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19. ABSTRACT (Continue on reverse if necessary and identify by block number)  A Public Meeting on the United States Air Force proposed plan for the clean-up of contamination at the BOMARC Missile Site, McGuire Air Force Base, New Jersey was conducted at Fort Dix, New Jersey on June 20, 1992. A summary of responses to comments provided at the Public Meeting is provided. Responses to written comments are provided. A transcript of the public hearing is provided as Appendix A. A copy of all letters provided to the United States Air Force are provided as Appendix B. The BOMARC Missile Site became contaminated in 1960 as the result of a fire which partially consumed a nuclear warhead-equipped BOMARC missile.					
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# RESPONSIVENESS SUMMARY

## BOMARC MISSILE SITE PROPOSED PLAN

NOVEMBER 1992

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## 1.0 INTRODUCTION

A Public Meeting on the U.S. Air Force proposed plan for the clean-up of contamination at the BOMARC Missile Site, McGuire Air Force Base, New Jersey was conducted at Fort Dix, New Jersey on June 20, 1992. A summary of responses to comments provided at the Public Meeting is provided in Section 2. Responses to written comments are provided in Section 3. A transcript of the public hearing is provided as Appendix A. A copy of all letters provided to the United States Air Force are provided as Appendix B.

**2.0 RESPONSES TO COMMENTS MADE AT THE  
PUBLIC MEETING FOR THE BOMARC MISSILE SITE  
PROPOSED PLAN,  
JUNE 20, 1992**

The comments have been summarized from transcripts of the Public Meeting which is provided as Appendix A.

**Comments of U.S. Congressman Jim Saxton**

**Comment 1:** The Air Force should ensure that excavation and hauling of soil in the area would not adversely affect human health and the environment.

**Response 1:** Implementation of the Preferred Alternative (Off-site Disposal) would require engineering controls to prevent erosion/suspension of contaminants during excavation. Mitigation measures are outlined in Section 4.6 of the Environmental Impact Statement. Air samplers would be used to monitor activities. Additional mitigation measures that would be used include: covering exposed piles of excavated dirt, restoring disturbed excavated areas, construction of perimeter controls around the excavated areas, fencing the threatened plants at the site, construction and use of a decontamination pad, limiting truck traffic during peak community hours, and development of a Health and Safety Plan specific to excavation activities. During the remedial design phase a complete mitigation plan would be developed. The plan will be provided to cognizant Federal, State, and local officials. Performance standards would be developed and incorporated into the remedial action contract.

**Comment 2:** The U.S. Air Force should ensure general safety and worker safety precautions observed during excavation of either On-site Treatment or Off-site Disposal options.

**Response 2:** Some of the mitigation measures for the Off-site Disposal Alternative are briefly described in item 1 above. The site specific Health and Safety plan to ensure general safety and worker safety and a site-specific mitigation plan will be developed prior to initiation of remedial action activities.

**Comment 3:** Where will the indigenous soil come from that would replace all excavated site soils?

**Response 3:** There is some indigenous soil left over onsite from grading operations associated with original site construction. These soils would be used to replace all excavated site soils.

**Comment 4:** When will remediation begin? How will the Low Level Radioactive Waste Policy Act deadline of January 1, 1993 affect disposal option?

**Response 4:** The issue that will most impact the Air Force's ability to make an independent decision regarding waste disposal is the Low-Level Radioactive Waste Policy Amendments Act (LLRWPA) governing interstate shipment and disposal of radioactive waste. The LLRWPA places the burden for low-level radioactive waste disposal with the individual states, or with compacts of states, and establishes a schedule for phased implementation. This act has already increased the cost of disposal at the licensed commercial sites through its provisions allowing currently sited states to levy waste surcharges. Costs are projected to escalate even more as states and compacts set fees to support their sites' operations. A more immediate issue affecting any decision is the scheduled closure of the commercial sites on January 1, 1993. On that date, another provision

of the LLRWPA takes effect that effectively closes existing commercial sites to generators outside the state or compact in which the site is located. As state and compact agreements now stand, waste generators in New Jersey will have no access to existing sites even if they remain open to member states within the sites' compacts.

All of the potential waste disposal sites have been identified and costs analyzed. Currently, the only cost-effective disposal site identified that can accept the BOMARC waste is a U.S. Department of Energy (DOE) facility. The Air Force will begin remedial design/remedial action upon notification that the DOE will accept waste or another equally cost-effective disposal site becomes available. The NEPA No Action Alternative would be implemented as an interim remedy until permission is secured from DOE for disposal.

**Comment 5:** There is concern that the NEPA No Action and Limited Action Alternative may help to turn the already contaminated site (as has been tried in the past) into a radioactive materials storage facility.

**Response 5:** In the event that the NEPA No Action Alternative is implemented, radioactive contamination would remain in place, and access controls and environmental monitoring would continue; containment structures would be maintained. NEPA No Action is an interim remedy that will allow the Air Force to secure a cost effective site for disposal of waste excavated from the BOMARC Missile Site. The Air Force is not considering turning the site into a radioactive materials storage facility.

**Comment 6:** There is concern that the area may be negatively perceived due to the fact that a nuclear waste site may remain in the area.

**Response 6:** If the NEPA No Action Alternative were implemented, contaminated materials would remain in place at the site, as they have since 1960. Implementation of this alternative would not be expected to alter present land use patterns in the area. Generally this conclusion is based on the remoteness of the site from adjacent nonmilitary properties, the agricultural and rural low-density nature of the existing development, and the lack of significant development pressure due to controls in regional and local land use plans and zoning ordinances. The Air Force's preferred site remedy is designed to reduce the source of site contaminants by off-site disposal.

**Comment 7:** There is concern that the cost will increase with time if remediation is delayed due to the lack of a viable disposal location.

**Response 7:** The comment is noted. The Air Force intends to dispose of the BOMARC Waste in a cost-effective waste disposal site. The current most likely option is a DOE facility. Costs for disposal at a commercial site are significantly greater than disposal at a DOE facility. The cost of disposing of BOMARC Missile Site waste at the commercial U.S. Ecology Hanford site is estimated to be \$24 million, whereas disposal at a DOE radioactivity waste disposal facility is estimated to cost \$7 million. Costs for disposal at a commercial site are expected to increase substantially by January 1, 1993, when the LLRWPA takes effect. Disposal of the BOMARC wastes at a commercial facility is not currently considered cost-effective.

The Air Force has no firm response from the DOE as to whether or not DOE will accept the BOMARC waste. It is the Air Force's understanding that the DOE will not consider acceptance of the waste unless the Air Force has been refused disposal permission at all available commercial sites. The Air Force has contacted all of the commercial disposal sites and the compacts. They have indicated that disposal of BOMARC Missile Site waste at their facilities is not an option.

**Comments of Mr. Ralph Bitter,  
Chairman of Plumsted Township Environmental Commission**

**Comment 8:** Is the \$30 million appropriated for this project is for this year only or will the project be funded for its lifetime?

**Response 8:** There is approximately seven million dollars available for the implementation of this project.

**Comment 9:** What is the projected timeframe to completion of the project?

**Response 9:** Once the Record of Decision is signed, it would take approximately 2 years to clean the site, assuming that a DOE disposal facility remains a viable disposal site.

**Comment 10:** What methods will be used to transport contaminated material off-site?

**Response 10:** Trucking has been selected as the preferred mode of transporting wastes. There are two main reasons to transport the wastes from the BOMARC Missile Site by truck rather than by rail or air: safety and the cost. The Department of Transportation and State regulations governing the transport of radioactive waste would be observed. The route selected would be the most direct and would use the interstate highway system to the maximum extent possible. The transport of radioactive waste by alternate modes of transport has been evaluated in other documents. Truck transport has generally been determined to be an acceptable mode. According to the U.S. Department of Commerce, truck transport is the most cost effective method of shipment. The unit cost of air transport is estimated to be substantially greater than the cost of truck transport. Either rail or air transport would require two additional transfers of waste material. The unit cost of rail transport is slightly lower than truck transport. However, rail transport would require two additional transfers of waste material which would increase cost and the potential for fugitive dust to escape to the environment.

**Comment 11:** How will the material be contained for transport?

**Response 11:** All contaminated materials would be transported in approved Department of Transportation containment. Different environmental media would be handled and packaged differently. On-site radioanalysis would be employed to limit the total amount of wastes designated for disposal as radioactive waste. In addition, separation of materials not requiring remediation from contaminated materials would be employed to limit the total amount of radioactive wastes. For example, on-site analysis would be used to scan concrete from Shelter 204 and the Concrete Apron/Drainage Ditch prior to final sectioning. Contaminated portions would then be sectioned away from uncontaminated portions. Uncontaminated materials would be left on-site. Handling procedures for each of the contaminated units are described below:

- **Shelter 204.** Shelter 204 would be sectioned, scanned with an appropriate radiation detection instrument and/or alpha detector and containerized for off-site transport. Materials found to be below threshold limits established in the Remedial Investigation/Feasibility Study would be left on-site. All demolition activities would be monitored using high-volume air samplers; data would be compiled at the end of each work-day. Engineering controls designed to minimize resuspension would be utilized. The maximum volume of waste material that would be disposed of estimated at 402 yd<sup>3</sup>, and transportation of this would be by truck to the disposal site.
- **Apron/Drainage Ditch.** The concrete apron would be sectioned and scanned with an appropriate radiation detection instrument to separate uncontaminated material prior to off-site disposal of the contaminated fraction. Concrete found to be below threshold limits established in the Remedial Investigation/Feasibility Study would be left on-site.

The maximum volume of concrete that could require off-site disposal is 356 yd<sup>3</sup>. There is an additional 1,120 yd<sup>3</sup> of asphalt cover in the drainage ditch with an expanded volume of 124 yd<sup>3</sup> that could require off-site disposal. All demolition activities would have engineering controls designed to minimize resuspension of radioactive contaminants, and all activities would be monitored using high volume air samplers. Transportation would be by truck to the disposal site.

- **Utility Bunkers.** Utility bunkers would be excavated, sectioned, scanned with an appropriate radiation detection instrument, and containerized on-site. The maximum volume that would require disposal as radioactive waste is estimated at 37 yd<sup>3</sup>.
- **Contaminated Soil.** Contaminated soil would be excavated using conventional excavation equipment. Continuous air monitoring would be performed in work areas, and engineering controls for dust suppression, such as spraying the soil with water, would be implemented. An estimated 6,200 yd<sup>3</sup> of soil would be excavated. Soil would be containerized on-site, loaded onto trucks, and trucked to the disposal site. All areas excavated would be restored to original grade, covered with topsoil, and replanted with species indigenous to the New Jersey Pinelands.
- **Missile Launcher.** The missile launcher and other metal debris would be excavated. The entire launcher, having an estimated volume of 5 yd<sup>3</sup> and an estimated weight of 2 to 3 tons, would require sectioning and disposal. All areas excavated would be restored to original grade, covered with topsoil, and replanted with species indigenous to the New Jersey Pinelands.

**Comment 12:** How will the material be prepared and loaded for transport?

**Response 12:** See response to item 11.

**Comment 13:** What provisions for containment on-site during the clean-up will there be to prevent airborne particles from escaping?

**Response 13:** Mitigations to insure airborne transport of soils during excavation are described in Section 4.6 of the Environmental Impact Statement summarized as follows:

- During excavation the following mitigation measures would be used to control soil erosion, decrease fugitive dust emissions, and lessen occupational and public health impacts:
  - Dirt roads, exposed storage piles, and off-road areas would be watered on an as-needed basis.
  - Activities would be curtailed during high-wind conditions.
  - Air samplers would be used to draw volumes of air through filters, and the filters would be analyzed for alpha activity daily in the field. If monitoring indicated resuspension of radionuclides, additional dust suppression techniques would be used. These corrective measures would include spraying the soil with water to minimize resuspension and changing operating procedures onsite to reduce dust resuspension.
  - Direct radiation surveys and/or soil sampling analyses would be used to ensure that appropriate controls are implemented to keep occupational doses within regulatory limits and As Low As Reasonably Achievable (ALARA).

- All active exposed piles would be watered and piles would be covered when not in active use.
- The excavated area would be replaced with clean fill, compacted to original grade, covered with topsoil (as needed), and replanted with locally indigenous flora as soon as feasible.
- Perimeter control measures including construction of silt fences, berms, diversion ditches, sediment traps, and retention basins would be used; activities would be staged to minimize the area of exposed soils during remedial activities and the potential for detachment and offsite transport of contaminated materials.
- Onsite sectioning of concrete would be performed outdoors. Strict engineering controls designed to prevent resuspension of contaminated particulates would be implemented. The concrete would be sectioned into manageable-sized pieces, and the layer of asphalt beneath the concrete would be removed. All water and fluids resulting from lubricating or cooling the sectioning equipment would be collected through a vacuum process and vented through a High-Efficiency Particulate Air (HEPA) filter to capture all particulate contaminants.
- Air samplers would be placed to monitor sectioning activities. If dust or airborne contaminants are generated, a separate vacuum blower would also be used to vent the air through HEPA filter.

A complete description of mitigation measures that would be implemented during the remedial action phase will be provided in the remedial design documentation.

**Comment 14:** What route, type of vehicle, and safety measures will be used during transport?

**Response 14:** A tentative transportation route has been developed from the BOMARC Missile Site to a DOE disposal facility. There are currently three operating commercial low-level radioactive waste disposal facilities in the nation licensed to receive the radioisotopes present as contamination on the BOMARC site. They are the Chem-Nuclear facility in Barnwell, South Carolina, and the U.S. Ecology facilities in Beatty, Nevada, and Hanford, Washington. An additional facility licensed for disposal of bulk materials and operated by Envirocare, Inc. located in Utah, has applied for an amendment to its license for plutonium and may also be available. Tentative routes have not yet been developed for the Washington or Utah sites.

The route, type of vehicle and safety measures will be finalized when the location of the disposal site has been determined. The U.S. Air Force would select the safest most cost effective route. Materials would be shipped in Department of Transportation approved containers.

**Comment 15:** What parameters define high and low level contamination?

**Response 15:** Low level transuranic wastes have activities of less than 100 nanocuries per gram (nCi/g), and high level transuranic wastes have activities of more than 100 nCi/g.

**Comment 16:** What proportions of these materials exist on the site currently?

**Response 16:** Of all whole soil grab samples collected during the Remedial Investigation, the highest activity observed was 14 nCi/g; all site contaminants sampled have been low level.

**Comment 17:** Local sources claim that Brindle Lake was contaminated during the BOMARC accident. Would the Air Force Examination Team examine this possibility?

- Response 17:** Brindle Lake is located on Fort Dix Military Reservation, 3¼ miles due west of the BOMARC Missile Site. It is not located within the Elisha Branch watershed. Thus, contamination would not be expected in Brindle Lake via surface water sediment transport. However, the Air Force will dispatch personnel from its Armstrong Laboratory to sample the lake.
- Comment 18:** If rejected by all the commercial sites, will the material definitely be accepted by the National Repository in Nevada?
- Response 18:** The Air Force has no firm commitment from the DOE as to whether or not the DOE will accept the BOMARC waste. The U.S. Air Force is currently attempting to negotiate that commitment with the DOE. It is the Air Force's understanding that the DOE will not consider acceptance of the waste unless the Air Force has been refused disposal permission at all available commercial sites. The U.S. Air Force is proceeding under the assumption that a DOE facility will accept the waste.
- Comment 19:** Does the remediation process extend to the silo itself?
- Response 19:** Yes. Shelter 204 would be sectioned, scanned with an appropriate radiation detection instrument and/or alpha detector and containerized for off-site transport. Materials found to be below threshold limits established in the Remedial Investigation/Feasibility Study would be left on-site. All demolition activities would be monitored using high-volume air samplers; data would be compiled at the end of each work-day. Engineering controls designed to minimize resuspension would be utilized. The maximum volume of waste material that would be disposed of estimated at 402 yd<sup>3</sup>, and transportation of this would be by truck to the disposal site.
- Comment 20:** In regard to the use of large caliber weaponry at the Fort Dix Firing Range, have you checked for or foresee any breach of containment due to the projectile impacts? Will this effect the longevity of the containment facilities?
- Response 20:** The BOMARC Missile Site and associated containment structures are located across Route 539 from and are well outside the Fort Dix Firing Range. Route 539 is a public highway and military training operations which involve projectiles and other weaponry are not conducted in the immediate vicinity of either the site or Route 539. Such military operations should not affect the longevity of the containment structures. Containment structures (asphalt and concrete) are inspected regularly and maintained by the Air Force.
- Comment 21:** During a proposed remediation process, what safeguards will be on place on-site and along the proposed transportation routes?
- Response 21:** Response 1 describes safety measures that would be employed to implement Off-site Disposal remedy. Extensive mitigation measures are associated with this alternative that would ensure that the health and safety of onsite workers or nearby residents is not compromised. These measures are described in Section 4.6 of the Environmental Impact Statement. These measures will be described in detail in the documents prepared during the remedial design phase. This documentation will include a description of the safeguards that would be utilized along the proposed transportation route.
- Comment 22:** What monitoring actions will be used to assure that no loss of containment is achieved?
- Response 22:** Excavation activities would be monitored with air samplers. The air samplers would be used to draw volumes of air through filters, and the filters would be analyzed daily for alpha activity in the field. If dust or airborne contaminants were generated, a separate vacuum blower would also be used to vent the air through a high-energy particulate air filter. Direct radiation surveys and/or

sampling analyses would be used to ensure that appropriate controls are implemented to keep occupational doses within regulatory limits and as low as reasonably achievable.

**Comment 23:** Could we be able to arrange for a demonstration of either the preferred alternative or the TRU-clean process in its final form so that we representatives of Plumsted accurately report on the procedures involved to our fellow citizens?

**Response 23:** The U.S. Air Force will prepare a detailed description of the actions associated with the offsite disposal remedy during remedial design and prior to initiating any action at the site. Documentation will be provided to cognizant Federal, State, and local officials. The Air Force does not intend to use the TRU-Clean process.

### **Comments of Mr. Ron Dancer, Mayor of Plumsted Township**

**Comment 24:** There is concern that waste that is across Route 539 may be disturbed by development at some point in the future.

