tritium was introduced into the well, it was a one-time event. If the source of the tritium was a plume originating from the disposal trenches, the health division added, the concentrations would be expected to build up, fluctuate with several peaks, and then decline.

According to Nevada's radiological health section, a water sample collected on September 15, 1992, from another well showed a tritium concentration of 24,000 picocuries per liter of water. However, the radiological health section does not consider this result reliable because subsequent sampling did not indicate any tritium above minimum detectable levels.

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[27]Conference of Radiation Control Program Directors, *Inc., Environmental Monitoring Report for Commercial Low-Level Radioactive Waste Disposal Sites--October 1994.*

*Is it true that the company's employees over an extended period of time opened barrels of waste upon receipt, took out valuable contaminated tools and other items, and sold them in the nearby town, requiring EPA, when the violations were finally revealed, to go through the town with Geiger counters attempting to locate the radioactive items and retrieve them?*

Yes. From at least as far back as 1967 and until 1976, some of NECO's employees at the Beatty facility had opened waste containers and removed materials intended for disposal as low-level radioactive waste for personal use or sale to others in the nearby town of Beatty. Once NECO employees at Beatty had revealed these events to Nevada regulatory officials, an intensive recovery effort involving about 35 employees of NRC, the Department of Energy, EPA, and the state was carried out over 5 or 6 days--and at a lesser pace for several more weeks--to try to locate and retrieve the radioactive items. Subsequently, NECO replaced the manager of the Beatty facility and, over time, replaced other facility employees in an effort to upgrade qualifications. Also, by about 1977, the state had begun to make more frequent inspections of NECO's disposal operations.

*Is it true that the facility was closed at one point after U.S. Geological Survey scientists preparing a test shaft off the property ran into buried radioactive waste drums where they were not supposed to be?*

According to Nevada's Radiological Health Section, Health Division, in 1979, the state made a request for technical assistance to NRC concerning the assessment of soil and trench conditions. The Geological Survey had planned to dig a trench-tunnel complex from under the north end of the closed trenches to evaluate the soil conditions and the potential for the leaching or migration of buried radioactive material. The Geological Survey encountered five containers of radioactive waste in a near-surface underground area immediately north of the established disposal area and its fenced boundary. The Geological Survey's subsequent investigation led it to conclude that maps of the trench boundaries were inaccurate. In commenting on a draft of this report, American Ecology stated that the fence surrounding the established disposal area was constructed years after the barrels had been buried and that the disposal trench had been filled and capped.

5. *Is it true that "low-level" radioactive waste includes virtually everything from a nuclear reactor except the spent fuel?*

Yes. The Low-Level Radioactive Waste Policy Amendments Act of 1985 distinguishes between lower hazard wastes (classes A, B, and C) and higher hazard wastes (greater-than-class-C). States and interstate compacts are responsible for the disposal of waste classes A, B, and C in disposal facilities for low-level

radioactive wastes. The Department of Energy is responsible for disposing of greater-than-class-C wastes in a geologic repository.[28]

(a). *Is it true that low-level radioactive waste can contain every radionuclide found in "high-level" waste?*

Yes. NRC defines high-level radioactive wastes as (1) irradiated reactor fuel, (2) liquid wastes from solvent extraction cycles in facilities for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted. The Low-Level Radioactive Waste Policy Act Amendments of 1985 defines low-level radioactive wastes as materials that are not high-level radioactive wastes, spent (irradiated) nuclear fuel, or uranium/thorium mill tailings[29] and that are classified by NRC as low-level radioactive wastes in its regulations on the land disposal of radioactive wastes.[30] In effect, for the purpose of activities–and the wastes generated from these activities–regulated by NRC, any radioactive wastes that are not high-level are low-level. As a result, low-level radioactive wastes constitute a very broad category containing many different types and concentrations of radionuclides, including the same radionuclides that may be found in high-level radioactive wastes.

(b). *Is it correct that when plutonium, cesium-137, strontium-90 and similar materials are inside the fuel, they are high-level; and that when they leak out of the fuel, as happens during reactor operations, and are collected in filters and ion-exchange resins, these same materials are considered low-level and permitted to go to facilities such as Ward Valley?*

Yes. In addition to irradiated fuel (a form of high-level radioactive waste), nuclear power plants produce several forms of low-level radioactive wastes, including resins from water-cleaning equipment, filters and filter sludges, and lubricating oils and greases. If the concentrations of the radionuclides in these types of wastes meet NRC's waste classification requirements, the wastes may be disposed of in

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[28]10 C.F.R. part 61. Section 61.7(b)(5) states that there may be some instances where waste with concentrations greater than permitted for Class C would be acceptable for near-surface disposal with special processing or design. These instances will be evaluated on a case-by-case basis.

[29]Mill tailings are the wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

[30]10 C.F.R. part 61. Section 61.55 establishes various classes of wastes that are collectively referred to as low-level radioactive wastes.

facilities similar to the proposed Ward Valley disposal facility. (See our answer to question (c), below, for a discussion of waste classification.)