**Response 24:** The Air Force has identified Off-site Disposal as the Preferred Alternative. Four areas across Route 539 would be remediated to the cleanup level documented in the Remedial Investigation/Feasibility Study. During any interim period of the areas would be fenced to restrict access.

### **Comments of Mr. Bruce Benner, New Jersey Department of Environmental Protection and Energy (NJDEPE)**

**Comment 25:** Although the New Jersey Department of Environmental Protection and Energy will submit formal comments, note that clean-up standards that are being proposed by the New Jersey Department of Environmental Protection and Energy are going to have a limit of  $10^{-6}$ .

**Response 25:** The New Jersey cleanup standards or health risk levels are proposed regulations, and thus are not potential state requirements, standards, criteria or limitations applicable or relevant and appropriate to the degree of cleanup required by law. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended requires onsite remedial cleanup levels comply only with state standards that have been promulgated [see 42 USC 9621 (d)(2)(A)(ii)]. Promulgated, as defined by implementing Environmental Protection Agency regulations, means the standards are of general applicability and are legally enforceable (40 CFR 300.400 (g)(4)). As these New Jersey standards have only been proposed, they are not effective or enforceable under state law [see 55 Federal Register 8666, 8746 (8 March 1990)].

Risk ranges and levels are not themselves applicable or relevant and appropriate requirements (ARARs) under CERCLA or Environmental Protection Agency's implementing regulations at 40 CFR Part 300, but rather relate to the requirement that all remedies selected be protective of human health and the environment [42 USC 9621 (b) and (d)(1)]. When cleanup standards, or ARARs, do not exist for a given site location, action, or chemical, or if they do exist but are not protective because they exceed a  $10^{-4}$  (1 in 10,000) excess cancer risk, then a cleanup level is to be established that falls within a cancer risk range of  $10^{-4}$  to  $10^{-6}$  (1 in 1,000,000), as set forth at 40 CFR 300.430 (e)(2)(i). The Air Force has applied these guidelines and based upon factors of uncertainty, technological limitations, exposure, current and plausible future land use, cost and cost-effectiveness, and implementability has selected a cleanup level corresponding to a  $10^{-4}$  health risk. The selected cleanup level is both protective of human health and the environment and complies with the requirements of CERCLA.

In a 15 July 1992 letter the U.S. Environmental Protection Agency Region II office transmitted to the Air Force its comments on our proposed remedial action plan and our identified radioactive contamination cleanup level. The Environmental Protection Agency specifically stated at page two of their comments that our cleanup level of 8 picocuries per gram of residual activity "...represents a lifetime cancer risk of  $< 10^{-4}$ , which is consistent with risk levels achieved at other site cleanups." The Environmental Protection Agency concurs, then, with the Air Force that our cleanup level, which achieves a  $10^{-4}$  risk level, is consistent with both applicable law and other site cleanup and risk levels.

### **Comments of Ms. Lucy Bottomley**

**Comment 26:** Please clarify the volume of waste to be transported.

**Response 26:** The various contaminated media (including soil and sediment, the concrete apron, the asphalt apron, the asphalt cover in the drainage ditch, Shelter 204, utility bunkers, and the missile launcher) are estimated to have a total expanded volume of 7,707 cubic yards.

**Comment 27:** Please clarify the waste disposal costs, transportation costs, and excavation costs.

**Response 27:** Detailed line item costs are provided in the feasibility study which is located at any of the document repositories (the Ocean County or Burlington County Public Libraries).

### **Comments of Mr. David Rall, Citizen of Lakewood, New Jersey**

**Comment 28:** There is concern for human health and safety at and near the site if the site is intentionally disturbed.

**Response 28:** See response to comments 1, 2, and 13.

**Comment 29:** There are several comments with regard to the nature and effects of plutonium:

- Plutonium is considered by many as the most dangerous substance ever handled by man due to its lethal capabilities and its extreme toxic longevity.
- Just a spoonful of plutonium dioxide particles, if dispersed in the air, is enough to kill millions of people. It also remains active for a long time.
- Plutonium must be contained with no leakage for thousands of years. One ounce of plutonium could cause a worldwide epidemic of lung cancer.
- Plutonium if exposed to the air ignites spontaneously. As it burns, it forms tiny particles of plutonium dioxide. One ounce of plutonium can form 10 trillion particles of plutonium dioxide which could remain in the atmosphere with lethal implications for hundreds of thousands of years.

**Response 29:** Knowledge of the delayed effects of low doses of radiation is necessarily indirect, because the incidence is too low to be observed against the much higher background incidence of similar effects from other causes. Hence, a relationship between health effect and radiation dose can only be estimated, based on observations made at much higher exposure levels, where effects have been observed in humans, and on animals through carefully conducted experiments. In the range of doses under consideration for the BOMARC Missile Site the incidence of resulting health effects is very small. There have been no direct measurements of increased cancer incidence rates for low-level radiation exposures. Consequently, these estimates are relevant only to the average

collective dose received by large populations of individuals and not to estimates of doses to individuals.

Because expected releases of radioactive material from the BOMARC Missile Site would be small and the projected radiation dose to any individual is small, the only effects considered are long-delayed somatic (cellular) effects. Acute radiation effects require exposures many orders of magnitude greater than those projected for BOMARC Missile Site remediation. The delayed effects considered in this assessment are potential excess fatal cancers of the lung, bone, and liver.

The pathway of primary concern for plutonium and americium is inhalation of contaminated particles. This is a consequence of three factors. First, these radionuclides are alpha particle emitters. Alpha particles have very short ranges in tissue and deposit their energy in small volumes. Second, the chemically inert actinide oxides remain in the lung for long periods of time. Finally, radioactive contamination at the BOMARC Missile Site exists in a form that is likely to produce respirable particles during clean-up activities.

Plutonium will ignite when exposed air. Plutonium at the site already ignited at the time of the fire, and is now in the form of an oxide as a result of ignition. It will not ignite again upon exposure to air. In addition, most of the plutonium oxide particles are capped beneath 4 inches of concrete and are strongly absorbed to the soil.

**Comment 30:** There is concern that 4 inches of concrete and asphalt presently at the site is insufficient; 30 inches is recommended.

**Response 30:** An additional thickness of concrete will not provide extra protection against alpha radiation and will not provide additional containment. The concrete and asphalt presently at the site is sufficient in thickness to adequately shield alpha radiation and to fix the contamination under a protective overburden. In the event that the NEPA No Action or Limited Action Alternative is implemented, the concrete would be inspected regularly and maintained as needed. The Air Force's preferred alternative is the off-site disposal of contaminants. This would eliminate perpetual maintenance of the concrete and asphalt.

**Comment 31:** The recommendation is made that "until a proof positive is devised that will readily enforce total eradication" of the contaminants, the site must not be disturbed, and continuous monitoring and security of the area must be maintained.

**Response 31:** Current management practices include access restrictions, maintenance of existing containment structures, and monitoring of site conditions. Monitoring of the area and additional access limitations will continue until the removal action is completed.

### **Comments of an Unidentified Participant #1**

**Comment 32:** Please discuss airborne plutonium particles and how they can be controlled.

**Response 32:** See response to comment 13. Movement of airborne particles can be controlled using a vacuum filter. Air monitoring would be conducted to ensure control of particulates. Wetting areas is an effective means of controlling dust and would be used during excavation activities.

## Comments of an Unidentified Participant #2

**Comment 33:** Was sampling only conducted only around the edge of the accident site? Are the samples representative of all the contamination including the most highly contaminated area? [This question has been significantly paraphrased.]

**Response 33:** Sampling was not conducted only around the edge of the accident site. The remedial investigation of the BOMARC Missile Site was conducted in order to determine the site distribution and concentrations of plutonium and its decay product americium in site soils, surface water, ground water, air and structural materials. This was done through a combination of background research on site characteristics and history, sampling/analysis of soil, surface water, ground water, air, and structural materials onsite, and various other surveys.

In many circumstances, sampling methods were used which were designed to measure worst-case radiation levels. Corings were taken through some of the most heavily contaminated portions of the concrete cap. Soil borings were installed primarily in areas of highest known radioactivity (exclusive of the concrete apron area) in order to ensure measurement of worst-case vertical contaminant migration. Borehole locations were selected by scanning areas of highest radioactivity (areas surrounding Shelter 204, drainage pathway, and others) with an instrument. "Hot-spots" were pin-pointed by lowering the instrument close to the ground. This soil core was rescanned with the instrument to ensure its radioactivity.

**Comment 34:** Were the samples taken for the treatment tests representative of the site (i.e., would the treatment technology TRU-Clean work?) [This question has been significantly paraphrased.]

**Response 34:** The pilot study results are described in a report entitle *Volume Reduction Research and Development Project (VORRP) Utilizing the TRU-Clean Process* (AWC, Inc., 1987). For this study, 18 55-gallon drums of soil from the area adjacent to the shelter, which is the area of highest contamination, were tested via the TRU-Clean process. However, soils in the drainage ditch were treated with oil soon after the fire accident occurred; these oil-stained soils have not been tested via the TRU-Clean process. This is one of the uncertainties associated with the On-site Treatment Alternative, and it is one reason that the Air Force has not selected On-site Treatment as the remedy.

**Comment 35:** On-site Treatment of soils ought to be considered.

**Response 35:** It was considered as an alternative, as described in the Environmental Impact Statement and Remedial Investigation/Feasibility Study, there are some drawbacks to this alternative. The treatment process cannot be used on some of the most contaminated site materials, like asphalt and concrete. The Air Force's selected remedy is Off-site Disposal.

**Comment 36:** There is concern that although plutonium emits alpha particles not strong enough to penetrate the skin, it causes internal bleeding in lungs or bone marrow cancer if inhaled or ingested.

**Response 36:** See responses 29 and 30.

**Comment 37:** Why did it take the Government so long to come to this point in addressing contamination at the site?

**Response 37:** Since the accident the Air Force has effectively contained the contamination at the site and has restricted access. Regular monitoring of the site has also been ongoing. However there are new technologies for handling, treating, and disposing of radioactive waste. The TRU-Clean process, for example, was only studied and tested in the late 1980s. Because the new treatment and

disposal alternatives are available, the Air Force wanted a detailed study of the site. The Feasibility Study was conducted in order to develop and evaluate all of the potential remedial alternatives. The Environmental Impact Statement was developed to assess all of the possible impacts of the alternatives to assist in the decision making process.

**Comment 38:** There is concern that in the future, the area may be disturbed by development.

**Response 38:** Implementation of the preferred alternative would return the site to a condition suitable for potential use. The Air Force will continue to monitor and restrict access to the site until remedial action is completed.

#### **Comments of an Unidentified Participant #4**

**Comment 39:** When sampling the area west of Route 539, why didn't the samplers take precautions against radiation contamination?

**Response 39:** All necessary precautions were taken, the levels in this area are not high enough to cause any exposure problems.

**Comment 40:** Can the Air Force speculate on the cause of the three geophysical anomalies that were outside the plan?

**Response 40:** Yes. The anomalies could represent the missing launcher and/or other metal shelter debris, buried drums, or utilities.

**Comment 41:** There is concern that the area across Route 539 is accessible to drivers or the public.

**Response 41:** See response 24. Access to this area will be restricted.

**Comment 42:** There is concern about the missing launcher. How did it get lost? Why is there no record of its location? Might the launcher have been taken to some remote location?

**Response 42:** The Air Force does not have all the records from events which occurred over three decades ago. Given this situation, the Air Force has attempted to locate the launcher by conducting geophysical surveys of the most likely burial locations in the area. The Air Force speculated that the launcher could be buried onsite, not too far from the shelter.

### **3.0 RESPONSES TO WRITTEN COMMENTS**

**JULY, 1992**

**Comments of Lauren Warner,  
Manchester Township,  
Vice Chairperson, Environmental Commission, letter dated July 2, 1992**

- Comment 1:** We support the preferred alternative because it addresses cleanup of the site and will permanently reduce the source of contamination at the site.
- Response 1:** Comment noted. As indicated by the Record of Decision, the Air Force has selected Off-site Disposal as the remedy and will continue to restrict access to the site until that remedy can be implemented.

**Comments of Theresa Lettman,  
Pinelands Preservation Alliance,  
Project Manager, Monitoring Network, letter dated July 3, 1992**

- Comment 1:** We are opposed to Alternatives #1 and #2 because they do not address cleanup of the site. Alternative #3 addresses only a limited amount of contaminated materials and does not address cleanup of the entire site.
- The two remaining Alternatives #4 and #5, address the same amount of cleanup. One method treats the soils with any sources less than 8 picocuries per gram being returned to the site. The other does not excavate any sources that are below the 8 picocuries per gram. The difference between the two would appear to be the amount of activity and construction on site that would be required to accomplish this, with Alternative #4 requiring the greater amount.
- We support the preferred Alternative #5 because it doesn't require additional construction or disturbance to the site area. Also, it will permanently reduce the source of contamination at the site.
- Response 1:** Comment noted. As indicated by the Record of Decision, the Air Force has selected Off-site Disposal as the remedy and will continue to restrict access to the site until that remedy can be implemented.

**Comments of Roman S. Luzacky,  
New Jersey Department of Environmental Protection and Energy,  
Section Chief Bureau of Federal Case Management, letter dated July 3, 1992**

- Comment 1:** The proposed New Jersey Cleanup Standards utilize a health risk basis of  $10^{-6}$ . Remediation to a health risk level of  $10^{-4}$  is not acceptable.
- Response 1:** The New Jersey cleanup standards or health risk levels are proposed regulations, and thus are not potential state requirements, standards, criteria or limitations applicable or relevant and appropriate to the degree of cleanup required by law. The Comprehensive Environmental Response,

Compensation, and Liability Act (CERCLA), as amended requires onsite remedial cleanup levels comply only with state standards that have been promulgated [see 42 USC 9621 (d)(2)(A)(ii)]. Promulgated, as defined by implementing Environmental Protection Agency regulations, means the standards are of general applicability and are legally enforceable (40 CFR 300.400 (g)(4)). As these New Jersey standards have only been proposed, they are not effective or enforceable under state law [see 55 Federal Register 8666, 8746 (8 March 1990)].

Risk ranges and levels are not themselves applicable or relevant and appropriate requirements (ARARs) under CERCLA or Environmental Protection Agency's implementing regulations at 40 CFR Part 300, but rather relate to the requirement that all remedies selected be protective of human health and the environment [42 USC 9621 (b) and (d)(1)]. When cleanup standards, or ARARs, do not exist for a given site location, action, or chemical, or if they do exist but are not protective because they exceed a  $10^{-4}$  (1 in 10,000) excess cancer risk, then a cleanup level is to be established that falls within a cancer risk range of  $10^{-4}$  to  $10^{-6}$  (1 in 1,000,000), as set forth at 40 CFR 300.430 (e)(2)(i). The Air Force has applied these guidelines and based upon factors of uncertainty, technological limitations, exposure, current and plausible future land use, cost and cost-effectiveness, and implementability has selected a cleanup level corresponding to a  $10^{-4}$  health risk. The selected cleanup level is both protective of human health and the environment and complies with the requirements of CERCLA.

In a 15 July 1992 letter the U.S. Environmental Protection Agency Region II office transmitted to the Air Force its comments on our proposed remedial action plan and our identified radioactive contamination cleanup level. The Environmental Protection Agency specifically stated at page two of their comments that our cleanup level of 8 picocuries per gram of residual activity "...represents a lifetime cancer risk of  $< 10^{-4}$ , which is consistent with risk levels achieved at other site cleanups." The Environmental Protection Agency concurs, then, with the Air Force that our cleanup level, which achieves a  $10^{-4}$  risk level, is consistent with both applicable law and other site cleanup and risk levels.

An additional issue involves the technical implementability and cost effectiveness of using the  $10^{-6}$  risk level as a basis for establishing cleanup levels. Substituting this risk level into our current risk assessment methodology results in a soil cleanup level of 0.08 picocuries per gram of plutonium, a level that is considered less than the average U.S. background plutonium level resulting from atmospheric testing. Cleanup to a level of less than background is technically impossible, and cleanup to a level even approaching background would be cost prohibitive.

**Comment 2:** The issue of chemical contaminants at this site was to be evaluated by a parallel investigation (the Installation Restoration Program). This investigation was cancelled due to a lack of funding. The presence of chemical contaminants on site must be addressed.

**Response 2:** The investigation will continue pending funding authorization.

**Comment 3:** Page 1, Paragraph 2: The plutonium loss was described as "a small amount". This contradicts the Remedial Investigation/Feasibility Study (page ES-1, paragraph 5) which states "a substantial amount of plutonium was exhausted from Shelter 204 during the incident". The description that the loss was substantial is supported in the Remedial Investigation/Feasibility Study which indicates that up to 300 grams of weapons grade plutonium was involved (Section 4.1.5.3.2, paragraph 3). The characterization of the loss as "small" should be corrected.

**Response 3:** The requested wording change will be made with no effect on the conclusions drawn from the documents, since all parties understand that 300 grams is the maximum estimated amount of plutonium unrecovered after the accident, as stated in the documents.

**Comment 4:** Page 1, Paragraph 5: The proposed plan does not comply with "applicable state cleanup standards". This statement must be amended accordingly.

**Response 4:** See Response to #1 above. As previously discussed, the plan does comply with all state identified cleanup standards that constitute potential applicable or relevant and appropriate requirements, standards, criteria or limitations under CERCLA. CERCLA requires that state requirements be promulgated (42 USC 9621(d)(2)(A)(ii)). The state cleanup standards referenced in the NJDEPE's comments are proposed regulations and therefore are not promulgated and do not constitute "applicable state cleanup standards" that the proposed plan and remedy are required to comply with by law. Additionally, risk levels are not applicable or relevant and appropriate requirements but rather relate to the complimentary but distinct requirement that the degree of cleanup be protective of human health and the environment.

**Comment 5:** Page 3, Nature and Extent of Contamination: Information provided in the Remedial Investigation/Feasibility Study report and Environmental Impact Statement were inconclusive regarding the presence of weapons grade plutonium in groundwater at the site. Information on general groundwater quality (e.g., oxidation/reduction potential; dissolved oxygen and total organic carbon) was not provided so an evaluation of colloidal transport of weapons grade plutonium, if any, in groundwater could not be performed. A monitor well was not installed and sampled in the ponded area which received significant amounts of runoff during and after the fire fighting activities. Surveys have detected significant levels of radioactivity in soils in this area.