(c). *Is it true that Class C low-level radioactive waste is permitted to contain up to 4,600 curies of cesium-137 per cubic meter of waste, sufficient to produce a lethal dose to someone standing 3 feet away without intervening shielding in approximately 15 minutes?*

NRC defines three classes of commercially generated low-level wastes that can be buried in disposal facilities for low-level radioactive wastes.[31] Class A wastes contain the lowest concentration of radioactive materials, most of which have half-lives of less than 5 years. Class B wastes contain a higher proportion of materials with longer half-lives. Class C low-level wastes have the highest concentration of radioactive material. Table I. shows the maximum Class C concentrations that NRC allows to be disposed of in low-level waste facilities.

Table I: Class C Radionuclide Limits

| Radionuclide | Curies per cubic meter |
|---|---|
| Total of all radionuclides with half-lives less than 5 years | [a] |
| Hydrogen-3 | [a] |
| Cobalt-60 | [a] |
| Nickel-63 | 700 |
| Nickel-63 in activated metal | 7,000 |
| Strontium-90 | 7,000 |
| Cesium-137 | 4,600 |

[a]There are no limits set for these radionuclides in Class C wastes. Practical considerations, such as the effects of external radiation and internal heat generation on transportation, handling, and disposal, will limit the concentration for these wastes.

Under the limits established by NRC, American Ecology calculates that at a maximum Class C waste limit of 4,600 curies, unshielded cesium-137 would yield a

[31]See 10 C.F.R. 61.55.

lethal dose to 50 percent of a hypothetically exposed population at a 1-meter distance in approximately 20 minutes.[32] In commenting on a draft of this report, California's Department of Health Services stated that we should note that requirements provided under U.S. Department of Transportation regulations (49 C.F.R. 173.441), the Ward Valley License (especially Conditions 88 and 89), and US Ecology's Operating Procedures (Nos. 6, 38, and 70) "are designed to protect the public and/or workers through the use of shielding as needed." The department also stated that focusing on hazards presented by unshielded Class C waste is misleading because the public will not be exposed to such material. According to the department, burial in an engineered trench at a depth ranging from 25 to 42 feet provides more than adequate shielding to protect the public.

In commenting on the draft report, American Ecology noted that there are rigorous regulatory and administrative controls in place to ensure protection from radiation during transportation and disposal. Also, other factors ensure that radiation doses from disposed waste are inconsequential.[33]

Any concentrations of radionuclides in waste materials that exceed the limits for class C waste are defined as "greater-than-class-C-wastes." According to the Low-Level Radioactive Waste Policy Amendments Act of 1985 and NRC regulations for disposing of low-level radioactive wastes, DOE is responsible for disposing of greater-than-class-C-wastes in a geologic repository regulated by NRC. Thus, this class of wastes would generally not be permitted at the proposed Ward Valley disposal facility. In fact, US Ecology's license states that the company shall not accept radioactive waste unless each waste package has been marked as Class A, B, or C low-level radioactive waste.

(d). *Is it true that approximately 50 pounds of plutonium were buried at US Ecology's low-level radioactive waste facility at Beatty, Nevada; 80 pounds at its Richland facility; and 180 pounds at its Maxey Flats facility?*

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[32]According to staff of NRC, American Ecology's calculation is reasonable. American Ecology stated that its calculation is based on what health physicists refer to as the "LD50" dose level of 500 roentgens. The specific gamma ray constant for cesium-137 is 0.327 roentgens per hour, per curie, at a distance of 1 meter in air. This formula is as follows: 4,600 curies x 0.327 roentgens per hour = 1,504.2 roentgens. It would, therefore, take about one-third of an hour (20 minutes) to receive a 500-roentgen dose.

[33]According to American Ecology, when waste is disposed beneath 24 feet of soil, as required by the license, the intensity of gamma radiation at the surface is unmeasurably small when both shielding and distance are considered.

According to American Ecology, about 47 pounds of plutonium was disposed of at the Beatty, Nevada, facility. Also, US Ecology's December 1994 plan to stabilize and close its disposal facility for low-level radioactive wastes at Richland, Washington, states that approximately 450 pounds of plutonium was disposed of at that facility, including about 270.3 pounds of plutonium-239. Finally, about 140 pounds of plutonium was disposed of at the Kentucky facility.

(e). *Is it true that US Ecology's application projects 120 pounds of plutonium to go to Ward Valley? Is it true that US Ecology's license would permit the disposal of 120 pounds of plutonium at Ward Valley?*

Yes to both questions. However, separate studies by US Ecology, the Congressional Research Service, the Committee to Bridge the Gap,[34] and the Idaho National Engineering Laboratory conclude that the amount of plutonium that could be disposed of at Ward Valley could vary from as little as about 1 pound to as much as several hundred pounds.