In order to evaluate this area, a supplemental Remedial Investigation work plan for groundwater must be submitted to the Department.

**Response 5:** The Air Force believes that data presented in the Environmental Impact Statement and the Remedial Investigation/Feasibility Study are sufficient to demonstrate that groundwater at the site has not been impacted by radionuclides. The additional information requested by New Jersey Department of Environmental Protection and Energy (redox potential, dissolved oxygen, total organic carbon) could at best provide an approximation of a very complex system and an imprecise prediction of the likelihood of colloid formation. Please note that the Air Force solicited and received input from New Jersey Department of Environmental Protection and Energy and Environmental Protection Agency Region II regarding the scope of groundwater sampling efforts. This item was discussed during a Technical Review Committee meeting held on April 13-14, 1989. The Air Force implemented all groundwater monitoring recommendations made by New Jersey Department of Environmental Protection and Energy and Environmental Protection Agency, and no radionuclides were detected. We believe that the empirical sampling data presented in the Remedial Investigation/Feasibility Study report is a much more reliable indication of the presence/absence of plutonium in groundwater (colloidal or dissolved) than any predictive model that could be employed, given the large number of variables that affect the system. Some of these variables, such as redox potential, are difficult to accurately determine, further reducing the accuracy and utility of predictive modelling.

Data reported in the Remedial Investigation/Feasibility Study indicating that plutonium is not affecting groundwater are as follows:

- **Groundwater Sampling Data.** If plutonium was being transported in groundwater in detectable quantities as colloidal plutonium or adsorbed to colloidal material such as iron oxide, it would have been detected in both unfiltered and filtered samples collected, since the pore spaces in the filters are much larger than the normal size range of colloids. No plutonium was detected. Filters were also analyzed with no plutonium detected. Laboratory analysis of groundwater is empirical data and is considered much more conclusive than any predictive model that could be employed.

- **Borehole Soil Analysis** of the most contaminated soils onsite demonstrated that most of the plutonium in soils was concentrated in the upper 1-2 feet of the soil column, with very little plutonium migrating as deep as 10 feet below grade. The water table averages approximately 40 feet deep in these areas. The extremely low solubility of plutonium oxides and their very strong affinity for soil particles are well documented in the literature. Laboratory analyses of soil cores showing very little vertical migration of plutonium in the soil column, coupled with well-documented tendencies of plutonium oxides to remain immobile in the soil environment strongly indicate that there is no pathway present at the site for plutonium to enter groundwater.
- **Concrete Coring** indicates that plutonium has not migrated to soils beneath the concrete apron, where much of the site inventory of plutonium remains immobile.

The portion of the comment requesting a monitoring well west of Highway 539 ("ponded area") was submitted to the Air Force previously, and the Air Force formulated a response explaining why no further monitoring west of Highway 539 was required. This response was forwarded to New Jersey Department of Environmental Protection and Energy in December 1991. A meeting was held for the purpose of resolving this and other comments on 9 January 1992, in Edison, New Jersey. This meeting was attended by New Jersey Department of Environmental Protection and Energy, Environmental Protection Agency Region II, Environmental Protection Agency Headquarters, and the Air Force. At that time, New Jersey Department of Environmental Protection and Energy was in possession of the Air Force response indicating that no further monitoring west of Highway 539 was required, and laying out the rationale for the Air Force position. New Jersey Department of Environmental Protection and Energy did not raise the issue during the meeting, which the Air Force interpreted as agreement with our rationale for no further monitoring west of Highway 539. The previously stated Air Force position on monitoring west of Highway 539 is still considered valid. The original comment and the Air Force response are repeated verbatim below:

Original New Jersey Department of Environmental Protection and Energy Comment:

"A shallow monitor well must be installed downgradient of ponding area. This well must be sampled for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), Target Analyte List (TAL) inorganics, total dissolved solids (TDS), gross alpha, gross beta and PU-239 using alpha spectroscopy. Both filtered and unfiltered samples must be collected for the inorganic analysis. (The installation and sampling of this monitor well may be included in the ongoing Remedial Investigation/Feasibility Study for McGuire AFB rather than the BOMARC site Remedial Investigation/Feasibility Study)."

Original Air Force Comment:

"Chemical contamination at the site is the subject of a separate ongoing investigation. We do not agree that there is currently a need for groundwater monitoring for radioactive contaminants on the southwestern portion of the site. During a Technical Review Committee meeting held on April 13-14, 1989 and attended by Environmental Protection Agency and New Jersey Department of Environmental Protection and Energy, the Air Force solicited and received input on groundwater monitoring efforts. As a result of that meeting, it was agreed to sample ten monitoring wells in the vicinity of Missile Shelter 204, where the bulk of radioactive contaminants are found. This sampling has been accomplished. A separate issue raised, which involves resampling of the ten wells to determine the specific radionuclides causing elevated gross alpha activity, may be a valid issue, and the Air Force is currently considering options to accomplish this. We believe that this follow-up sampling should be accomplished to determine whether the elevated gross alpha activity is, in fact, caused by naturally-occurring radionuclides, as we currently believe. If this is the case, and no radionuclides attributable to the missile accident are detected in wells surrounding

the most heavily contaminated area onsite (the shelter 204 area), then there is no need to investigate groundwater in the much less significant potential source area located on the southwestern portion of the site."

The follow-up sampling mentioned above was completed as documented in the Remedial Investigation/Feasibility Study. No radioactive groundwater contamination attributable to the missile accident was detected in the most heavily contaminated areas onsite, so follow-up investigation in the minor source area west of Highway 539 is not required.

In summary, the Air Force does not believe that the Remedial Investigation/Feasibility Study and Environmental Impact Statement are inconclusive regarding the presence of plutonium in groundwater, and does not believe that the additional studies requested by New Jersey Department of Environmental Protection and Energy would significantly add to our knowledge of the site.

**Comment 6:** Page 3, Paragraph 5: This paragraph implies that little movement potential for the plutonium exists. This is seemingly contradictory to Section 4.1.5.2.1, paragraphs 2 and 3 in the Remedial Investigation/Feasibility Study which imply or state "movement to and out of the ponding area has probably taken place during major storms since the ditch was asphalted."

**Response 6:** The Air Force does not believe that the two portions of the documents cited are contradictory. Page 3, paragraph 5 of the Proposed Plan addresses the bulk of contaminants found in various media at the site, including contaminants found on Shelter 204, beneath the concrete apron, beneath the asphalt-covered portions of the drainage ditch, and in shallow soils. As documented in the Remedial Investigation/Feasibility Study, sampling of these various media has shown little movement of contaminants since the accident occurred, and in some cases (e.g. the concrete apron) very good containment of contaminants.

The paragraphs referenced from the Remedial Investigation/Feasibility Study do not address contaminated site media collectively as does page 3, paragraph 5 of the Proposed Plan, but only address shallow soils in the un-asphalted portion of the drainage ditch. While this area is in fact contaminated, levels of contaminants are slight compared to those found in and around Shelter 204, the concrete apron, and the asphalt-covered portions of the drainage ditch. Therefore, although some movement of contaminated soils may have occurred in this area after the accident, the generalized statement made in the Proposed Plan regarding the bulk of site contaminants is valid and is not contradicted.

**Comment 7:** Page 4, Summary of Health and Environmental Risks: The evaluation of the potential risks to future onsite residents did not include the potential risk of unrestricted use of groundwater at the site. Insufficient information was provided in the Remedial Investigation/Feasibility Study to determine if weapons grade plutonium is present in groundwater. The most abundant isotope of weapons grade plutonium has a half-life of approximately 24,000 years. It is uncertain if site access restrictions can be maintained for that period of time. The New Jersey Department of Environmental Protection and Energy requests can be maintained for that period of time.

**Response 7:** The Air Force does not believe that insufficient information was provided in the Remedial Investigation/Feasibility Study to determine if weapons grade plutonium is present in site groundwater. (See response to #5, above). Groundwater was sampled, with no weapons grade plutonium detected. Therefore, for purposes of baseline risk assessment, the groundwater pathway is considered incomplete, and does not require evaluation. Since plutonium is almost totally immobile in soil and groundwater, the groundwater pathway will remain incomplete in the future.

Since the preferred alternative involves source removal, the uncertainty of maintaining site access restrictions for 24,000 years is not an issue. If cost-effective disposal sites are unavailable, the

waste will have to remain onsite, in which case institutional controls, although difficult to guarantee for 24,000 years, are the only feasible option.

**Comment 8:** Page 5, Cleanup Levels: Cleanup levels for groundwater, surface water and air were not established since "no concentrations of radionuclides attributable to the missile accident were detected in" these media. A supplemental Remedial Investigation to investigate the presence of weapons grade plutonium in groundwater at and near the site must be completed to determine where plutonium found in some wells during the first round of sampling was the result of the drilling operation or if it is indeed in groundwater at the site. If present, cleanup levels for weapons grade plutonium must be developed using the Department's proposed Cleanup Standards for Contaminated Sites and the maximum contaminant levels for radionuclides contained in the New Jersey Safe Drinking Water Act (NJAC 7:10-1 *et seq.*). The cleanup levels must be protected of a Class I-PL (Pinelands Preservation Area) aquifer.

**Response 8:** The Air Force does not believe that a supplemental groundwater investigation is required (see response #5, above). The "first round of sampling" referred to in the comment was not part of this Remedial Investigation/Feasibility Study, but was part of a previous investigation. Groundwater was re-sampled during this Remedial Investigation/Feasibility Study, with no plutonium detected. Therefore, additional sampling is not required.

**Comment 9:** Page 9, The Preferred Alternative: The U.S. Air Force prefers to dispose of the BOMARC waste in a DOE low-level radioactive waste facility. This alternative is acceptable provided that a supplemental Remedial Investigation work plan for groundwater is submitted to the Department.

**Response 9:** The Air Force believes that a supplemental groundwater investigation would be redundant and unnecessary. See response to comment #5, above.

**Comment 10:** Page 10, Paragraph 2: The Air Force is apparently reserving the right to modify the results of the Remedial Investigation/Feasibility Study process at some time in the future based on its own to-be-developed evaluation of the cost-effectiveness of the preferred alternative. This is questioned on the basis that cost analysis is already a part of the Feasibility Study. The Feasibility Study figures should be sufficient to evaluate the cost-effectiveness of the alternatives and this analysis should have already been a part of the process in which the Air Force identified the preferred alternative.

**Response 10:** Cost analysis is, in fact, currently included in the Remedial Investigation/Feasibility Study. Currently, the only cost-effective disposal site is a U.S. Department of Energy (DOE) disposal facility. If costs for disposal at a DOE facility should rise due to unforeseen circumstances, then the Air Force would have to re-evaluate the cost/benefits of the preferred alternative. The cost-effectiveness of alternatives was evaluated based on current costs, which may change radically after January 1, 1993, when the LLRWPA takes effect.

**Comment 11:** Page 10, Paragraph 4: The excavation of source material at 8 picocuries per gram will not address the ponding area on the other side of Route 539 which is the most contaminated site outside the confines of the BOMARC installation property. As this site is unsecured and is a source of radioactive material potentially subject to movement into a downstream wildlife area, this is unacceptable.

**Response 11:** As documented in the Remedial Investigation/Feasibility Study report, a total area of approximately 30,000 square feet west of Highway 539 in the "ponding area" will be remediated under the selected remedy. This area would be secured and access would be restricted until excavation and off-site disposal activities are completed.

**Comments of Robert L. Callegari,  
U.S. Department of the Army,  
Chief, Planning Division, letter dated July 6, 1992**

**Comment 1:** Response to our comment (identified as Comment #24 in Volume 2: Public Hearing, Comment and Consultation Letters, of the Final Environmental Impact Statement) has been noted.

Your response indicates recognition of the requirement to secure a 404 permit (issued by the Department of the Army), as mandated by the Clean Water Act (CWA), prior to impact (placement or discharge of fill material) on the waters of the United States.

**Response 1:** Comment noted. The U.S. Air Force will obtain all required permits.

**Comments of Jeff Story, Geologist,  
New Jersey Department of Environmental Protection and Energy,  
Bureau of Ground Water Pollution Abatement, letter dated July 6, 1992**

**Comment 1:** Information obtained during the Remedial Investigation/Feasibility Study indicated that there is no weapons grade plutonium in groundwater at the site. Therefore, the environmental impact of plutonium in groundwater was not considered in the Environmental Impact Statement. It is considered by this bureau that there is, in general, a lack of information regarding site-specific groundwater quality to determine if it has been impacted by radionuclides. Likewise, the potential for colloidal transport of plutonium in groundwater, if any, was not sufficiently evaluated in the Remedial Investigation/Feasibility Study.

**Response 1:** The Air Force believes that information presented in the Remedial Investigation/Feasibility Study and Environmental Impact Statement is sufficient to determine that groundwater has not been impacted by radionuclides. Groundwater was sampled and analyzed for plutonium, as documented in the Remedial Investigation/Feasibility Study report. No plutonium was detected. The Air Force believes that colloidal transport of plutonium was sufficiently evaluated in the Remedial Investigation/Feasibility Study in that if detectable quantities of plutonium were being transported, sampling efforts would have detected any colloidal plutonium present. Please note that the Air Force solicited and received input from New Jersey Department of Environmental Protection and Energy (at that time, NJDEP) and Environmental Protection Agency Region II on the scope of groundwater sampling efforts during a Technical Review Committee meeting held on April 13-14, 1989. The Air Force implemented all New Jersey Department of Environmental Protection and Energy and Environmental Protection Agency requests for groundwater monitoring, and no plutonium was detected in groundwater at the site.

**Comment 2:** The preferred alternative is offsite disposal of contaminated materials. This bureau concurs with this alternative. However, additional information on groundwater quality must be obtained to determine if it has been impacted by activities at the site.

**Response 2:** The Air Force believes that sufficient work has been done to characterize groundwater at the site. Please see response #1 above.

**Comment 3:** Section 2.2; NEPA No Action Alternative.

a. Included in this alternative are radiological surveys. These surveys would include "sampling of 10 onsite groundwater-monitoring wells". Monitoring of offsite wells is not included in the proposal.

Information regarding water quality and groundwater flow directions and rates is needed in both onsite and offsite areas. Additional monitoring of groundwater both on and off the site must be conducted under a supplemental Remedial Investigation to determine the potential impact to groundwater quality. The results must be included in a revised Environmental Impact Statement.

- b. The frequency, duration and monitoring parameters were not specified. The frequency, duration and parameters for groundwater monitoring must be specified.

**Response 3:** a. The Air Force believes that groundwater at the site has been sufficiently characterized, and that additional investigation would be redundant and unnecessary. Please see response #1 above.

- b. These items would be specified in remedial design documents should the NEPA No Action Alternative be selected.

**Comment 4:** Section 3.3.3.2; Groundwater Flow Characteristics.

It is stated that "groundwater divide exists adjacent to Ocean County Route 539. However, no groundwater elevation data to the west of the site is available, and a definitive groundwater divide cannot be established."

A monitoring well(s) must be installed west of the site to verify groundwater flow characteristics in that area. This activity must be included in a supplemental Remedial Investigation work plan. The results must be included in a revised Environmental Impact Statement.

**Response 4:** There is, in fact, a monitoring well located west of the site. Please refer to Figure 4-2 of the Remedial Investigation/Feasibility Study. The Air Force believes that groundwater at the site has been sufficiently characterized. Please note that the Air Force solicited and received input from New Jersey Department of Environmental Protection and Energy (at that time, NJDEP) and Environmental Protection Agency Region II on the scope of groundwater sampling efforts during a Technical Review Committee meeting held on April 13-14, 1989. The Air Force implemented all New Jersey Department of Environmental Protection and Energy and Environmental Protection Agency requests for groundwater monitoring, and no plutonium was detected in groundwater at the site.

**Comment 5:** Section 3.3.3.3; Groundwater Quality.

- a. It is stated that "Limited groundwater quality information is available for the BOMARC Missile Site. The data collected at the site have focused on site-derived contamination". No site-specific information was provided in the Remedial Investigation/Feasibility Study on major ions, organic carbon content and oxidation state of the groundwater.

Submittal of this information must be included in a supplemental Remedial Investigation report. It will indicate if the groundwater environment is conducive to colloidal transport, and therefore, the migration of radionuclides adsorbed to the colloids. Evaluation of these data must be included in the revised Environmental Impact Statement.

- b. It is stated that "It is not clear whether the plutonium detected at various times and in varying wells represents samples contaminated with the surface-contaminated soils, or if it reflects the actual presence of plutonium in the groundwater".

To fully assess the presence of plutonium and to determine the impact to groundwater from plutonium, if any, additional groundwater monitoring must be proposed in a

supplemental Remedial Investigation work plan. Results must be discussed in a revised Environmental Impact Statement.

- c. "It should be noted that because plutonium has low solubility and high sorption, it can be transported through groundwater with soil colloids. However, this type of transport is very erratic and difficult to predict. Relatively long-term pumping and sampling would be needed to actually detect its presence in a monitoring well."

A long-term groundwater monitoring program (e.g., annually) must be proposed in the supplemental groundwater Remedial Investigation report. Data obtained during this monitoring must be used to verify that plutonium is not present in groundwater at or near the site and to evaluate the potential for migration (e.g., by colloidal transport) of plutonium or its daughter products due to the existing groundwater characteristics (e.g., oxidation-reduction potential and organic carbon content, both natural and anthropogenic).

- d. It is stated that "Standard water supply parameters (i.e., inorganic species and others) have not been evaluated at the site."

Such data, including oxidation-reduction potential ( $E_H$ ), dissolved oxygen and total organic carbon, must be submitted in a supplemental Remedial Investigation report. Results, and their bearing on radionuclide migration, must be discussed in the revised Environmental Impact Statement.

Response 5: a.

See the response to #4 above. The Air force does not believe that the information requested is necessary or will significantly add to our understanding of the site. The additional information requested by New Jersey Department of Environmental Protection and Energy (redox potential, dissolved oxygen, total organic carbon) could at best provide an approximation of a very complex system and an imprecise prediction of the likelihood of colloid formation. The Air Force believes that the empirical sampling data presented in the Remedial Investigation/Feasibility Study report is a much more reliable indication of the presence/absence of plutonium in groundwater (colloidal or dissolved) than any predictive model that could be employed, given the large number of variables that affect the system. Some of these variables, such as redox potential, are difficult to accurately determine, further reducing the accuracy and utility of predictive modelling.