US Ecology's initial license application and the April 1991 joint environmental impact statement estimated that less than 1 pound of plutonium would be disposed of in the proposed Ward Valley facility. According to the Congressional Research Service, controversy over the amount of plutonium that might be sent to the Ward Valley site emerged in 1994.[35] In January of that year, California's Department of Health Services stated that certain documents had been inadvertently omitted from the administrative record of the licensing proceeding on the Ward Valley facility. Among these documents was a new table listing the major radionuclides considered for analysis in the license application, including 3,448 curies--about 124 pounds--of plutonium-239.[36] This revised estimate of plutonium-239, according to US Ecology, was based on an analysis that NRC had prepared and used in developing its regulations on the land disposal of low-level radioactive wastes. US Ecology also contended that the higher estimate was intended to provide a

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[34]The Committee to Bridge the Gap is a public interest group specializing in issues related to nuclear safety, environmental protection, and preventing nuclear terrorism and the proliferation of nuclear weapons. The Committee opposes the development of the proposed Ward Valley disposal facility on safety grounds.

[35]California commented that higher estimates for plutonium were provided in places within the Ward Valley administrative record, such as in Table 6151-1 of US Ecology's 1989 license application.

[36]According to a report by the Committee to Bridge the Gap, 1 pound of plutonium-239 contains about 27.78 curies of radioactivity.

conservative case for licensing purposes instead of the amount of plutonium that might actually be disposed of at the site.

In commenting to our draft report, American Ecology Corporation said that US Ecology had never "projected" that 120 pounds of plutonium would go to Ward Valley. In the license application, according to the corporation, US Ecology projected the most likely amount of plutonium-239 for Ward Valley to be about 0.45 curies or 0.02 pounds; however, in the safety analysis of the site's performance, US Ecology used a conservative estimate based on NRC projections for decontamination available at that time (and later found by NRC and the Congressional Research Service to over estimate the amount by 100 times).

After examining US Ecology's data and methods for estimating an amount of plutonium, the Congressional Research Service generally agreed with US Ecology that the revised, larger projection was unrealistically high. According to the Congressional Research Service, NRC made an error in the original analysis upon which US Ecology had made its revised estimate. Correcting the error would reduce the estimated amount of plutonium bound for the Ward Valley disposal facility to about 1.3 pounds.

In 1995, a consultant to the Committee to Bridge the Gap statistically analyzed the potential amounts of plutonium that might be produced and disposed of at the Ward Valley facility from the wastes produced in decommissioning retired nuclear power plants. The consultant concluded that from about 142 to 22,629 curies–or from about 5 to 815 pounds–of plutonium could be produced from decommissioning nuclear plants located in the four states–Arizona, California, North Dakota, and South Dakota–that would be authorized to dispose of wastes at the Ward Valley facility. In 1996, DOE's Idaho National Engineering Laboratory performed a similar analysis that led the laboratory to conclude that the amount of plutonium that decommissioning these nuclear plants would produce could range from less than 1 to about 118 pounds.

6. *What did American Ecology's independent auditors conclude in the company's SEC 10-K filing for 1995 about the company's financial circumstances and prospects for continuing as a going concern? Were its financial losses for that year related to questionable investments in Tennessee and Texas?*

In American Ecology's 1995 annual report (Securities and Exchange Commission Forms 10-K and 10-K/A), independent public accountants concluded that there was substantial doubt about the company's ability to continue as a going concern. The accountants noted that the company had incurred significant losses from operations and write-downs of assets and as of December 31, 1995, had a working

capital deficiency of $16.1 million. Furthermore, although American Ecology had obtained capital contributions from certain of its directors and others and had restructured its credit agreement with its bank, the company continued to have limited cash resources available and had substantial obligations that were due in the future. Finally, the auditors concluded that American Ecology was involved in various significant permitting efforts, claims, lawsuits, and other administrative matters that were uncertain, including the company's Gibraltar Chemical Resources, Inc. (Winona, Tex.) and Quadrex Recycle Center (Oak Ridge, Tenn.) facilities.

In December 1994, American Ecology had purchased Gibraltar Chemical Resources, Inc., which is a 620-acre fuels blending and solvent recycling facility with two hazardous waste deep wells. Permit renewal filings were made for the facility under several environmental regulatory laws. The accountant's report noted that there is active local opposition to the renewal of permits for the facility. The accountants concluded that there could be a material adverse effect on American Ecology's financial position and operations if the permits are not renewed.

In 1996, American Ecology renegotiated the terms of its secured debt as part of its "turnaround plan." As a condition of the agreement with its bank, an additional $3 million of equity was raised prior to the agreement. According to the company, the renegotiated terms extended the maturity of the company's debt to December 31, 2000, and freed up additional working capital to support operations. In addition, American Ecology is required to use its best efforts to raise an additional $2 million of equity.

7. *What did American Ecology's independent auditors conclude in the company's SEC 10-K filing for 1996?*

The independent auditors made similar statements about the financial condition of American Ecology in 1996 and 1997 as it did in 1995. However, the auditors calculated that the company's working capital deficiency increased from $16.1 million to $16.9 million as of December 1997.

ENCLOSURE II

## COMMENTS FROM THE DEPARTMENT OF THE INTERIOR

Note: GAO comments supplementing those in the report text appear at the end of this enclosure.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

APR 27 1998

Ms. Gary L. Jones
Acting Associate Director
Energy, Resources and Science Issues
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Ms. Jones:

Thank you for the opportunity to review the draft report, "Radioactive Waste: Answers to Questions Related to the Proposed Ward Valley Low-Level Radioactive Waste Disposal Facility" (Report). In general, the Department of the Interior (Department) agrees with the findings in the Report. The Report sheds valuable light on a number of important issues relating to the California Department of Health Services request[1] to purchase Federal lands at Ward Valley to site a low-level radioactive waste facility.

Most of the Department's comments concern the history of negotiations between the Department and the State of California in 1995. The Report, in the introductory letter and in the section on Questions Regarding Federal Land Transfers to States, is inaccurate in certain respects.

The Report incorrectly states that the Department insisted during negotiations with the State of California that third party "beneficiaries," including project opponents, would also have the right to independently enforce the State's implementation of the National Academy of Sciences recommendations in court. The Department's position on this point is set forth in the draft Memorandum of Agreement (MOA) between the Department and California, an attachment to Deputy Secretary John Garamendi's letter of October 20, 1995, to Sandra R. Smoley, Secretary, State of California Health and Welfare Agency. A copy of the letter and MOA is enclosed. Paragraph 8 of the MOA states that the parties to the agreement are the State of California and the Department, and that all agreements, promises and commitments made "are specific to these parties." Paragraph 9 of the draft MOA states that the provisions of the agreement shall be specifically enforceable "by the parties . . . " There are no third parties involved.

In May 1995, the Secretary set forth in writing that he was prepared to move forward with the

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[1]Members of the California State Legislature recently raised questions in a letter dated April 14, 1998, to Secretary Bruce Babbitt regarding the authority of the California Department of Health Services under State law to purchase the lands at Ward Valley. These questions are under review.

transfer subject to receiving a binding commitment from the State that the additional safeguards recommended by the Academy panel would be carried out, among other conditions. Negotiations broke down when the State submitted an unacceptable proposal to the Department in September 1995 that explicitly provided that the State's commitments to carry out the National Academy of Sciences recommendations were unenforceable.

See note 1.

The introductory letter suggests that the reason for the Department's 1996 decision to prepare a supplemental environmental impact statement was the breakdown in negotiations between the Department and the State of California in September 1995. Shortly thereafter, in October 1995, the U.S. Geological Survey released new data regarding findings in the soil outside the perimeter of US Ecology's low-level radioactive waste facility near Beatty, Nevada. The new data "showed greater than normal concentrations of tritium and carbon-14 in soil gas samples" from a test hole near the Beatty site. The findings at the Beatty, Nevada site (considered by the State of California as an analog to Ward Valley), along with new issues, two executive orders, and volumes of information that had come to the Department's attention since 1991 when the environmental impact statement/environmental impact report (EIS/EIR) was prepared, resulted in the Department's decision in 1996 to prepare a supplemental environmental impact statement (SEIS). The introductory letter also should be clarified to reflect that there were no negotiations "subsequent" to the decision to prepare the SEIS and perform the tritium testing.

Aside from comments on the Report's discussions of negotiations between the Department and the State of California, the Department has some additional comments on the section entitled Questions Regarding Federal Land Transfers to States. In the discussion in response to Question 1, the Report states that the Bureau of Land Management (BLM) received nine letters and one petition opposing the direct sale of the Ward Valley site to the State of California. In actuality, the Department received more than 200 protests to the proposed sale described in the Federal Register Notice of Realty Action dated September 21, 1992, and never responded to the vast majority of these, notwithstanding the requirements of 43 CFR 4.450-2.

The Report tends to simplify the procedures required for a direct sale. The fact that the Secretary makes a finding that public objectives will be served by a sale does not obligate the Department to make a sale. There are other considerations involved, including meeting the direct sale regulations at 43 CFR 2711.3-3 and observing relevant executive orders.

The Response to Question 2 in this same section also incorrectly states that the BLM notified the California State Lands Commission that its original "in lieu" application was deficient. The application found wanting was filed on September 19, 1990, and was distinct from the Commission's original "in lieu" application filed in 1987.

ENCLOSURE II



In addition, certain other points in the Report should be clarified. The 1991 document prepared by the Federal and State governments was an environmental impact statement/environmental impact report -- not solely an environmental impact statement as referenced in the report. Also, critical habitat (as opposed to habitat) is the proper term for the lands designated under the Endangered Species Act for the desert tortoise.

Finally, the Department notes that the Report in the response to Question 2 of the section on Questions Regarding Federal Land Transfers to States fails to discuss the many events that occurred between the time when BLM published its Notice of Realty Action and Secretary Manuel Lujan signed a record of decision. One such event was the issuance by a Federal court of a temporary restraining order on January 8, 1993. This order restrained the Secretary from transferring any BLM land in Ward Valley.

Thank you for the opportunity to provide comments on the Report.

Sincerely,

John Berry
Assistant Secretary for
Policy, Management and Budget

Enclosure

Note 1 Interior's February 15, 1996, press release announcing its intention to perform tests at the Ward Valley site and prepare a supplemental environmental impact statement does mention the findings at the Beatty site, one of two executive orders, and "public concerns" that had arisen since the original environmental impact statement was issued. In addition, Interior directly tied the announced actions to the impasse in its negotiations with California. The press release states:

> "The State of California has officially objected to the Department's [land-transfer] conditions, which prompted today's action to do tritium testing and additional environmental assessment prior to proceeding with the land transfer."