Data reported in the Remedial Investigation/Feasibility Study indicating that plutonium is not affecting groundwater are as follows:

- **Groundwater Sampling Data.** If plutonium was being transported in groundwater in detectable quantities as colloidal plutonium or adsorbed to colloidal material such as iron oxide, it would have been detected in both unfiltered and filtered samples collected, since the pore spaces in the filters are much larger than the normal size range of the colloids. No plutonium was detected. Filters were also analyzed with no plutonium detected. Laboratory analysis of groundwater is empirical data and is considered much more conclusive than any predictive model that could be employed.
- **Borehole Soil Analysis** of the most contaminated soils onsite demonstrated that most of the plutonium in soils was concentrated in the upper 1-3 feet of the soil column, with very little plutonium migrating as deep as ten feet below grade. The water table averages approximately 40 feet deep in these areas. The extremely low solubility of plutonium oxides and their very strong affinity for soil particles are well documented in the literature. Laboratory analyses of soil cores showing very little vertical migration of plutonium in the soil column,

coupled with well-documented tendencies of plutonium oxides to remain immobile in the soil environment strongly indicate that there is no pathway present at the site for plutonium to enter groundwater.

- Concrete Coring indicates that plutonium has not migrated to soils beneath the concrete apron, where much of the site inventory of plutonium remains immobile.
- b. Ten monitoring wells located in the most highly contaminated area of the site were sampled, with no plutonium detected. The Air force believes that further sampling in a supplemental Remedial Investigation is redundant and unnecessary.
- c. The Air Force believes that a supplemental Remedial Investigation would be redundant and unnecessary. Please see responses to # 4 and #5a, above.
- d. The Air Force believes that the information requested is unnecessary and would not significantly add to our understanding of the site. Please see the response to #5a, above.

**Comment 6:** Section 3.3.3.4; (Groundwater) User Inventory.

It is stated that "The BOMARC Missile Site is located within the area supplied by the Lakehurst Naval Air and Engineering Center (NAEC) Water System. A few other private, industrial, and agricultural groundwater users exist within the region (Battelle Columbus Division, 1988). The U.S. Air Force Occupational and Environmental Health Laboratory (1988) study identified several private residence wells within one to three miles of the site." In Volume 3, Methodology Development, it is stated that "Individual private wells may exist in the region near the site, however, additional research and/or survey work is needed to confirm the existence and use of all wells in the area."

It is not clear if the additional survey work has been completed or whether a formal well search of Department well records was conducted. Clarification is required. A well search must be conducted of all domestic wells within a half-mile radius of the site and all public supply wells within a one-mile radius of the site. Results must be discussed in the revised Environmental Impact Statement.

**Response 6:** The Air Force believes that the information requested is unnecessary because groundwater at the site has not been impacted by radionuclides.

**Comment 7:** Sections 4.1.2.2, 4.2.2.2, 4.3.2.2, 4.4.2.2, and 4.5.2.2; Groundwater.

The impact to groundwater resulting from each of the five remedial alternatives is evaluated. It is stated that, "As discussed in Section 3.3.3.3, groundwater sampling and analysis indicated that no radioactivity associated with plutonium could be detected" and, "Due to the insoluble nature of the contaminants and their adsorption to soils, contaminants are not likely to be found in the groundwater and no information was provided on the solubility of plutonium and americium.

Solubility data must be provided in the supplemental Remedial Investigation report. To determine if plutonium is present in groundwater, the U.S. Air Force must perform additional groundwater monitoring. Results must be discussed in a revised Environmental Impact Statement.

**Response 7:** The Air Force believes that the sampling data supplied in the Remedial Investigation/Feasibility Study is sufficient to demonstrate that site groundwater is not impacted by radionuclides, and that the information requested is therefore unnecessary.

**Comment 8:** Section 4.2; NEPA No Action Alternative.

Operational procedures implementing this alternative would include "monthly visual inspections" and a "radiological survey" which will be conducted annually for 5 years and at 5-year intervals thereafter.

The frequency of groundwater monitoring must be on an annual basis, at a minimum. Additional information on radionuclide presence and transport in groundwater is necessary prior to determining an acceptable, ongoing monitoring program. Such a monitoring program should be proposed following the supplemental Remedial Investigation conducted in accordance with Department recommendations.

**Response 8:** The Air Force believes that data presented in the Remedial Investigation/Feasibility Study are sufficient to characterize site groundwater with respect to any potential impacts by radionuclides, and therefore that a supplemental Remedial Investigation would be redundant and unnecessary. If the NEPA No Action Alternative were selected, the Air Force would institute for yearly monitoring and specify the frequency of monitoring in the remedial design phase of the project.

**Comment 9:** Volume 3, Appendix 3-2, Section 2.2.4; Flow Net Characteristics.

It is stated that "Groundwater movement to the north is not expected, although water level data are not available to verify this condition."

Verification of the directions of groundwater flow must be included in a supplemental Remedial Investigation report. Results must be discussed in a revised Environmental Impact Statement.

**Response 9:** The Air Force believes that groundwater flow directions were sufficiently characterized in the Remedial Investigation/Feasibility Study and that a supplemental Remedial Investigation would be redundant and unnecessary. Please refer to Figure 4-2 in the Remedial Investigation/Feasibility Study, which is a groundwater contour map.

**Comments of Mr. & Mrs. Andrew Favara,  
letter dated July 1, 1992**

**Comment 1:** Based on the information I have read and heard it seems obvious to me that the BOMARC site should be cleaned up for the following reasons:

The concrete containment tank housing much of the plutonium at BOMARC is not going to last forever. Cracks are inevitable over a period of time. Maybe the cracks won't happen for decades, but everything wears out sooner or later.

**Response 1:** Comment noted. As indicated by the Record of Decision, the Air Force has selected Off-site Disposal as the remedy and will continue to restrict access to the site until that remedy can be implemented.

**Comment 2:** The plutonium in the drainage ditch under Route 539 seems to pose a more immediate threat. If it has not already seeped into the ground, and possibly the water, couldn't it at anytime? Also, an accident (car or truck), which happens somewhat frequently on Route 539, in the vicinity of this unspecified area could contaminate everyone involved including rescue people. I would imagine any significant disturbance, such as an accident, could also cause contamination of soil and water to accelerate.

**Response 2:** The U.S. Air Force selected remedy would remove contamination. The Air Force will secure this area until the remedial action activities are completed.

**Comment 3:** If the BOMARC site became a dumping ground for plutonium, cesium-137 and other radioactive wastes all of Plumsted and communities for miles around would see a definite decrease in property value. Just because a person lives 5 or 10 miles away they shouldn't become complacent. I doubt if anyone knows the distance that one would have to live away from such a site to be safe from any deleterious effects it would have on air, soil, and groundwater.

Those who feel smug about being a "few miles away" might want to think about how radioactive materials will be transported to this dumping site. Can you envision trucks criss-crossing Plumsted, Hanover, Upper Freehold, etc. with tons of radioactive wastes. Can you envision the potential disaster if one or more of these trucks has an accident, possibly on my or your front lawn for instance.

If the waste was transported by train spillage could still occur. According to the Federal Railroad Administration at least 830 leaks of hazardous materials occurred each year between 1982 and 1986. In 1982 - 839 spills, 1983 - 868 spills, 1984 - 996 spills, 1985 - 842 spills, and 1986 - 836 spills.

So people must be aware that if we become a dumping site for other radioactive wastes not only does the site become a potential toxic problem, but also the routes traveled by trucks, trains, planes or ships become potential sites for accidents and spillage.

I have many other concerns and questions such as where does the Pinelands Commission stand on this? Who (if anyone) would conduct the cleanup and who if anyone would regulate the cleanup? State Senator John Dorsey (R) has been active in opposing food irradiation in New Jersey, and may have some insight.

Also is there a grandfather clause? In other words if we start the cleanup before 1 January 1993, but do not finish will we be permitted to complete the out of state shipments of wastes after 1 January 1993? I would hate to think we would be rushed once the cleanup got started.

In conclusion I feel that the township, the county, the state and federal government should do whatever it takes to safely remove the plutonium for the BOMARC site. Remember plutonium waste is forever. If we allow ourselves to become a dumping ground for the State, the physical and physiological damage it will cost will haunt future generations indefinitely.

**Response 3:** Comments noted. The U.S. Air Force is pursuing a course of action that would eliminate contamination at the site. This course of action will be well documented prior to initiation of removal activities documentation will include plans and specifications to insure safe transport of radioactive contaminated materials. Documentation will be provided to cognizant government agencies for review.

**Comments of Ronald S. Dancer,  
Mayor of Plumsted Township, letter dated July 14, 1992**

**Comment 1:** First, while the contamination around silo 204 is a fenced-in site-specific area with unlikely breach of containment, the plutonium is also offsite in a drainage ditch in a culvert, and directly under heavily traveled Route 539. Undoubtedly, there will be land disturbance to this public highway and culvert in the future for reconstruction. With the likelihood of land disturbance being unavoidable, serious consideration must be taken to safely remove the contaminate.

Secondly, this proposal has a window of opportunity for both permitting and funding. As of January 1, 1993, a federal deadline takes effect after which no low-level radioactive waste can be shipped from New Jersey because of a law that requires states to fund their own regional disposal

area. Not only could the BOMARC site be a final resting place for this plutonium, but our township could become the State's depository for low-level radioactive waste notwithstanding present day Pinelands regulations.

Confronted with this limited window of opportunity, Plumsted Township caveats the U.S. Air Force preferred alternative of offsite disposal with the following comments:

- The Plumsted Township Committee, Plumsted's Environmental Commission and Plumsted's Office of Emergency Management must be involved in all phases of site remediation planning and activities. Prior to the commencement of the next phase, Implementation Planning, Plumsted Township requests that our representatives from the aforementioned bodies be appointed to ensure our input and involvement.
- Discuss the practicality of constructing an impermeable "Bubble" for all excavating areas.
- Prior to implementation, further mitigate any risk by developing a contingency plan in the event of a transportation accident and spill.

**Response 1:** The Air Force will solicit and utilize input from Plumsted Township in planning for implementation of the preferred alternative. The Air Force will investigate the feasibility of constructing an impermeable bubble for covering work areas, and will include a contingency plan for transportation accidents in remedial design documents for any offsite waste transport.

**Comments of Robert W. Hargrove,  
U.S. Environmental Protection Agency Region II,  
Chief, Environmental Impacts Branch, letter dated July 15, 1992**

**Comment 1:** The draft Environmental Impact Statement indicated that more than one kilogram of weapons grade plutonium remained on site after the cleanup actions following the fire. In our comments on the draft Environmental Impact Statement and Remedial Investigation/Feasibility Study, we asked the U.S. Air Force to develop a more accurate estimate of the amount of weapons grade plutonium remaining at the site. Given that this information is classified, Environmental Protection Agency, New Jersey Department of Environmental Protection and Energy, and U.S. Air Force agreed during our January 9, 1992 meeting that an unclassified summary discussing potential residual weapons grade plutonium onsite would be adequate.

Based on the U.S. Air Force's review of classified information pertaining to the recovery of material from the accident versus the plutonium inventory of the warhead, the final Environmental Impact Statement and Remedial Investigation/Feasibility Study estimate the amount of unrecovered weapons grade plutonium at the site to be between 60 and 300 grams. Although we recognize that these estimates cannot be verified independently, Environmental Protection Agency accepts them for the purpose of this evaluation. Nevertheless, if significant changes in the estimate arise during the implementation of the remedial action, we recommend that the dose assessment evaluations, including the residual radioactivity program (RESRAD) model, be updated.

**Response 1:** Comment noted. If the estimated changes significantly, the evaluation would be revised.

**Comment 2:** The documents state that the no-action alternative would be implemented by default if permission is not secured or if disposal options are not cost effective. Given the half-life of plutonium-239, we believe that it is reasonable to assume that the U.S. Air Force will lose institutional control of the site before the radioactive material becomes stable. With this in mind, we believe that the ultimate result of the no-action alternative would be similar to the unrestricted access alternative,

which the U.S. Air Force found unreasonable in the draft Environmental Impact Statement due to the excess lifetime cancer risk of greater than  $10^{-4}$  to users of the site.

Accordingly, Environmental Protection Agency believes that the no-action alternative is acceptable only as an interim action while the U.S. Air Force secures adequate funding and makes arrangements for permanent offsite disposal of radioactive contamination.

**Response 2:** As indicated by the Record of Decision, the Air Force has selected Off-site Disposal as the remedy and will continue to restrict access to the site until that remedy can be implemented.

**Comment 3:** Moreover, it must noted that Environmental Protection Agency has concerns about the no-action alternative being implemented on an interim basis. Specifically, we believe that the U.S. Air Force must formally commit to addressing potential contamination in the ponding area adjacent to Route 539 and the culvert below the road. Although the ponding area and culvert were slated for study under the preferred alternative, the no-action alternative did not sufficiently address the possible contamination in those areas. Under the no-action alternative, the ponding area would be fenced and monitoring program would be developed for the culvert. However, because of the potential for earth disturbance during road maintenance activities, a characterization of conditions and culvert should be included in the no-action alternative.

**Response 3:** The culvert area will be characterized to insure that earth disturbance during road maintenance activities did not pose potential threats to human health.

**Comment 4:** Additionally, even with present institutional controls, Environmental Protection Agency has concerns about the maintenance of the BOMARC site. Specifically, based on my staff's visits last fall, the final Environmental Impact Statement's characterization of conditions at the site does not appear to reflect current management practices. In fact, in our January 9, 1992 letter to LTC William Drake, Base Civil Engineer, McGuire AFB, we expressed concern about the present condition of the BOMARC site, including gaps in concertina wire, limited number of signs indicating the radiological hazard, evidence of trespassing, and cracks in the apron in the vicinity of Shelter 204. The U.S. Air Force's response discussed commitments to address those concerns. However, until a permanent remedy is implemented, we recommend that visual site inspections be performed more frequently than the quarterly inspections presented in the final Environmental Impact Statement and Remedial Investigation/Feasibility Study. Moreover, we believe the U.S. Air Force's decision to perform annual radiological monitoring (groundwater sampling, soil and sediment sampling, and the use of field instrumentation to detect low energy radiation) will be effective in tracking on an interim basis. Accordingly, we concur with the U.S. Air Force's proposed measures to improve the existing maintenance program at the BOMARC site, and believe that these commitments must be reflected in the project's Record of Decision.

**Response 4:** The Air Force will conduct monthly visual site inspections and conduct annual radiological monitoring until the offsite disposal alternative has been implemented.

**Comment 5:** The preferred alternative (offsite disposal) involves the removal of all contaminated material above the threshold level established in the final Environmental Impact Statement and Remedial Investigation/Feasibility Study. This alternative would include the excavation of soils, demolition of Shelter 204 and other structures, removal of caps and contaminated soil underneath, and location and removal of the missile launcher. Material would be collected and shipped to an appropriate licensed offsite facility for disposal. After removal of the material, the site would be restored to pre-accident conditions.

The documents indicate that three commercial low-level radioactive waste disposal facilities (i.e., Chem-Nuclear in Barnwell, South Carolina; U.S. Ecology in Beatty, Nevada; and U.S. Ecology in Hanford, Washington) are currently licensed to receive the radioisotopes present at the

BOMARC site. Additionally, the documents note that the U.S. Air Force has contacted a fourth facility, Envirocare, Inc. in Utah, that has applied for an amendment to its license to allow plutonium disposal. Nevertheless, because of the significant cost difference, the U.S. Air Force has stated a preference for disposal of the BOMARC waste in a DOE low-level radioactive waste facility. However, the documents state that DOE will consider disposal at one of its disposal facilities only if the commercial sites refuse permission for disposal of the BOMARC waste.

The documents specifically evaluate the feasibility of waste disposal at the U.S. Ecology (Hanford) and Nevada Test Site facilities. However, similar analyses of the other commercial sites is not presented. Consequently, it is difficult to assess whether these facilities are the best choices for the disposal of the BOMARC waste. In a related matter, it must be noted that the provisions of the Low-Level Waste Policy Act would allow states containing commercial disposal sites to ban disposal of radioactive waste generated outside of their respective state compacts after January 1, 1993. This impending deadline may impact the implementation of the offsite disposal alternative. In view of the potential impact of the Low-Level Waste Policy Act on disposal at the various sites, alternative sites that will remain open after the cutoff date should be examined further. Accordingly, the feasibility of disposing of the BOMARC radioactive waste at the other three sites identified in the documents must be reanalyzed and presented.

**Response 5: Commercial Disposal Facilities.** An evaluation of all commercial disposal sites has been conducted to determine the availability and cost of alternatives for disposal of radioactive waste from the BOMARC site. Included in the analysis is the ability of facilities to accept out-of-compact waste and the facility disposal fees.

Three commercial low-level radioactive waste disposal facilities are currently operating and are licensed to receive radioisotopes present at the BOMARC site. The companies that own and operate the facilities and the locations are as follows: Chem-Nuclear in Barnwell, South Carolina; U.S. Ecology, Inc. in Beatty, Nevada; and U.S. Ecology, Inc. in Hanford, Washington. The ability of these disposal facilities to accept the waste from the BOMARC site is determined in part by the provisions of the Low-Level Radioactive Waste Policy Amendments Act. The provisions of the Low-Level Radioactive Waste Policy Amendments Act allow states containing commercial disposal sites to ban disposal of radioactive waste generated outside of the state compacts after January 1, 1993.

Both the Hanford, Washington and Beatty, Nevada facilities will currently accept radioactive waste from New Jersey. However, a representative from the Northwest Interstate Compact on Low Level Radioactive Waste Management reported that the facility in Hanford, Washington will not accept disposal of out-of-compact waste as of January 1, 1993. In addition, the Transportation and Brokerage Manager at U.S. Ecology, Inc. Corporate Headquarters reported that Beatty, Nevada will close its radioactive waste disposal facility on January 1, 1993, although it will continue to receive hazardous waste at that location. The Chem-Nuclear facility in Barnwell, South Carolina will reportedly accept imported waste from January 1, 1993 until July 30, 1994 with some restrictions.

Several representatives from U.S. Ecology, Inc. indicated the possibility of receiving permission to accept waste from outside the state compact on an individual case basis. However, a representative from the Northwest Interstate Compact on Low-Level Radioactive Waste Management reported that it was a longstanding policy of the association that the compact would not allow imported waste after the January 1, 1993 deadline.

**Cost of Disposal in Commercial Facilities.** Current radioactive waste disposal costs at the U.S. Ecology, Inc. facilities (in Hanford, Washington or Beatty, Nevada), effective March 1, 1992 through December 31, 1992, will range from \$36.00 per cubic foot (for packages with 0.00 to 0.20 r/hr at container surface) to \$61.60 per cubic foot (for packages with 20.01 to 40.00 at

container surface). An additional \$120 per cubic foot surcharge is added to the price of disposal for all waste originating from outside of the compact states. However, after January 1, 1993, the facility will not accept disposal from states outside of the compact. The Beatty, Nevada site will not be open for disposal in 1993.

The cost of disposal in the Chem-Nuclear facility in Barnwell, South Carolina is currently \$42 per cubic foot plus \$160 per cubic foot surcharge on wastes from states outside of the compact. However, the surcharge reportedly may be increased to as much as \$1,200 per cubic foot. The Chem-Nuclear facility has a contract for low level radioactive waste disposal with AMC Command in Rock Island, Illinois/Kelly Air Force Base in Texas. No information was available on the unit cost under this contract.

**Additional Disposal Facilities and Proposed Disposal Facilities.** Four other locations have been selected as sites for future radioactive waste facilities: Needles, California; Butte, Nebraska; Pennsylvania; and Texas. U.S. Ecology, Inc. applied for licenses for the California and Nebraska facilities. The licensing process has been delayed for both facilities, according to a public affairs representative at U.S. Ecology, Inc. and no definite date has been determined for either facility. When these facilities become operational, the U.S. Ecology, Inc. representative reported that disposal will be restricted to members of the compact in which the facility is located. The facility in Pennsylvania is being proposed by Chem-Nuclear and the one in Texas will reportedly be owned by the State. No additional information was available on the status of permitting or construction of these facilities at this time. These facilities reportedly will not receive imported waste.

In summary, after research of currently operating and proposed commercial radioactive waste disposal facilities, the only commercial alternative to a DOE facility appears to be the facility in Barnwell, South Carolina which will receive imported waste on a limited basis until July 1994. However, even if approval is granted for disposal in the facility, costs would be prohibitive.

**Comment 6:** Clearly, a full evaluation of all the alternative disposal sites is critical because the documents indicate that "cost effectiveness" is a key factor in determining whether the no-action alternative will be implemented by default. However, the documents do not clearly indicate the basis for such a determination (e.g., site-specific disposal fees or funding availability). With this in mind, Environmental Protection Agency requests the opportunity to review the factors used in determining cost effectiveness of the alternative sites being considered for offsite disposal prior to the issuance of the project's record of decision.

**Response 6:** Cost effectiveness is a key factor. The Air Force is committed to an active environmental restoration effort that involves potential remedial action over 4,000 sites across the U.S. In accordance with the DoD worst first policy the Air Force will focus financial resources on those sites that pose the most significant threat to Human Health and the environment. This focus is tempered by the knowledge that our financial resources are limited. We cannot afford, nor do conditions warrant, cleanup of every contaminated site regardless of cost. The Air Force must balance the threat posed to public health and the environment against the cost required to eliminate that threat. There is no rigid cost effectiveness formula that is used to arrive at that determination. The Air Force must use judgement to balance the exigencies of the restoration program against requirements of individual sites. It is clear that while off-site disposal provides a permanent remedy at the BOMARC Missile Site, there is no immediate threat posed by the site that would require off site disposal regardless of cost.

**Comment 7:** As indicated in our previous comments, we believe that offsite disposal offers a permanent solution for the radioactive contamination at the BOMARC site. However, we indicated that stringent management practices and pollution abatement control measures are needed to ensure that radioactive contaminants are not lost from the site. As such, we recommended that future project

documents discuss the preparation of a site-specific contingency plan that would prevent the transport of contamination offsite. The final Environmental Impact Statement provides mitigation measures for all alternatives requiring excavation to control soil erosion, decrease fugitive dust emissions, and lessen occupational and public health impacts. We believe the measures identified in the final Environmental Impact Statement effectively eliminate the potential resuspension of contamination during the remediation of the BOMARC site. We concur with the commitment of the U.S. Air Force to incorporate the mitigation measures into the remedial design specifications, and request a copy of the specifications when they are available.

**Response 7:** Comment noted. Remedial design specifications will be provided to Environmental Protection Agency when they are developed.

**Comment 8:** In conclusion, based on our review of the final Environmental Impact Statement, Remedial Investigation/Feasibility Study, and PRAP, we believe that the U.S. Air Force's preferred alternative, offsite disposal, offers an effective permanent solution to address the radioactive contamination at the BOMARC site. Further, we believe that the no-action alternative is not a permanent solution for the site; rather, it can serve only as an interim action. Nevertheless, in the event that the U.S. Air Force decides to implement the no-action alternative on an interim basis, we recommend that the project's Record of Decision include commitments identified in the final Environmental Impact Statement, Remedial Investigation/Feasibility Study, and Environmental Protection Agency's recommendations to ensure that the no-action alternative would not result in significant adverse environmental or public health impacts. I would appreciate a copy of the Record of Decision and Responsiveness Summary when it is completed.

**Response 8:** Comment noted. The U.S. Air Force will pursue the Off-site Disposal Alternative until the removal action is initiated and the U.S. Air Force will maintain and operate the site in a manner consistent with the commitments outlined in the Record of Decision, Environmental Impact Statement, and Remedial Investigation/Feasibility Study.

**Comments of Fred Gardner,  
Chemical Waste Management, Incorporated, letter dated July 15, 1992**

**Comment 1:** Chemical Waste Management, Incorporated suggests that you consider utilization of volume reduction and waste minimization techniques prior to offsite transportation and disposal of the plutonium contaminated wastes from the BOMARC site. These technologies are commercially available today, and would result not only in a substantial cost savings, but also would minimize the risk from transportation, and conserve disposal space.

We believe volume reduction will also meet the intent of Environmental Protection Agency regulations, and policies for waste minimization.

**Response 1:** The Air Force did consider volume reduction techniques in the Remedial Investigation/Feasibility Study report. For a variety of reasons, including technical problems associated with implementation of the techniques, and increased health and safety risks, these techniques were not chosen for implementation.

**APPENDIX A**  
**TRANSCRIPT OF PUBLIC HEARING**

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**Public Meeting on Air Force Proposed Plan for Clean-Up  
of Contamination at the BOMARC Missile Site,  
McGuire Air Force Base, New Jersey**

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**Fort Dix Reception Center  
Fort Dix, New Jersey**

**Transcribed From Provided Tapes By:**

**C.A.S.E.T ASSOCIATES, LTD.**

3927 Old Lee Highway  
Fairfax, Virginia 22030  
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**June 20, 1992**

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# PROCEEDINGS

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## **Agenda Item: Introduction by McGuire Air Force Base Public Affairs**

**Major Bossick:** Good afternoon. I'm Major Debra Bossick. I'm the Chief of Public Affairs over at McGuire. Welcome to the BOMARC Public Hearing today. As you know, the Air Force has completed its study on the proposed alternatives for remediation of the BOMARC site and that's what we're here to discuss today: the five alternatives and the preferred alternative. What we will do is go through a presentation that will be about 30, 35 minutes long, and then there will be a short break, and then you will be able to ask questions and make comments. If you have not already picked up a comment card, raise your hand and the Air Force people will hand those out to you. We ask you that you put your name and such and that which will allow us to look to see who is going to make some comments and try to run this a little smoother.

Also, just to remind you, if at the end of this presentation and at the end of the hearing you would like to get a copy of the summary, the responsiveness summary, please make sure that you write that at the end of the card. If you're from the media, and you haven't checked in with Sergeant Whita or Sergeant Gonzales, please do that, we have a press package for you, and it will help us look in which newspapers we need to clip out.

Well without much further ado, let me introduce your two presenters today. Sharon Geil is from Headquarters AMC, Air Mobility Command, our civil engineering area and Colonel David Case is from the General's Office, Headquarters level. So I think Sharon you're going to start.

Ms. Geil: Yes, thank you. Good afternoon ladies and gentlemen. My name is Sharon Geil and I am the Air Force Project Manager for the BOMARC Missile Site Project. As Major Bossick said, I work for Headquarters Air Mobility Command at Scott Air Force Base in Illinois.

The purpose of this public hearing is to present the Air Force proposed plan for addressing radioactive contamination at the BOMARC Missile Site, to discuss the proposed plan with you the public and to solicit your comments and input on the plan. Colonel Case will briefly summarize the history of the BOMARC Missile Site and the recent remedial investigation/feasibility study of the site. I will then discuss the clean-up alternatives that were considered, the Air Force preferred alternative, and the rationale for selection of the preferred alternative. I will conclude by describing how you can attain additional information on the project and to submit written comments we will consider in selecting the final remedy of the BOMARC site. We will then take questions and comments on the proposed plan. Now I will turn the microphone over to Colonel Case.

#### **Agenda Item: Air Force Presentation -- Colonel Case**

Colonel Case: Thank you Sharon. The BOMARC Missile Site occupies approximately 218 acres just east of Ocean County Highway 539 in Plumsted Township, Ocean County, New Jersey. Can I have the slides Sharon? This gives you a general look at where the location is. It's about 11 miles east of McGuire Air Force Base and is contained within the Fort Dix Military Reservation on land leased to the Air Force. On June 7, 1960 an explosion fire occurred in missile Shelter 204 which housed the nuclear warhead equipped BOMARC missile. Although nuclear explosion took place, the nuclear warhead was burned and melted. The missile

was destroyed and the launcher shelter was badly damaged. Most of the radioactive material contained in the warhead was recovered by the Air Force, containerized, and shipped to Medina Base in San Antonio, Texas. The residue of the burning warhead, water from fire fighting activities contaminated the concrete floor, asphalt apron, and drainage ditch south of the shelter with weapons grade plutonium. In addition, a small quantity of plutonium from the nuclear warhead may have been dispersed by the wind.

The Air Force implemented a program of site control and monitoring soon after the accident. Four to six inches of concrete were poured on contaminated portions of the asphalt apron and floor of Shelter 204. An asphalt covering was placed on the drainage ditch leading from the shelter in order to prevent erosion and transport of contaminated soils. These actions have effectively contained contaminants through the present time. Access to the site has been controlled. Monitoring activities such as radiation surveys were implemented to ensure that the public was not exposed to the site contaminants.

The Air Force recently completed the remedial investigation/feasibility study for the BOMARC Missile Site. This report documents the nature and extent of radioactive contamination on-site, quantifies risks to human health and the environment and evaluates clean-up alternatives. In addition to the RI/FS, the Air Force also completed an environmental impact statement which is a companion document to the RI/FS and provides an assessment of the environment impacts associated with each clean-up alternative considered in the RI/FS.

The remedial investigation included a review of all existing site information and new information from sampling activities to complete the characterization. These activities included sampling of soils, sediments, surface water, ground water, air, concrete, and structures for

radioactive contaminants. Samples were analyzed for the items shown which are radioactive analyses and for materials such as uranium and thorium that normally occur in the earth's crust. Field radiological surveys included radioactivity measurements in soil, concrete, asphalt, and structures using a variety of sensitive radiation detectors. Two geophysical survey techniques, magnetic profiling and ground penetration radar, were used to search for the missile launcher from Shelter 204 and other hardware potentially deposited on-site. Five geophysical anomalies were located. Those are indicated by the white dots on the chart.

Plutonium from the missile accident was detected in shallow soils, sediments, and in structural materials including the concrete asphalt apron, the missile shelter, and the underground utility bunkers adjacent to the shelter. These investigations revealed little movement of these contaminants in soils or other materials since the accident occurred. This slide shows the general distribution of contaminants at the site, generally located within the fenced boundary of the site with a small area across highway 539. No concentrations of radionuclide attributable to the missile accident were detected in ground water, surface water, or air at the site. The radiological residues at the site consist of weapons grade plutonium. This material consists primarily of one isotope of plutonium, as well as lesser amounts of other plutonium isotopes, and americium, a radioactive decay product of plutonium. The most abundant isotope of plutonium in this material has a half life of approximately 24,000 years, meaning that half the original quantity will decay in that time. The radioactive contamination is not distributed evenly over the site, but occurs in discrete hot spots which in several instances have been found to be a single particle. Oxides of plutonium and americium are relatively insoluble in water and bind to soil particles. Because of this, these elements are not highly mobile in the environment and

are not easily taken up by plants or animals.

The most likely source of human exposure at the site is from inhalation of airborne contaminated particles generated by activities that disturb the soil such as farming or construction. It is believed that plutonium and americium may cause cancer if inhaled or ingested. Because of the relatively small amount of radioactivity at the site, these adverse effects could only be possible after many years of exposure. These delayed effects are primarily cancers of the lung, bone, and liver.

I will now discuss the methods used to determine human health and environmental risks posed by the site. Radiation exposure was estimated using a very conservative scenario assuming that all site controls currently in place were discontinued, and a hypothetically maximally exposed individual took up residence on this site, and ate foods grown there. By maximally exposed individual we mean the person who could get the highest dose. Exposures from all possible pathways were modeled using the RESRAD computer model. Inputs for this model were data from the site itself wherever possible and conservative default values where data was unavailable. Using this model, it was estimated that the hypothetically maximally exposed individual would have an increased cancer risk of 1.3 in 1,000 for a 70-year lifetime of exposure. This compares with a one in five chance of cancer overall. Risks to off-site populations were determined to be negligible.

I will now discuss how the Air Force derived clean-up levels for the site. Since there are no promulgated clean-up standards for the site, the Air Force used the results of the risk assessment for the hypothetical maximally exposed individual to identify clean-up goals. No standards currently exist for levels of plutonium and americium in soils. In lieu of such a

standard, an acceptable soil concentration was derived using data on-site conditions and contaminant properties. A soil level of 8 picocuries per gram, the measure of radioactivity, was calculated to produce an estimated radiation dose of 4 millirem in a year. We estimate this dose produces an excess 5 time cancer risk in the maximally exposed individual of about 1 in 10,000. This risk is within the EPA's accepted range for environmental contaminants. For your information, radiation workers may receive up to 5,000 millirem in a year.

Since no concentrations of radionuclides from the missile accident were detected in surface water, groundwater, or air at the site, clean-up goals were not established for these environmental medium. No surface contamination standards currently exist for facilities such as the BOMARC site. Rather surface contamination levels on structures were adopted from Nuclear Regulatory Commission guidelines to release licensed facilities such as nuclear power plants for unrestricted use. These limits are 100, 300, and 20 radioactive decays per minute from an area of 100 square centimeters for the average, maximum, and removable levels of contamination respectively.

This slide shows the area of concrete and asphalt to be remediated. These areas consist of concrete-covered asphalt apron, missile Shelter 204 and its utility bunkers, and the asphalt-covered drainage ditch where fire fighting water from the accident flowed. Areas of soil to be remediated include the soil beneath the asphalt-overed drainage ditch, the area around Shelter 204, behind Shelter 210, and across highway 539. Areas across the highway are in the drainage pathway which received fire fighting runoff. Soils beneath the concrete-covered apron are also shown on this map. While these soils were shown to be relatively uncontaminated by the remedial investigation sampling efforts, they may become contaminated during removal of the

concrete apron, so we have assumed that some of these soils may require remediation.

I have discussed the history the accident, results of field studies, and risks to health. Sharon will now discuss remedial alternatives considered and the selection of the preferred alternative.

### **Agenda Item: Air Force Presentation -- Sharon Geil**

**Ms. Geil:** Thank you Colonel Case. A wide range of remedial alternatives were evaluated as part of the feasibility study. One alternative, on-site containment of radioactive materials and soils, was eliminated from consideration after initial screening because Federal and State of New Jersey requirements prohibit implementation of this alternative. After this screening process, five remaining alternatives were analyzed in detail. These are listed on the slide. Costs for these alternatives are estimates and are in terms of present worth for a 30-year performance period. Costs were also based on disposing of the waste at the Department of Energy Nevada Test Site or at a commercial facility at Hanford Washington. Although neither of these locations have been selected, costs are representative of disposing of the waste at a DOE site or a commercial facility. The unrestricted access alternative consists of discontinuing institutional and access controls currently in place and leaving contaminated materials at the site. The Air Force never seriously considered implementing this option; it was evaluated to estimate worst case exposure to human populations and for comparison with other clean-up alternatives. The alternative served as a functional No Action Alternative required by the Comprehensive Environmental Response Compensation and Liability Act or CERCLA. There is no cost associated with implementing this alternative.

The Existing Conditions Alternative is designed to minimize exposures using access restrictions and institutional controls. These controls include fencing and posting, inspection and maintenance of the site, radiation surveys, and continued government control. The cost for this alternative is associated with maintenance of these controls.

The Limited Action Alternative is designed to minimize exposures using all monitoring, maintenance and access controls currently implemented at the site, plus the limited amount of clean-up. Under this alternative, an effort would be made to locate the missing missile launcher and associated hardware. If located, the launcher and a limited amount of contaminated material would be removed from the site and properly disposed of in a licensed radioactive waste facility either at a Department of Energy site or at a commercial facility. We used the Nevada Test Site and the Hanford Washington-site as specific examples of these two respective disposal options in order to derive cost estimates.

The On-site Treatment Alternative is designed to reduce risk by reducing concentrations of contaminants in soils and structures to below clean-up criteria. This alternative includes technologies that concentrate and remove radioactive contaminants from contaminated materials. A number of physical treatment technologies can be used to treat surface soils, contaminated concrete and asphalt, shelter structures, and underground utilities. The concentrated radioactive waste produced by the treatment process require transport and disposal at either a DOE facility or at a commercial facility. The choice of disposal site greatly affects cost of this alternative due to the higher disposal cost at a commercial facility.

The Off-site Disposal Alternative is designed to reduce risk by removing radioactive waste from the site and disposing of waste off-site. This alternative consists of excavation of

soils contaminated above 8 picocuries per gram, demolition of contaminated structures and transport and disposal at a permanent off-site disposal facility. As with the On-site Treatment Alternative and Limited Action Alternative, the choice of disposal site greatly affects the cost of this alternative.