ENCLOSURE III

## COMMENTS FROM THE STATE OF CALIFORNIA

STATE OF CALIFORNIA —HEALTH AND WELFARE AGENCY

PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
714/744 P STREET
P.O. BOX 942732
SACRAMENTO, CA 94234-7320

(916) 322-4992

April 20, 1998

Mr. John Bagnulo
U.S. General Accounting Office
441 G Street NW, Room 2440
Washington, D.C. 20548

Dear Mr. Bagnulo:

RADIOACTIVE WASTE: ANSWERS TO QUESTIONS RELATED TO THE PROPOSED WARD VALLEY LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY

The Department of Health Services (DHS) has reviewed the subject draft document, and offers the following comments:

Now on p. 2. Page 1, third line from the bottom – DHS and others do not agree with Interior that the infiltration study is a "key test". Please insert "what it considers to be" before the term, "key test".

Page 3, paragraph 2 – The issue of water collecting on the tops of buried waste barrels was considered by DHS; what was not considered was the suggestion that such could collectively form a continuous "perched water table". DHS considers this to be impossible, since barrels are round containers that are geometrically incapable of forming such a "perched water table". Furthermore, DHS did not consider upward migration of soluble radionuclides to be credible since it would violate fundamental principles of soil science and is refuted by the fact that peak concentrations of soluble chemicals at the site are found at a depth of six feet and not at the surface, which is where they would collect if such a process were occurring. Finally, neither DHS nor the National Academy of Sciences believe that lateral migration of radionuclides along buried caliche layers is possible. Please revise the text of this paragraph to reflect these comments.

Now on p. 3. Page 4, paragraph 1 – The last sentence of this paragraph is confusing. It is out of sequence and seems to incorrectly imply that, even after deciding to carry out a second SEIS, Interior was willing to transfer the land if the State would agree to "enforceable commitments" to carry out certain tests. In fact, DHS made several offers for an enforceable commitment to carry out the subject tests after Interior announced the SEIS, but the offers were rejected. To remove this implication, please move this sentence to the end of paragraph 2.

Now on p. 6. Page 7, first complete paragraph – The first sentence is misleading as written, since (a) most states plan to continue disposing of LLRW in existing unlined facilities, and (b) Texas does not plan to use a lined facility with a leachate collection system. Please replace the first sentence with the following text: "Both California and Texas have selected LLRW disposal facility designs that do not include liners or leachate collection systems. It should also be noted that most states plan to continue using the three existing LLRW disposal facilities for the forseeable future, none of which has these design features."

Now on p. 6. Page 7, second complete paragraph – The NRC and the States of California and Texas have both expertise in and responsibility for the disposal of radioactive materials, whereas the agencies which expressed a preference for trench liners have neither. Please revise the text to reflect this fact.

Now on p. 6. Page 7, partial paragraph at bottom – US Ecology was one of three commercial firms licensed by the AEC to perform ocean disposal operations. This is an important point, and should be reflected in the text.

Page 8, first complete paragraph –

Now on p. 6.
- The State of Illinois' comments on the lack of public health significance of tritium migration at the Sheffield site were much stronger than the text implies. Please replace the sentence that begins, "According to the State..." with the following sentence from page 52 of your report: "According to the State, (1) the contamination remains localized and is diminishing, (2) the off-site migration of radionuclides from the Sheffield site has never exceed the maximum permissible concentrations, and (3) no known contamination of nearby drinking water supplies has ever occurred (and none is anticipated)."

Now on p. 7.
- The first sentence which describes the migration of contaminants at Maxey Flats makes specific mention of plutonium, as though it occurs in higher concentrations or is inherently more dangerous than any of the other radionuclides detected. Unless this is the case, please delete it as a specific reference. Anti-nuclear activists like to perpetuate the popular myth that plutonium is the "deadliest substance on earth", and giving special attention to it in the text appears to buy into this misconception.

Now on p. 7.
- The second sentence which describes the migration of contaminants at Maxey Flats indicates that the state found that the leakage from Maxey Flats does not create a public health hazard, but does not mention that the NRC investigated the situation and concurs with this assessment. Please revise it accordingly. Also, some information on remedial actions undertaken at the site and the effectiveness of these actions would be helpful.

Now on p. 7. Page 7, bottom paragraph – The discussion of tritium and carbon 14 in the unsaturated zone at Beatty should clarify that these radionuclides were found in soil gas samples, not in groundwater, and that the groundwater samples collected at this location had no measurable concentrations of either tritium or carbon 14.

ENCLOSURE III

Now on p. 19. Page 21, Section (b) - please add the following: "DHS commented to us that this process was not considered because the science of soil physics and the mineralogy of the site demonstrate that such a process is not occurring. Under the extremely low moisture conditions found at the site, any water in soil pores is very tightly bound on soil particles and upward migration of solutes is impossible. In addition, DHS points to a well-documented concentration of natural soluble chemicals (e.g., chlorides) that occurs at a depth of approximately six feet. Were such materials being carried upward by a hydraulic gradient, peak concentrations would be found at the surface, not at a depth of six feet."