In the feasibility study there are three steps in the evaluation of alternatives. In the first step, technologies capable of addressing site contaminants are identified, screened, and assembled into remedial alternatives capable of addressing the site as a whole. In the second step, these remedial alternatives are further screened using three preliminary screening criteria of effectiveness, implementability, and cost. Alternatives that are not effective, readily implementable, or cost effective are eliminated for further consideration.

In the third step, the remaining alternatives are evaluated in detail using the following nine evaluation criteria. In the third step of the evaluation, the alternatives are compared to determine their relative performance and identify their respective advantages and disadvantages. This comparison is summarized as follows. The different alternatives are across the top and the various different criteria that were listed on the former slide are again listed on the side. Overall protection of human health and the environment is shown across row one. Alternatives four and five at the top provide the highest degree of protection of human health and the environment. These alternatives reduce the potential for contaminants to migrate from the site and benefit human health and the environment by removing contaminants from the site. Alternative four would return treated soils to the site. Although both alternatives have the potential for adverse effects during construction or treatment phase of clean-up, these adverse effects can be mitigated and are outweighed by the benefits of permanently reducing the source of contamination.

Alternatives two and three provide for a level of protection of human health by restricting access and the potential for on-site exposure. Alternative one offers no protection of human health and the environment.

Relative compliance with regulations is shown in row two. Alternatives four and five achieve health-based and regulatory-based clean-up goals. Alternative four would return treated soils to the sites. This may be in conflict with the Pinelands Commission nondegradation policy. Although neither alternative two nor three meet clean-up goals, these goals apply only if unrestricted access to the site is allowed. However, access is restricted under these two alternatives. Alternative one does not achieve clean-up goals or reduce risk by any means.

Row three shows the relative short-term effectiveness. Alternatives two and three provide greater short term effectiveness because they can be implemented more rapidly than the other alternatives and provide for minimal disturbance to the site. Alternatives four and five are both less effective in the short term, and alternative one is least effective because risks are not mitigated.

With regard to long-term effectiveness and permanence, alternatives four and five provide the greatest degree of effectiveness because waste contaminated above clean-up criteria are removed from the site and placed in a facility designed for management of long lived radioactive wastes. Alternatives two and three are not as effective over the long term because both leave contaminated materials in place and rely on access restrictions to prevent exposure. Due to the extremely long half-life of these site wastes, access controls may be difficult to guarantee over the long period of time that the wastes remain hazardous. Alternative one is least effective over the long term.

As is shown in the row labeled MTV, alternative four is the only alternative that reduces toxicity, mobility, or volume of the waste, since it is the only alternative that includes some form of treatment. The remaining alternatives including alternative five do not address this criteria.

Due to their more complex nature, on-site treatment and off-site disposal present more challenges in terms of implementability than existing conditions, limited action, and unrestricted access strategies. Of the two permanent source control alternatives, off-site disposal is more technically feasible and more easily implemented because it is basically a construction activity. There are uncertainties associated with implementation of on-site treatment including process efficiency and effectiveness. Administratively, limited action, on-site treatment, and off-site disposal may be difficult to implement after the first of January 1993. On that date, provisions of the Low Level Radioactive Waste Policy Amendments Act take effect. The provisions of this Act may preclude inter-state shipment and disposal of radioactive waste at commercial disposal facilities.

The cost for implementing each of the alternatives vary greatly. Since alternative one will eliminate all existing controls and restrictions, no costs are involved. Alternative one is closely followed by alternatives two and three respectively. The two active restoration alternatives, four and five, are the most costly. The choice of disposal sites for waste generated greatly influences the cost of each alternative since disposal at a government-operated off-site disposal site is much less costly than disposal at a commercially operated facility. State acceptance will be addressed in the record of decision following the public comment period on the proposed plan. Community acceptance will be evaluated based on comments received from

you during the public comment period.

### **Agenda Item: Preferred Alternative**

I will now discuss the Air Force preferred alternative and the rationale for selecting this alternative. The Air Force prefers off-site disposal of the BOMARC waste in a Department of Energy low level radioactive waste facility because this alternative best satisfies the nine evaluation criteria and is the most cost effective active restoration alternative. Cost for disposal at a commercial site are significantly greater than disposal at a DOE facility. The cost of disposing of BOMARC Missile Site waste at a commercial facility is estimated to be \$23 million, whereas disposal at a DOE site is estimated to cost approximately \$7 million.

The Department of Energy is cooperating with the Air Force to develop methodologies to dispose of the BOMARC waste. Although the Air Force has no firm response as to whether or not DOE will accept the waste, their sites remain options should the commercial sites not be available. The issue that will most impact the Air Force's ability to make an independent decision is the Low Level Radioactive Waste Policy Amendment Act which governs inter-state shipment and disposal of radioactive waste. This Act places the burden for low level radioactive waste disposal with the individual states or compacts of states and establishes a schedule for phased implementation. This Act has already increased the cost of disposal at licensed commercial sites, since its provisions allow currently cited states to levy waste surcharges. Costs are projected to escalate even more as states and compacts set fees to support their site's operations.

A more immediate issue affecting any decision is the scheduled closure of the commercial sites on the first of January 1993. On that date, another provision of the Act takes effect which

closes existing commercial to generators outside the state or compact in which the site is located. As state and compact agreements now stand, waste generators in New Jersey will have no access to existing sites even if they remain open to member states within the site's compacts. The Air Force cannot make a decision on the BOMARC site that involves disposal until sites willing to accept the waste have been identified and the costs analyzed for effectiveness. If disposal sites are willing to accept the waste cannot be identified, or sites willing to accept the waste are not cost effective, then the existing conditions alternative will be implemented by default. In the event existing condition alternative is implemented, radioactive contamination would remain in place and access controls and environmental monitoring would continue until such time that a viable economically feasible off-site disposal facility becomes available.

The major components of the preferred Off-site Disposal Alternatives are as follows. Excavation of source soils containing greater than 8 picocuries per gram of plutonium. This will limit maximum risk to any future resident of the site to a level of less than 1 in 10,000 excess lifetime cancer risk. Excavation and sectioning of contaminated portions of the concrete apron, utility bunkers, and the missile shelter, excavation and removal of the missile launcher if found, packaging, transport, and disposal of radioactive materials to an off-site licensed low level radioactive waste facility and restoration of the site by backfilling with clean soil, followed by grading and revegetation of the site with indigenous plant species.

This chart gives the estimated clean-up volumes for contaminated soils and structures requiring remediation. Confirmation of waste removal will be accomplished as shown on this slide. Sampling of contaminated media will be conducted both during and after clean-up to ensure that all waste contaminated above clean-up levels have been removed. Both field surveys

and laboratory analyses will be used to verify that the site has been cleaned up to applicable clean-up levels. Field surveys will be conducted using a variety of sensitive radiation detectors. In addition, strict engineering controls will be applied during the excavation phase to prevent any exposure to workers or off-site populations. These include dust suppression and runoff and sediment control measures.

I will now describe how you can participate in the decision making process. My address. The Air Force welcomes your comments on the proposed plan. You are encouraged to comment on all of the alternatives considered, not just the preferred alternative. Written comments should be sent to me at that address. Selection of the preferred alternative is preliminary and could change in response to public comment or other new information. All of the reports in this study are available at the Information Repository, the address of which is provided on the slide. The Administrator of Records for this study, which includes a complete record of all actions and decisions upon which the preferred alternative is based, is located at McGuire Air Force Base. Contact McGuire Public Affairs Office for access to this record. They are under the wing, but that's their correct phone number and information will get to them at the Public Affairs Office.

The public comment period began on May 28th and will run for 45 days until July 15, 1992. At the end of the comment period and after considering all public comments received, the Air Force will select a final clean-up plan. The selected clean-up plan will be documented in the record of decision and will include a responsiveness summary providing responses to all public comments received. After the record of decision is complete, a fact sheet representing the responsiveness summary and selected remedy will be mailed to all interested parties. If you would like to receive a copy of this, please indicate so on the bottom of one of the cards

available to you in the back of the room or from McGuire Public Affairs.

The record of decision, including the responsiveness summary, will also be placed in the administrative record and in a local repository. We will now have a short break, and you can get a card if you didn't get one earlier. Then we will take any of your questions and comments. Thank you for your attention.

(Recess.)

### **Agenda Item: Public Comment**

**Ms. Geil:** I was a little remiss earlier on in not introducing U.S. Congressman Jim Saxton. He is here today to listen to the procedures, and I think he also has some comments that he would like to make at this time.

**Mr. Saxton:** Thank you. First let me say how pleased that I am that we're here today at this stage of these proceedings. It's been quite some time getting here and I understand what it is that we have had to go through in terms of procedures to do this, but I would like to begin by thanking Gary Vest, the Deputy Secretary for the Air Force for Environment and his staff, Colonel, and Sharon for your great effort in bringing us here today and also to say that I'm glad to see that there are so many individuals from the community interested in this issue. Like any public process, participation by all of the folks who are concerned is of vital importance. I know there are people here from the community and people from governing bodies, people from environmental groups, people from the Pinelands Commission, and people from industry who are interested in this process for a variety of reasons, particularly those who are in the business itself who are also here.

We are also here to discuss a 30-year-old problem, one that has plagued us for three decades: what to do with the Boeing Michigan Aeronautics Research Center Site, commonly known as BOMARC. The Air Force has discussed five solutions with us today and its final environmental impact study and is leaning toward, as they said, off-site disposal. While I applaud the Air Force efforts to finally put this issue to rest, I know that we all have some questions relative to safety precautions that I hope will be addressed at this meeting, and I know that there are members of the community who share in those concerns, particularly people who are here from Plumsted Township. And I know that the Air Force will listen carefully to those questions and provide good logical scientific answers to them.

Those are serious questions that need to be answered obviously before we proceed with any of the five proposals that were mentioned. Nevertheless, I believe that we have reached a monumental decision regarding the BOMARC Site. After many years, the Air Force has decided to expunge the weapons grade plutonium saturating the soil as a preferred alternative, and I loudly applaud that decision. Knowing that the EPA and other Federal agencies almost always err on the side of caution when it comes to disturbing hazardous waste sites, I believe this decision is a positive one. I have been and am a strong advocate of cleaning the BOMARC Site. I believe cleaning the site is the only way to finally once and for all get this issue behind us. I believe it's important to discuss why this is true.

I first became aware of BOMARC many years ago when concerned citizens from the communities in this area, particularly Plumsted Township and Jackson Township, contacted me to express concern about it. It had been proposed by the New Jersey Department of Environmental Protection at the time, which is now known as the Department of Environmental

Protection and Energy, that the already contaminated site be used to dispose of radon contaminated soil from the northern part of our state. I guess it was the position of DEP that if it's contaminated with one type of nuclear material, we might as well put the other one there, too. Together the citizens from Plumsted Township and Jackson Township and I fought off that proposal, and I might add that it wasn't easy.

Also several years ago, it was brought to my attention that we have the technology to clean contaminated soils. A sample of the BOMARC soil was shipped to the desert in Nevada to see if the technology worked and it did work. It was clean through this wonderful advance in technology. Today several companies, one of which is represented here today I understand, have this leading edge technology. I witnessed that process in the desert and I must say that I was very impressed. I understand that there are some technical reasons as to why it may not be applicable to this site, but it was and is one of the alternatives.

Certainly there are some concerns that I have with regard to clean-up. There is the excavation and hauling of soil in the area and many other issues to be concerned with. Some of those questions were answered for members of the community who spent an hour or two here before this meeting. I am also interested to know what safety precautions the Air Force will take on during the excavation of either on-site or the off-site options. I want to be sure, as to members of the community, to know what type of precautions the workers who will be doing the excavation and hauling will be provided with. I think everybody would like to have answers to these questions and again, some of these issues were addressed in the meeting prior to this official hearing.

Another concern is that the BOMARC site is in the protected Pinelands area. And the record should show that the Pinelands Commission is represented here today. All soil that is carted off, I understand, must be replaced by indigenous soil and where is the indigenous soil going to come from is I think a very important question.

We will be able to get started to resolve this issue before January 1 I hope, because I understand there is some question as to whether or not it can be done after that date. Just by coincidence this morning, while I was waiting for an airplane in Hartford Connecticut, I picked up a copy of the Hartford newspaper and the headline story on page one says "States freed from having to take their own waste, pressure is still on companies in nuclear dump site" and I would like to read the first couple of paragraphs of this article for the record as I know it will be something that you will be addressing subsequent to a recent court ruling.

The Supreme Court ruled, it said, in a six/three ruling last Friday, it struck down a key section of the law that had forced states to find ways to dispose of nuclear waste created within their borders. But the court also said that Congress acted properly when it devised a series of incentives to prod states and companies that produce the waste to find ways of getting rid of it. That part of the ruling is critical to companies and states such as Connecticut, and I assume New Jersey, while the state government saw a legal hammer lifted Friday, the mostly commercial generators of low level radioactive wastes are still confronted with the practical problem of finding a way to dispose of it. Ultimately that could force the state governments and Congress back into the fray.

If I am interpreting that correctly, that is the issue that we're discussing, and if I'm interpreting it correctly, that may take some heat off the January 1 date, I hope it does.

Anyway, I hope that we will be able to get started with this process in a short period of time. If we miss this window of opportunity, perhaps I will have a lifetime job as a member of the Armed Services Committee and the Environmental Panel on the Armed Services Committee dealing with this issue. I certainly hope not.

I have serious, in fact I may say very serious concerns, with regard to the status quo option or with the limited treatment option. There is certainly as to future clean-up efforts and the new law which I just mentioned may help to turn the already contaminated BOMARC Site into, perhaps as has been tried in the past, an additional type of radioactive material storage facility. In spite of the fact that there are currently laws that say that that's not possible, laws change as do regulations and as to people's outlook as those laws change. The Low Level Radioactive Waste Policy Amendment places a new question mark on the BOMARC Site, as has this court ruling that I just referred to speaks to that as well. The Amendment governs the shipment of radioactive waste and places the burden of disposal of this waste on the individual states or with a group of states that enter into any particular agreement. In any event, discussions that the BOMARC Site could be conceptually turned into a low level radiation-site causes all of us great concern. It is within the realm of logic of someone to conclude that if we, meaning we the Federal government and the Air Force and all of us collectively, if we conclude that it is not harmful to leave plutonium at the site, then perhaps someone can conclude that it's not harmful to store or contain other waste at the same site, certainly something that we should be concerned about.

I want to also mention here that there is another issue that those of us who live in and represent this area need to be concerned about. We have a community that is centered around

Fort Dix, McGuire Air Force Base, and Lakehurst Naval Engineering Station. We are surrounded by towns like Plumsted and Jackson and Brightstown and New Hanover and North Hanover and Springfield Township and Pepperton Township, and we know how important perception is to our area. Perception that there's a nuclear waste site which remains in this area is not helpful to either us as civilians or to the Army, the Navy, or to the Air Force.

I know the concerns that some have regarding the removal, on the other hand, of plutonium and the possibility that it become airborne would tend to complicate people's perceptions. By having truckloads of low level radiation being trucked away or by having truckloads of low level radiation trucked in all speak to that perceptual problem or that issue that we have to face. I've been an advocate of removal of plutonium since 1967. Today I remain a strong advocate. As I mentioned, a few minutes ago, I hope I don't have to extend my career with regard to this subject because I've been dealing with it for quite some time.

In light of what we know scientifically about this issue, as well as what we know about perceptual issues and about possible changes in regulation and law and about on-site contaminants, it's a substantially illogical conclusion, I believe, to opt for the options that would leave the contamination on-site.

So I look forward to the Air Force's answers to the concerns that I've expressed and I know there will be concerns expressed by members of the community which I know the Air Force will heed and provide good answers for.

I would also just like to conclude by saying that there is a paragraph here which speaks to something which you have mentioned both informally and formally, and that is the cost related to this issue. I happen to believe that the quicker we get to it, the less expensive it will

be. I also happen to believe that there is good reason to believe and hope that the Department of Energy will recognize this as a responsibility of theirs subsequent to us finding that perhaps it could not be disposed of in the expensive commercial site method. I hope we can get to that point quickly so that we can get on with the actual clean-up. And again, I appreciate very much the attention and the wonderful effort that the Air Force has put into bringing us here today. Thank you very much.

Ms. Geil: Thank you Congressman Saxton. If we could look at the newspaper article afterwards, we would appreciate it.

Mr. Ralph Bitter, you can either address at this microphone or --

Mr. Bitter: [Off mike.] Good afternoon. My name is Ralph Bitter, I am Chairman of Plumsted Township Environmental Commission. I have a short statement, and then I have a list of several questions which I would like to read, and I will get through them as quickly as possible. But I would like to list them for the public record.

At the June 8th meeting of our Environmental Commission, we had a discussion of the various aspects of the BOMARC situation. It was decided we were faced with two scenarios. First we had an unstable situation as things stand now. And second, a proposed remediation process about which we knew very little. It was noted that the Environmental Commission had responded in October of 1991 to request for comments from the Air Force for which we never received an answer. After further discussion, also noting that the window of opportunity for shipping contaminated material out of state would close January of 1993, it was found that we simply did not have enough information to reach an intelligent decision regarding the remediation process. As Chairman, I volunteered to monitor the situation and report to the other

commissioners as new data made itself known. And please note that there were no formal resolutions from this meeting.

What we did come forward with were several questions. Just bear with me please, I will get through these as quickly as possible. First of all, we would like to know if the \$30 million appropriated for this project is for this year only or will the project be funded for its lifetime?

What is the projected timeframe to completion of the project?

What methods will be used to transport contaminated material off-site?

How will the material be contained for transport?

How will the material be prepared and loaded for transport?

What provisions for containment on-site during the clean-up will there be to prevent airborne particles from escaping?

What route, type of vehicle and safety measures will be used during transport?

What parameters define high and low level contamination?

What proportions of these materials exist on the site currently?

Local sources claim that Brindle Lake was contaminated during the BOMARC accident. Would the Air Force Examination Team examine this possibility?

If rejected by all the commercial sites, will the material definitely be accepted by the National Repository in Nevada?