Now on p. 21. ıge 23, section (d) - please add the following: "However, DHS commented to us that this ggestion is conceptually absurd. The very term "perched water table" implies a body of water at least tens of feet in size. Since waste barrels are round, the largest such "perched water table" that could form would be the size of a barrel – about two feet in diameter. This would not constitute a "perched water table" in the common use of the term, nor would it impact facility performance."

Now on p. 23. Page 26, section (t) - please add the following: "DHS commented to us that it has reviewed Dr, Hayden's report and has found its conclusions regarding the Ward Valley project to be invalid. Furthermore, DHS commented that the financial aspects of the project are the sole concern of the licensing agency, and are not legitimately within the purview of the Department of the Interior."

Now on p. 35. Page 41, second paragraph, second sentence – Is June 1980 correct? Also, some discussion of how the issue was resolved would be helpful.

Now on p. 38. Page 45, section 2 – please replace "many states plan to continue using disposal facilities ..." with "most states plan to continue using disposal facilities...". This is more accurate since only California, Texas, and Nebraska are actively working on siting disposal facilities, to which a total of twelve states will have access. The remaining states will continue using existing facilities that have neither trench liners nor internally monitored vaults for their disposal areas.

Now on p. 40. Page 47, section 2. The first paragraph should also mention that the Maxey Flats site was selected the Commonwealth of Kentucky, not NECO.

Now on p. 41. Page 49. A paragraph describing remedial actions undertaken at Maxey Flats and their effectiveness would be helpful.

Now on p. 51. Page 62. Focusing on the hazards presented by unshielded Class C waste is misleading, because the public will not be exposed to such material. Although the discussion addresses precautions to be taken prior to and during disposal, it is important to note that burial in an engineered trench at a depth ranging from 25 to 42 feet also provides more than adequate shielding to protect the public.

Now on p. 53. Page 64, first complete paragraph – The text implies that the higher estimates for plutonium disposal were not released prior to 1994. This is not the case. The particular table cited from the

EIS and US Ecology's 1989 license application did not include a revised figure for plutonium, but the number was, in fact, given in other places in the administrative record (e.g., Table 6151-1 in US Ecology's license application for the Ward Valley facility). In fact, this very table is reprinted on page 34 of the 1992 CBG "Report of the Ward Valley Technical Review Panel" and correctly attributed to the 1989 US Ecology license application. Please revise the text to reflect this information.

Thank you for the opportunity to comment on this report. Please call me at (916) 323-3693 if you have any questions.

Sincerely,

Carl Lischeska

Carl Lischeska, P.E., Manager,
Low-Level Radioactive Waste Program

ENCLOSURE IV

COMMENTS FROM AMERICAN ECOLOGY CORPORATION

Note: GAO comments supplementing those in the report text appear at the end of this enclosure.

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**American Ecology**

April 17, 1998

Mr. Gary L. Jones
Acting Associate Director
Energy, Resources, and Science Issues
U.S. General Accounting Office
111 Massachusetts Avenue
Suite 201
Washington, D.C. 20001

Dear Mr. Jones:

As requested in your April 8, 1998 letter, American Ecology Corporation offers its comments on the General Accounting Office draft, Radioactive Waste: Answers to Questions Related to the Proposed Ward Valley Low-Level Radioactive Waste Disposal Facility.

It is apparent that considerable changes have been made to the earlier version of your responses. In several instances, specious arguments offered by project opponents are presented without providing readily available scientific information which discredits those arguments. In other cases, important context from earlier drafts has been deleted or altered in its meaning. If the final report selectively omits relevant information the General Accounting Office has at its disposal, it will call into question the accuracy, objectivity, and credibility of the final report. It could also lead some readers to erroneously conclude a Supplemental Environmental Impact Statement was needed to set various issues to rest. Nothing, of course, could be farther from the truth.

Given the new issues raised, we ask that you carefully consider our comments as well as those offered by the responsible state and federal radiation safety regulatory officials. Our specific comments follow:

1. Page 1, letter; first paragraph line 7: Please add "after Secretary Babbitt rescinded former Interior Secretary Lujan's January 1993 decision to sell the land to California" after "By the Fall of 1995".

Now on p. 2.

2. Page 3, letter. The final environmental impact statement considered a number of atmospheric release scenarios including the "bounding case" of an atmospheric release involving a hypothetical trench fire in which waste was burned. Potential

radiological exposure from "upward migration and release to the atmosphere of soluble radionuclides" is well within the more conservative bounding case, which did not exceed regulatory limits.

The National Emission Standards for Hazardous Air Pollutants ("NESHAP") Subpart I atmospheric release analysis conducted in accordance with US EPA guidelines confirmed that atmospheric release of soluble radionuclides is insignificant. To avoid misleading the reader, we suggest that the bounding case analysis and EPA results be summarized in the letter and presented in sufficient detail on pages 21-22 of Enclosure 1 to convey why this is not a significant concern. (See Attachment A)

Now on p. 2.

Now on p. 2.

3. Page 3, letter. Water collecting on top of waste barrels is not analyzed because it is not credible. At Ward Valley, barrels will be emplaced on their sides in lifts surrounded by free-draining, granular backfill. This operational requirement does not allow for the perching of water above the barrels. The same comment applies to page 23 of Enclosure 1, which should be expanded to explain the reason why this is an invalid concern.

Now on p. 4.

4. Page 5, letter. The response incorrectly reports that the National Academy of Sciences panel majority recommended new tests "before the monitoring of the disposal site begins." The recommendation was to test "during construction and operation of the site." (See Attachment B, page 5) Extensive monitoring of the site, including groundwater, has been underway since 1988.

5. Despite the apparent inference from the quotation from the March 7, 1994 internal company memorandum, US Ecology does not now nor did it ever consider the Beatty site facility an analog for the proposed Ward Valley facility. As stated in our October 17, 1997 letter to Mr. John Bagnulo, "The Beatty site was used as a conceptual analog for site selection purposes." Prospective performance assessment of the Ward Valley site is based on site specific data from Ward Valley, not Beatty. The genesis of the memorandum and reason for it are fully articulated in the December 19, 1994 letter to the State of California (Attachment C) to which it is an attachment. The resolution is summarized in our October 17, 1997 letter to Mr. Bagnulo.

Now on p. 31.

Clearly the quotation taken from the November 7, 1994 memo does not relate to findings by USGS as stated on page 37. USGS reports of those findings post dated the US Ecology memo by ten months.

Now on p. 6.

6. Page 7, letter. The draft incorrectly states that California is the only state planning disposal operations without a liner and leachate collection system. With regard to planned new facilities, the State of Texas is also planning an arid region facility which will not employ disposal unit liners. This is the only other new facility contemplated in an arid setting.

Letter to Gary Jones
April 17, 1998
Page 3

It should also be noted that all states currently planning to continue using existing disposal facilities will also pass on liner technology since none of the existing sites employ such systems. As written, the discussion suggests that only Southwestern Compact waste generators will use sites without liners when, in fact, it is entirely possible that all states' generators will use sites without liners.

In discussing the 1990 NRC comment on liners, it should be pointed out that the preamble to the agency's 10 CFR Part 61 land disposal regulations discourages liners [See Federal Register, Vol. 47., No. 248, 57446; December 27, 1982]. Further, correspondence from US NRC to California Regulatory officials (Attachment D) indicate specific guidance against the use of liners in Ward Valley. The California Department of Health Services - which is the duly authorize regulatory authority - also performed independent analysis of liners and rejected them.

Now on p. 6.

7. Page 7, letter. The draft incorrectly states US Ecology disposed of waste between 1946-1962. A predecessor company, Nuclear Engineering Company (NECO), disposed of waste between 1961-1962. NECO performed no such disposal prior to 1961.

Now on p. 6.

8. Page 8, letter; Enclosure 1, Page 54. In its report entitled Sheffield Low-Level Radioactive Waste Disposal Facility Closure Post Closure Performance, January 1997 (Attachment E), the Illinois Department of Nuclear Safety (IDNS) actually gave a stronger endorsement of site performance than is indicated on page 8. Enclosure 1 reflects this on page 54. The summary on page 8 should be changed to more accurately reflect Illinois' assessment.

Now on p. 43.

Now on p. 43.

Enclosure 1, Page 52, last paragraph. Temporary problems with subsidence and localized infiltration at Sheffield were a consequence of soil instability, and spring snow-melt and rain, not licensee neglect. Native soil material used as interim trench covers before permanent closure was unstable when saturated and susceptible to subsidence. To have attempted to correct problems during wet periods would have resulted in more instability. However, as soon as soil conditions allowed, construction problems with the interim cap were rectified. Since installation of a permanent clay trench cover, as stipulated in the closure agreement, problems have not recurred.

Now on p. 5.

9. Page 8-9, letter. The summary paragraph on Beatty juxtaposes a number of chronologically separate issues and particularly USGS observations regarding small concentrations of tritium and C-14 in the unsaturated zone, first reported in 1995, and observations in a saturated zone monitoring well in 1982 by US Ecology. Further events discussed on page 9 do not include follow up and resolution. These issues, with the exception noted in #5 above, are much better explained in Enclosure 1, pages 35-41.

Now on p. 13.

10. Enclosure 1 within item #5, Page 15. Please add the following after "or its impacts."

ENCLOSURE IV



(sixth line from top of page within item #5)

See note 1.

The U.S. Supreme Court has held that the standard governing an agency's decision to prepare a supplement to an existing environmental impact statement is based on a "rule of reason," and that an agency is not required to supplement an EIS every time new information comes to light. March v. Oregon Natural Resources Council, 490 U.S. 360, 373, 109 S. Ct. 1851, 1859 (1989). "To require otherwise would render agency decision-making intractable, always awaiting updated information only to find the new information outdated by the time a decision is made." Id.

See note 2.
Now on p. 13.