Does the remediation process extend to the silo itself?

In regard to the use of larger caliber weaponry at the Fort Dix Firing Range, have you checked for or foresee any breach of containment due to the projectile impacts?

Will this effect the longevity of the containment facilities?

During a proposed remediation process, what safeguards will be on place on-site and along the proposed transportation routes?

What monitoring actions will be used to assure that no loss of containment is achieved?

And finally, could we be able to arrange for a demonstration of either the preferred alternative or the true clean process in its final form so that we representatives of Plumsted accurately report on the procedures involved to our fellow citizens?

Thank you for your time.

**Ms. Geil:** In brief, just to hit on a couple of those and detail they will be in the responsiveness summary, but it was a misunderstanding that there was \$30 million appropriated for this year. The only money that was appropriated for this year was for the actual remedial investigation/feasibility study and to start a remedial design. And there is a request in, this is the time period during which we request money for FY'93 and there is a request in.

For a large number of your questions on the specifics on the remedial design, we have not yet performed the remedial design and they will be addressed at that time. And then there will be, before we actually implement the alternative, there will be another public hearing with the details of exactly what we will be doing. So a lot of your questions we will go over them then.

The parameters, defining the high and low levels and such, those were risk based decisions using EPA standards on excess cancer risk potential.

I think that's most of the currently answerable questions. Thank you for your comments.

**Colonel Case:** You mentioned a lake that had been contaminated, I think I would like to talk to you afterwards about the specifics of that.

Ms. Geil: Mr. Ron Dancer, you had a question.

Mr. Dancer: Thank you very much. As the Mayor of Plumsted Township, I am here without any prepared comments. The governing body has not taken any formal position on the preferred alternative that the Air Force is recommending here this afternoon. However, as has been mentioned at the outset, we have had the opportunity, thanks to Congressman Saxton, to have a pre-meeting if you will, where we have had some more technical questions answered, and that was very informative to help put us in a more informational-gathering mode to make an informed decision. I think that's why I'm here today. We are part of the process, the public is part of the process. We want to gain information and further our education on this issue.

Obviously I think the task before us is to weigh the risk and benefit. And if I could just probably accentuate some of the points that Congressman Saxton has made is that we do have a window of opportunity here I believe for both funding and permitting. And as we approach this January 1, 1993 deadline, I think history and future generations could look back on this process right now and hopefully we will be making a decision that will restore the environmental integrity of not only the Pinelands Reserve but our community, Plumsted Township.

During the pre-meeting, we looked at, and the perception is perhaps, that there is some stable process ongoing right now with the evaluation of any contamination, that it was my perception that it was site specific. And as we have seen in some of the slide presentations, that there was migration of this contamination off-site, if you will the fenced-in area. It is across a public highway, a country road, route 539, a heavily traveled shore route. It is a highway that the Ocean County Planning Board, for example, has informed me that there is a right of way for future expansion of possibly a four lane highway. I think that perhaps in generations to

come and when we're looking at a 24,000 year life of plutonium, can we guarantee the unrestricted access to a fenced in area of the missile base silo, what was it 204?

**Ms. Geil:** 204.

**Mr. Dancer:** But really when you look at the probability that 539 some day, there's going to be land disturbance there, that culvert, there's going to be land disturbance there, we have a contaminant, we have a nuclear waste lying beneath and beside a public highway that's not going to be fenced, it's not going to be contained in perpetuity. I think these are variables that we all need to consider and Plumsted Township will, prior to the closing of the July 15th public comment period, we will submit something in writing to you with a more formal endorsement or recommendation of the preferred alternative.

Just to close, I want to just take an opportunity to thank Congressman Saxton for his tenacity, his untiring efforts to procure the appropriations that are necessary for the clean-up of our environment and future generations to come. Jim, thanks very much for that on your part, and we look forward to being part of this process. I know a lot of our questions are being answered and hopefully we will all make the right decisions for our environment and future generations to come.

**Ms. Geil:** Thank you Mr. Dancer.

**Mr. Bruce Benner,** if I mispronounce names, sorry.

**Mr. Benner:** My name is Bruce Benner, I am with the New Jersey Department of Environmental Protection and Energy. While our formal comments are being prepared at this time, I just wanted to more or less make a statement in reference to clean-up standards that the Department proposed on February 3rd of this year. On page four of the proposed plan, under

summary of health and environmental risks, it stated that federal and state -- I will paraphrase -  
- under federal and state hazardous waste laws acceptable risk is generally defined as risk that  
does not exceed the range of  $10^{-4}$  to  $10^{-6}$ . The clean-up standards that are being proposed by the  
Department are going to have a limit of  $10^{-6}$  protectiveness range. I just wanted to make sure  
that that is addressed. We will be addressing that in our formal comments. Thank you.

. Ms. Geil: Thank you. Mr. Jeff Rightman.

Mr. Rightman: I am going to defer.

Ms. Geil: Okay. Ms. Lucy Bottomley.

Ms. Bottomely: The questions that I had are on the card.

· Ms. Geil: Okay. Please clarify, volume of waste to be transported. There was a slide  
on that -- Phil can you? Phil Watts is our contractor by the way, Earth Technology.

Lucy was also asking about the waste disposal costs, transportation costs, and the  
excavation costs. All of these costs are all summarized together and included in the alternative  
cost for each of them which was -- there's the quantities. Can you see that with the lights as  
they are? Which were in the proposed plan.

[Off mike question.]

Ms. Geil: Oh, what is it? The Ocean County Library? In the Information Repository  
in the Ocean County Library, there actually is the RI/FS is in there with the detailed cost  
estimates that Phil was just mentioning. Those documents are available to you all to look  
through.

**Ms. Bottomley:** These are the volumes in the RI/FS, cost for excavation?

[Off mike comment.]

**Ms. Geil:** Did anyone else have any questions or comments. We can take the slide off at this point, turn the lights back on.

We're finished with cards, if you would like to make a comment, please. If you would just state your name for the record we would appreciate it.

**Mr. Rall:** My name is David Rall and I live in Lakewood. I was here, not here, but I was in this area back in 1987 when things were stirring up in reference to the Mount Clair soil radiation that took place and the fight that you people down here put up to keep it from coming here. That's what aroused my interest in the BOMARC situation. I had heard about it before, but I was even more interested the more I read and the more I heard. So I took it upon myself to look as deep as I could through resource through various library sources, and I came here and spoke to Mayor Charles Horner of New Egypt, and he and I had a long conversation to the BOMARC situation. During that time, when the action actually took place, he was, you might say, a big part of it. And then I also spoke to Mayor Black of Jackson about the same thing. And I got their reactions to the situation. And so I carried it a step further and I wrote a letter to Governor Kane (this was in 1987). I will read what I wrote to Governor Kane for what interest it might have, whether you think I'm right or wrong. Maybe I was wrong, because I didn't get an answer from him, that's either here nor there; at least he did receive it.

I am going to read it verbatim. In June 1960, the nuclear warhead on a 47 foot BOMARC missile caught fire in its bunker at an Ocean County New Jersey Missile Base. This fire turned out to be the worst plutonium accident in the history of our nation. Once the fire

was brought under control and put out on that fateful afternoon of June 7, 1960, the perilous condition of spewed plutonium over the missile site commanded emergency action to suppress the plutonium threat. The entire plutonium contaminant area was promptly filled over with 4 inches of concrete and asphalt to keep the plutonium from becoming airborne and has remained dormant in this state of condition for the last 27 years. At that time, it was 27 years.

Plutonium is considered by many as the most dangerous substance ever handled by man. The recent reputable authorities are wont to say that plutonium is the most dangerous substance twofold, the lethal capabilities and its extreme toxic longevity. Just a spoonful of plutonium dioxide particles, if dispersed in the air, is enough to kill millions of people. It also remains active for a long long time. It must be contained with no leakage for thousands of years. To be more precise, 1 ounce of plutonium could cause a worldwide epidemic of lung cancer. Plutonium if exposed to the air ignites spontaneously. As it burns, it forms tiny particles of plutonium dioxide. One ounce of plutonium can form 10 trillion particles of plutonium dioxide which could remain in the atmosphere with lethal implications for hundreds of thousands of years.

What I have stated is not my interpretation of the dangers and characteristics of plutonium, but instead are actually two established facts from authoritative sources in the field of nuclear science. Needless to say, a silent lethal escape of plutonium from the BOMARC nuclear accident must never happen. If through erroneous handling or any other reason, it becomes unleashed into the atmospheric forces, this radioactive destroyer will jeopardize the health, welfare, and survival of the whole northeast United States and beyond for all generations hereafter.

The reason I explain and put this on the line in such blunt terminology is because not only is it true, but the present meager protection between us and the living public and the deadly effects of plutonium contamination is only 4 inches of concrete apart. A mere 4 inches of concrete is keeping a sleeping giant from shortening our lives and poisoning our environment permanently. This long neglected condition is inexcusable.

I firmly recommend that until a proof positive is devised that will readily enforce total eradication of this deadly substance on the spot, it must not be moved or disturbed in any way for any reason at all. To remove and transport away the plutonium and the contaminated soil it is in will without doubt pose a most serious danger of irreversible genocide to all of us. If expensive experimental research and development were to be instigated at a Federal Department of Energy plutonium division in Hanford Washington, or some other government location being appropriate for this purpose, the safe and correct answer to this devastating situation can one day be found and applied sensibly. In the meantime, I consider it urgently advisable to install an additional 30 inches at least of concrete over the 4 inches of concrete that now exists. Furthermore, continuous monitoring and security of this entire plutonium-contaminated area must remain in force indefinitely. Contamination of the plutonium disposal plant described in the enclosed Star Ledger Article should never be carried out for to do so may mean the beginning of disastrous incurable consequences. Immediate action must be taken to prevent this most serious occurrence or else we have had it for there is no turning back and correction attempts will become impossible when the gamble is lost.

A responsible act by you to enforce the sensible approach to this ugly event of uncertainly will mean more than you will ever know to everyone, Governor Kane. Most

Sincerely yours, amen, David Rall.

Maybe I got carried away, perhaps I made it sound more morbid than it is, but it is a problem that we all have to face. It's an accident that happened and it does cause an awful lot of thinking for people far smarter than me to solve. What I was mainly concerned about was when I read about the fact that the material would be so effective in causing lung cancer and other health hazards, just by being in the air and being unable to be controlled, aroused my concern to go and try to do something about it. Now I can't do it, but I think a coalition of a lot of people could do it and bring this thing into focus. And until a right method is made or is proved positive to handle it, I think we should leave this alone right where it is because you're not playing with a tinker toy or dynamite even, you're playing with something that's beyond our full knowledge as science is today. And I know that other people think otherwise and have thoughts of trying to get it out of our district and put it in Hanford, Washington so it can accompany the other mistakes that we've made, but if you do that I think you're playing a very very serious game with fate that we don't want to happen.

I am not going to say any more and thank you very much for letting me speak my piece.

Colonel Case: Thank you very much. We talked to many of the same people that you probably have with regard to plutonium effects and we think that the plan we have can be done very safely. As a matter of fact, there have been some workers associated with the weapons program for 45 years who have handled plutonium at very high levels and so far as we know, no one has ever gotten cancer from plutonium. So we will address the specifics of the health risks for this whole operation and already have done that to a good extent in the RI/FS and will continue to do that in answer to your comments.

**Ms. Geil:** Anyone else have any comments that they would like to say now? I certainly understand being hesitant to get up in front of the public to speak. Please remember that you can send written comments to me. My address is on the card and we will give it to you again here, up until July 15. We will address all comments received equally whether they are verbal or written.

**Participant:** Can I just ask you if you could backtrack. You have some slides with you I believe that address some of the questions the gentleman asked about airborne, that the gentleman brought up about airborne plutonium particles and how it can be controlled and so on. Would you just show those to us and explain what they are?

**Ms. Geil:** Sure. Bill, or I can, all right.

**Colonel Case:** First of all, one of the comments that was made that plutonium when exposed to the air will ignite. That's true. The plutonium at the BOMARC site did that in 1960. So it's already been ignited. And plutonium that's out there is underneath this concrete in small particles and it's 4 to 5 inches down in most of the soil that's there, so we're not, by digging this material, we're not going to have any more fires of plutonium, it's already been oxidized.

This is the shelter, and we're going to show you some examples of what can be done to contain materials. These were some things that were done while our contractor was out doing the field study. This is a temporary plastic cover, double thickness of plastic over a wood frame, that was constructed over Shelter 204 to be sure that any activities inside didn't disrupt the materials. And it's sealed along the bottom and along the top so nothing can get out.

**Ms. Geil:** One thing I might add is that there are different types of radiation, and the type of radiation from plutonium is alpha radiation which does not have much penetrating power. It is stopped by the dead skin cell layer on top of your skin which is why the potential danger is from breathing it or something because then it can directly get into live lung tissue. But 4 inches of concrete, it won't get through.

**Colonel Case:** The measures we take, the concrete cover and the plastic enclosure, work to control any possible movement of material.

Other things that can be done while working on concrete include surrounding the area with a plastic enclosure, using a very powerful vacuum cleaner that filters particles out of it to gather any dust that gets generated through drilling or through cutting concrete. Residues are collected in this barrel and any material that comes through the air is filtered out by the vacuum cleaner.

This is an example of some work that was done on-site to penetrate the concrete, to get at a manhole cover. You notice the plastic sheeting around is intended to capture the material and then after concrete is broken up, the residues were vacuumed up with this same vacuum cleaner to ensure that no particles were distributed into the air. That's a shot of the manhole cover after the operation was completed. There's no more dust in there, most of that dust was concrete dust and was contained in the barrel with the vacuuming operation.

This is an example of the radiation monitoring technician monitoring around that cover to see whether or not there was any contamination on it and to assess the levels and take some temporary precautions to be sure it doesn't get on their clothes or on their shoes.

One of the things that can be done to address the business of material getting into the air while sampling and certainly while any mitigation efforts go on is to use a device which will actually collect samples in the air and filter out any particles that are in. Dust particles and plutonium particles and then analyze that at the end of the day or the end of the week or whatever the appropriate period might be to see whether any materials actually is getting into the air. This is not a protective measure, this is a measure that will let us assess whether or not what's going on is being done in a manner in which the material is being controlled. And during this entire on-site work that was done for the feasibility study, or the remedial investigation study, nothing was ever detected on any of the air samplers that were operated on this site. And there were at least four, if I'm not mistaken, air samplers run continuously while all of the on-site sampling activities were going on.

[Tape flip.]

-- concrete and other materials, workers are protected because in some cases we don't know what they may get into, but in any case all of that is very local.

More examples of putting plastic down and plastic covered boxes to localize and control the dust that may be generated in the area. This is an example of a coring machine which is being used to core through the concrete and some of the measures that were taken, constructing of a special box around the coring bit. That was sealed to the surface below. The coring bit itself had to be cooled with water which came in through those lines and the water served two purposes. One of the purposes was to cool the bit while the drilling was going on. The other thing was to control any dust that was produced. Since the entire area is wet, dust production was virtually eliminated, and then the water slurry was collected through a vacuum immediately

upon production so it didn't get spread around anywhere. Those are the same kinds of techniques that can be used during construction.

Another example of use of the vacuum cleaner over the barrel and enclosure around an area where some sampling is going on to control any dust, it's collected. Again, monitoring around the area to determine the level of contamination and to be sure that it's adequately controlled. An example of a coring operation, the concrete and soils and areas where hot spots were detected, we took samples to be able to see how far down plutonium may have gone. The point of this is that there's a plastic barrier around to keep winds from disturbing the area and there's also a plastic pipe which is connected to a very powerful suction device, 1,500 cubic feet per minute if I'm not mistaken. The effect of that is to draw air across this surface where the drilling is going on, collect any particles that are produced and any dust that's produced and run that back through a machine that filters out any particles so we're controlling the contamination in all cases. In addition, there is some spray water available to wet down the area. Wetting down the area is very effective in controlling dust. I understand from the people who actually did the site work that that was never needed because the dust production just wasn't a problem.

A temporary enclosure to decontaminate the drilling apparatus which might have had a little dirt or dust on it after the testing was completed. This is a three-sided structure with a swimming pool liner supported by plywood, three-sided to prevent winds from blowing in and to prevent any wash down water from blowing out of the area. Of course any water that was used to wash down the trucks and drilling apparatus and so forth would be contained in this area and then collected and disposed of.

A collection of soil samples on-site and across the ditch, the area across 539. One thing you may note in this case, the technician isn't wearing any kind of a face mask, he's wearing gloves but those are ordinary every day work gloves, and they are there to protect his hands from thorns and rocks and branches, but there are no special precautions in this case being taken for radiation control purposes.

So I appreciate the concern; we are concerned about any catastrophic release of contamination to people in the area, too. We wouldn't be proposing this if we didn't have good evidence that we think this can be done safely and the material can be put in an area where it's designed for control of these areas, which the BOMARC Site is not. Assuming that it can be done in a cost effective manner, it would be a good thing for the Air Force and we hope will be a good thing for the people in Plumsted Township.

Ms. Geil: One other thing, as I'm sure you are all aware, is the soil out around the BOMARC Site is rather sandy and it doesn't create dust very readily out there just in the first place; even if we didn't do any of these sorts of activities. And we do have planned in the cost estimates, money set aside for designing particular things like that box around the coring facility and such so that whatever details on the remediation as we're designing it, those sorts of things there is money being set aside for designing those sorts of things, too.

Were there any other questions or comments? Yes Sir.

Participant: [Off mike.] I wanted to ask you, when you took samples of the site, you only took edge fringements, am I right?

Ms. Geil: Edge fringements?

**Participant:** Meaning you only, you took the chance of taking samples from the site where the accident happened, and they just took new pieces from around the edge, is that correct?

**Colonel Case:** No.

**Ms. Geil:** No.

**Participant:** How large samples were they?

**Ms. Geil:** A large number of samples were taken. Each sampling analysis can only handle a certain amount of soil, so the size of the sample is not what's important but the number and the area over which they are taken.

**Participant:** [Off mike.] My point is that I think that you were not just -- if you delve too deeply into it to get a sizeable sample, you could create a problem bigger than you --

**Ms. Geil:** We took those coring samples.

**Colonel Case:** You need to understand that in some cases there were measurements made with instruments on the ground to detect the highest levels that could be detected. And then those areas were sampled and removed as part of the testing process. So the samples were not limited to around the edge of this material. There were samples from some of the various areas with the highest readings that could be found to try to get a handle on what the real risk could be. So we have been into, and in fact by the sampling process, have probably removed some of the hotter areas that are on that site.