Please add the following clarifying sentence after "...systems and natural resources." within item #6: NEPA's purpose, however, is not to generate paperwork (40CFR 1500.1 (c)) and federal agencies are encouraged to emphasize "real environmental issues"; make their environmental analyses concise and clear (40CFR 1500.2 (b)); and reduce excessive paperwork and delay by using the scoping process for early identification of the real issues and de-emphasis of insignificant issues (40 CFR 1500.4 (g) and 1500.5(d)).

Now on p. 13.

11. Enclosure 1, Page 16. Please change response to read "If Interior decides to ..... Interior's decision can be challenged ..... a legal challenge might be (rather than "might have been") is speculative.

These changes are necessary in recognition of the fact that former Secretary of the Interior Manuel Lujan did transfer the land in January 1993.

See note 3.
Now on p. 33.

12. Enclosure 1, Page 39 (Item 2 continued from page 38). A letter dated February 14, 1996 (Attachment F) indicates that the US Geological Survey (USGS) agrees that Beatty data has no relevance to Ward Valley.

Now on p. 45.

13. Enclosure 1, Pages 54 last paragraph continuing through the end of the paragraph on the top of Page 55: It would be more accurate to re-write the first sentence of the last paragraph on page 54 as follows: The state sued American Ecology and US Ecology to avoid accepting the site as its responsibility at the conclusion of the interim maintenance period.

Now on p. 45.

The following should be added at the conclusion of the paragraph on the top of page 55: The judge hearing the state's suit has just ruled the companies must continue to maintain the site until they meet the monetary conditions of the settlement agreement. However, he also suggested interest available on monies the companies paid the state over the last 10 years should be used to defray the companies' costs.

Now on p. 51.

14. Enclosure 1, Page 62. The narrative in the paragraph under the table is correct but

neglects critical points articulated in our October 17, 1997 letter to Mr. Bagnulo. (Item 2, paragraph 2). There are the rigorous regulatory and administrative controls in place to ensure protection from radiation during transportation and disposal, and attenuation factors which ensure that radiation doses from disposed waste are inconsequential. When disposed beneath 24 feet of soil, as required by license, the gamma radiation attenuation factor would be enormous, about $8x10^{15}$. So, while the unshielded dose rate is 1504 Roentgens per hour at 1 meter, the dose rate is unmeasurably small when the attenuation factors due to shielding and distance are included.

Now on p. 53.

15. Enclosure 1, Page 63(e) and 64 first full paragraph. US Ecology never projected that 120 pounds of plutonium would go to Ward Valley. In the license application, US Ecology projected the most likely amount of Pu-239 for Ward Valley to be about 0.45 curies or 0.02 pounds. However, in the safety analysis of site performance, we used a conservative overestimate based on NRC projections for decontamination available at the time (and later found by US NRC and Congressional Research Service to overestimate specific activities 100 fold).

This was also discussed in our October 17, 1997 letter and was painstakingly explained to Senator Barbara Boxer, (D-Ca) in a letter dated March 30, 1994. (Attachment G)

Now on p. 53.

16. Enclosure 1, Page 64. First full paragraph third to last line please delete the word "not".

In conclusion, it is our overall observation that the latest draft response to Senator Boxer and Congressman George Miller is much less forthright and honest than your earlier draft response. While we recognize the political pressures brought to bear on the agency by congressional opponents of the Ward Valley project, we hope truth will not be compromised in your final report. Please feel free to contact me at (208) 331-8400 or Jim Shaffner at (916) 624-9316 if you have questions.

Sincerely,

JOE NAGEL

Joe Nagel

cc: Carl Lischeske, California Department of Health Services
Peter Baldridge, California Department of Health Services
Jim Shaffner, US Ecology California
Steve Romano

# TABLE OF CONTENTS


| ATTACHMENT | DESCRIPTION |
|---|---|
| A | Exerpts from EIR/S, US Ecology License Application, NESHAPS submittal to USEPA-Region IX, letter to Mr. Shelly Rosenblum dated 10/05/93, and scenarios. |
| B | George A. Thompson Opening Statement dated 05/11/95. |
| C | Letter to Carl Lischeske from James Shaffner, 12/19/94, (enclosures to letter are included). |
| D | Letters from:<br>• Carlton Kammerer to Mr. Don J. Womeldorf, dated 11/27/90<br>• Frederick W. Ross to Mr. Reuben Junkert, dated 02/21/91<br>• Steve Pardieck to Harvey F. Collins, dated 02/22/91 |
| E | Sheffield Low-Level Radioactive Waste Disposal Facility Closure and Post-Closure Performance, IDNS, January 1997 (provided by J. Shaffner). |
| F | Memorandum to Ed Hastey from Gordon P. Eaton, dated 02/14/96. |
| G | Letter to the Honorable Barbara Boxer from Steven A. Romano, dated 03/30/94. |

Note 1 No change. Our responses to this question and to question 3 are based on and supported by a review of relevant case law, including the Supreme Court case cited by American Ecology.

Note 2 No change.

Note 3 No change. The Geological Survey's views not germane to this question, which asks about positions taken by US Ecology and California.

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