**Ms. Geil:** That drill rig that we had a slide of in there, one of the places that was selected for sampling was the higher areas and we took cores down 24 inches, right, in places? Ten feet and it only -- we should have Phil give some of the details here -- but they were deep

samples taken and it was not shown to have migrated down in the column. There was more fill put on top of it so some of the radiation was found lower down, but that was fill put on top of it afterwards in order to contain the plutonium.

**Participant:** [Off mike.] What I was trying to get at was were those samples productive enough to make the technology that Congressman Saxton -- feasible to do the job that everybody seems -- I mean were they just light samples, it might not be as effective is what I was driving at.

**Ms. Geil:** These were samples, this was a feasibility study remember, so all we were wanting to do was to be able to determine what types of things might be useful. We still need to do the remedial design which may include taking some more samples possibly, and we will be taking samples during and after the clean-up to make sure that we've gotten all of the areas.

**Colonel Case:** I would like to add also, I heard a new part of your question and that addresses the on-site processing where as one of the alternatives we talked about using a technology that would be able to remove some of the plutonium from the soil and return cleaner soil to the site and take the more contaminated stuff off and bury it at a radioactive waste facility. Our preferred alternative doesn't include that particular technology.

**Participant:** It ought to be considered.

**Ms. Geil:** It is being considered. Part of the problem with it is that it does not clean the soil so that there is nothing in it, it simply concentrates most of the plutonium and there is still plutonium in the clean part of it too. It's not 100 percent removed.

**Colonel Case:** The site has a number of different sources of contaminated materials, one of those is soil. Fortunately or unfortunately, the more heavily contaminated materials are not

soil. The more heavily contaminated materials are concrete and asphalt, and fortunately for us that's what has been containing this material over the 30 plus years since the accident. Now, as I understand it, the process that was being used would be very difficult to apply to the concrete and asphalt.

**Ms. Geil:** It does not apply to asphalt.

**Participant:** [Off mike.] In answer to your remark about the effects of plutonium on human health, I have an article written in the Asbury Park Press in 1987 by a Patricia Malum - - but in this article, which is titled BOMARC Fire Concerns Linger in Homestead Area, and in this article she states, and I will read verbatim, plutonium, a manmade element, emits alpha particles not strong enough to penetrate the skin, but able to cause internal bleeding in lungs or bone marrow cancer if inhaled or ingested. I just wanted to say that so that people would be aware of it.

**Colonel Case:** I'm aware of that and I am also aware that for the employees of the government who worked at Los Alamos and worked with plutonium and developed the bomb, who have plutonium in their lungs, none of them have yet developed cancer.

**Participant:** But you being aware of it, I wonder why you made the statement earlier, that's why I brought it up, and I also want to add one more question before I sit down. Why did it take the government so long to bring this thing to where we are today. I mean something of this magnitude should have been addressed a long time ago and straightened out one way or the other. I want to know what you have to say in reference to why this thing has dragged and dragged. What pressures on it and yet all this -- something that you just didn't want to deal with. I think the public has a right to know what they've got here and how it should be straightened

out.

**Ms. Geil:** Part of it was in reference to exactly the concerns that you had on how to deal with the issue. So we put on the concrete and the asphalt in order to contain the material and we did annual surveys and such to make sure that it wasn't going anywhere and then some of these technologies such as Congressman Saxton brought up were developed. And at that point is when we decided to take a closer look at the BOMARC Site and see whether we should do something different than what we had been doing.

**Colonel Case:** I would have to add in addition to that that there are some legislation that exists today that didn't exist in those days, having to do with environmental clean-up and environmental restoration and that's a very very useful and helpful thing to us to try to deal with this issue now when previously it would have taken other resources from other programs to deal with the issue. And we felt that the site was being adequately controlled and we still do, but this is an opportunity that may not last forever for us to permanently deal with the situation and that's what we're trying to do.

**Participant:** [Off mike.] Mayor Dancer brought up a situation that I don't think anybody has considered and that was the fact that in years to come, long after we're all gone, you've got areas around there where action is going to take place that will disturb the environment that contains the plutonium.

**Colonel Case:** All the more reason for us to get on with the preferred alternative.

**Mr. Saxton:** I would just like to see I am really pleased that the gentleman is bringing all these questions because they are questions that linger someplace, and we all try to be reasonable, but there are questions that linger in everybody's consciousness and they have in

mine. This issue was first brought to light in modern history kind of by accident when Ken Dowling, then Commissioner of DEP decided that this was a -- and we got looking at some of the possibilities that existed then and as a result of that the newspapers wrote a lot about it as you know and as a result of those newspaper articles, I was contacted by a group that had developed the technology that separates this type of plutonium from dirt, they had a device called a centrifuge which is what I saw which works as Sharon points out. It separates plutonium at the bottom of a little drum in that process -- and I went out there and saw that and there were volumes, I don't know how to tell you how much dirt there was there that had been excavated here and carted out there, but it was measured in terms of 50 gallon drums and I was impressed with that. Apparently there are some reasons why it is not the best way to go here. I am not a scientist, I can't make those kinds of decisions. But I want to say, I'm pleased that you brought up the concerns that you did because we all have those concerns and that's one of the reasons we're even at the place that we are, to ensure that they are adequately addressed. I want to make sure from my point of view and for my constituents who I care about.

**Ms. Geil:** Thank you. Do you have a question?

**Participant:** [Off mike.] If you identified an area west of 539 as a hot spot, would you think it's from the water, why weren't your samplers there using any kind of precaution?

**Colonel Case:** Because the levels aren't high enough to cause any real radiation exposure problem. They're just higher than some of the levels that environmental standards intended to address long long long term occupancy would be a concern.

**Participant:** [Off mike.] If your window of opportunity closes in '93, and you -- you would not then make any kind of --

**Ms. Geil:** The existing conditions alternative also includes extending the fence, but at a DOE facility that the low level radioactive waste contact does not affect implementability, if DOE accepts it.

**Colonel Case:** Our preferred alternative includes negotiation with the DOE to use one of their sites. And if that indeed comes to fruition, the provisions of the 1 January '93 which affect commercial waste sites won't affect that. So that's why we're working hard to try to come to an agreement on all of that.

**Participant:** Do you have any idea what those three geophysical anomalies were outside the plan?

**Colonel Case:** Not yet.

**Ms. Geil:** The launcher is a possibility, there are other drums.

**Colonel Case:** Buried utilities.

**Participant:** [Off mike.] So an area of radiation that is not contained -- you are talking a lot about how airborne particles are -- and this butts up right against a highway and --

**Colonel Case:** I don't think it really does. It's in the ditch and it looks like it butts up right against the highway, but it's not really accessible to anybody. Folks aren't in there driving trucks through the ditch and those kinds of things. They are not in there rooting around and digging and those kinds of things. The levels are really very low.

**Participant:** Can I add one more question? I was concerned when you were talking and having those various things put on the screen, there was something that was misplaced and it said, if found -- I think it was when the young lady was talking. I guess it was the launcher?

**Ms. Geil:** Right.

**Participant:** If found? I want to know how it got lost or furthermore I want to know why there's no record as to where it is because that's just as contaminated as anything else around here.

**Colonel Case:** We don't know that it's lost and we don't have the record. I wish we had the record too. We know that it can't be any more contaminated than the rest of the building, it's not very contaminated, frankly.

**Participant:** Apparently, what was everybody doing to try to contain the situation and I imagine that that piece of equipment was carried off somehow and put in some remote area, I don't know where, underground.

**Ms. Geil:** Probably buried right behind the shelter, which is where some of the --

**Participant:** Any way of detecting it with --

**Ms. Geil:** Geophysical --

**Colonel Case:** It should have been found. There was, just for your information, the major amount of material, the plutonium was packaged up and shipped to Texas and eventually found its way to the Pantex Plant in Amarillo and then to the Nevada Test Site. There was also a shipment of some other materials from inside the shelter, the missile itself, the debris from the missile itself, and other things from inside the building were packaged up and shipped to we believe the Idaho National Engineering Laboratory in Idaho Falls Idaho. The records of the shipment just aren't that specific. They just say contaminated materials and debris from inside the missile shelter and that's it. It doesn't say one each missile launcher, I wish it did then this problem would go away.

**Major Bossick:** Thank you. Are there any other questions or comments. I suppose we should put my address up above.

Again, we want to thank you for coming today and for your comments and such. I think you can look in the future for a public hearing or two or more. If you have any questions that you may think about later that you didn't bring up today, please send them to Sharon. She's the gatherer of all questions and comments, and they will give the report out on this hearing sometime in the future.

We have until July 15th to get those comments in. Turn the light on the slide projector.

That's my office. While he's getting through to look for Sharon's address, remember the Burlington County Library is a repository for the volumes of information that is available on the processes that we've done with the BOMARC Site. So if you really want to get into it, it's a good place to go.

**Ms. Geil:** There's the library. My address. I want to thank you all very much for coming.

**[Whereupon the meeting was adjourned.]**

**APPENDIX B**  
**LETTERS**



# Manchester Township

Environmental Commission

1 Colonial Drive

Lakewood, New Jersey 08733

(201) 657-8121

July 2, 1992

Ms. Sharon Geil, Project Manager  
HQ AMC / CEVR  
Scott Air Force Base, Illinois 62225-5001

Dear Ms. Geil,

The Manchester Township Environmental Commission has reviewed all five alternatives for the cleanup of the BOMARC Missile Accident Site at McGuire Air Force Base.

We support the preferred alternative because it addresses cleanup of the site and will permanently reduce the source of contamination at the site.

Very truly yours,

*Lauren Warner*

Lauren Warner  
Vice Chairperson  
Environmental Commission

LW/mac

cc: C. Cicalese  
K. Vanderziel  
R. Turner  
EC / file

mlr, 8 Jul 92, 1230

VR

**Pinelands  
Preservation Alliance**

120-348 Whitesbog Road - Browns Mills, NJ 08015 - (609) 983-4707

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Wash., DC; Former NJ  
D.E.P. Commissioner

Judith Shaw Berry  
Former, Public Policy  
Advisor; Former Chief  
of Staff, NJ D.O.T.

Howard P. Boyd  
Past Pres. American  
Entomological Society; Author,  
*A Field Guide to  
The Five Burners of NJ*

Bonnie Ellis Churchill  
President, World Affairs  
Council of Philadelphia

Sally Dudley  
Executive Director,  
As'n of NJ  
Environmental Commissioners

Michael Callaway  
Pinelands Coordinator,  
Sierra Club

Nan Weston-Walnut  
Coordinator,  
Five Burners Coalition

David F. Moore  
Executive Director,  
NJ Conservation Foundation

Paul B. Moss, Jr.  
Executive Director,  
F. M. Kirby Foundation, Inc.

Franklin E. Parker  
Director, NJ Field Office of  
Trust for Public Land

James T.B. Tripp, Esq.  
General Counsel,  
Environmental Defense Fund

Cezmi Vrta, Ph.D.  
Retired Chemical Engineer

July 3, 1992

Ms. Sharon Geil  
Project Manager  
HQ AMC/CEVR  
Scott Air Force Base, Ill 62225-5001

Dear Ms. Geil:

The Pinelands Preservation Alliance has reviewed all five alternatives for the BOMARC Missile Accident Site, McGuire Air Force Base, New Jersey.

We are opposed to alternatives #1 and #2 because they do not address cleanup of the site. Alternative #3 addresses only a limited amount of contaminated materials and does not address cleanup of the entire site.

The two remaining alternatives, #4 and #5, address the same amount of cleanup. One method treats the soils with any sources less than 8 picocuries per gram being returned to the site. The other does not excavate any sources that are below the 8 picocuries per gram. The difference between the two would appear to be the amount of activity and construction on site that would be required to accomplish this, with alternative #4 requiring the greater amount.

We support the preferred alternative #5 because it doesn't require additional construction or disturbance to the site area. Also, it will permanently reduce the source of contamination at the site.

Sincerely,

*Theresa Lettman*

Theresa Lettman  
Project Manager-Monitoring Network



DEPARTMENT OF THE ARMY  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
WANAMAKER BUILDING, 100 PENN SQUARE EAST  
PHILADELPHIA, PENNSYLVANIA 19107-3390

JUL 06 1992

REPLY TO  
ATTENTION OF

Environmental Resources Branch

Ms. Sharon Geil  
HQ MAC LEVC  
Scott AFB, Illinois 62225-5001

Dear Ms. Geil:

Thank you for providing us with the opportunity to review the Final Environmental Impact Statement (FEIS) for the BOMARC Missile Site, McGuire Air Force Base, New Jersey.

Response to our comment (identified as comment #24 in Vol. 2: Public Hearing, Comment and Consultation Letters, of the Final EIS) has been noted.

Your response indicates recognition of the requirement to secure a 404 permit (issued by the Department of the Army), as mandated by the Clean Water Act (CWA), prior to impact (placement or discharge of fill material) on the waters of the United States. Please keep this requirement in mind while developing plans for the final selected alternative.

Please direct any questions to Ms. Mary Marshall of the Environmental Resources Branch at (215) 656-6561.

Sincerely,

for *John A. Burns*  
Robert L. Callegari  
Chief, Planning Division

CP: CENAD-PL-R/Doukas

MLC, 14 Jul 92, 1350

Municipal Clerk (609) 758-2241  
Tax Assessor (609) 758-1518  
Tax Collector (609) 758-2266  
Finance Office (609) 758-0161  
Mayor's Office (609) 758-2262  
Construction Dept. (609) 758-1517  
FAX (609) 758-0123

## Township of Plumsted

Municipal Offices  
P.O. Box 398  
New Egypt, New Jersey 08533



July 9, 1992

Mr. & Mrs. Andrew Favara  
RD 1, Box 143A  
New Egypt, NJ 08533

Dear Mr. & Mrs. Favara:

Thank you for your letter of July 1 regarding the U. S. Air Force proposal to remediate the BOMARC site of plutonium contamination with off-site disposal. The public comment deadline period established by the U. S. Air Force is July 15. I am forwarding your letter to Sharon Gail, Project Manager, HQ AMC/CEVR, Scott Air Force Base, IL 62225-500, in order to be part of the official proceedings. Your comments are important to both the Township and the U. S. Air Force during this concensus building, decision making process.

By copy of this letter I am requesting the U. S. Air Force Officials to answer the questions in your correspondence. I am also forwarding a copy of your letter to our Environmental Commission for their perusal. As you may be aware, the Chairman our Environmental Commission, Ralph Bitter and I have personally attended all public hearings on this matter.

Thank you, once again, for your interest. I would enjoy speaking with you personally, please call.

Very truly yours,

  
Ronald S. Dancer  
Mayor

RSD:djh

cc: Environmental Commission  
Scott Air Force Base ✓

mls. 19 Jul 92. 11:57

ANDREW FAVARA  
RDI BOX 143A (Woolkill Rd)  
New Egypt, NJ 06533

01 July 92

Honorable Mayor Dancer,

Based on the information I have read, and heard it seems obvious to me that the BOMARC site should be cleaned up for the following reasons.

1- The concrete containment tank housing much of the plutonium at the BOMARC is not going to last for ever. Cracks are inevitable over a period of time. Maybe the cracks won't happen for decades, but everything wears out sooner or later.

2- The plutonium in the drainage ditches under Rt 539 seems to pose a more immediate threat. If it hasn't already seeped into the ground, and possibly the water, couldn't it at anytime? Also an accident (car or truck), which happens somewhat frequently on Rt 539, in the vicinity of this unspecified area could contaminate everyone involved including rescue people.

I would imagine any significant disturbance, such as an accident, could also cause contamination of soil and water to exacerate.

3- If the BOMARC site became a dumping ground for plutonium, cesium-137 and other radioactive wastes all of Plumsted and communities for miles around would see a definite decrease in property value. Just because a person lives 5 or 10 miles away they shouldn't become complacent. I doubt if anyone knows the distance that one would have to live away from such a site to be safe from any deleterious effects it would have on air, soil and ground water.

RECEIVED

JUL 16 1992

Plumsted Twp.  
Clerk's Office

p. 2

4- Those who feel smug about being a "few miles away" might want to think about how radioactive materials will be transported to this dumping site. Can you envision trucks criss-crossing Plumsted, Hanover, Upper Freehold, etc. with tons of radioactive wastes. Can you envision the potential disaster if one or more of these trucks has an accident, possibly on my or your front lawn for instance.

If the waste was transported by train spillage could still occur. According to the Federal Railroad Administration at least 830 leaks of hazardous materials occurred each year between 1982 & 1986.

In 1982 - 839 spills  
 1983 - 868 spills  
 1984 - 996 spills  
 1985 - 842 spills  
 1986 - 836 spills

So people must be aware that if we become a dumping site for other radioactive wastes not only does the site become a potential toxic problem, but also the routes traveled by trucks, trains, planes or ships become potential sites for accidents and spillage.

(and questions)  
 I have many other concerns<sup>1</sup> such as where does the Pinelands Commission stand on this? Who (if anyone) would conduct the clean-up and who if anyone would regulate the clean-up?

State Senator John Dorsey (R) has been active in opposing food irradiation in New Jersey, and may have some insight.

In conclusion I (we) feel that the township, the county, the state and federal government should do what ever it takes to safely remove the plutonium from the BOMARE site.

Remember plutonium waste is forever. If we allow ourselves to become a dumping ground for the State, the physical and psychological damage it will cost will-havnt future generations indefinitely.

P.S. Is there a grandfather clause? In other words if we start the clean-up before 1 Jan 93, but ~~don't~~ do not finish except will we be permitted to complete the out of state shipments of wastes after 1 Jan 93?

I would hate to think we would be rushed once the clean-up got started. Haste make waste. Lets not let this become a crisis!

Sincerely

Andrew J. Favara  
Dennis L. Favara

VK



State of New Jersey  
Department of Environmental Protection and Energy  
CN 402  
Trenton, NJ 08625-0402

Scott A. Weiner  
Commissioner

July 10, 1992

Ms. Sharon Gail  
HQ MAC/LEEVC  
Scott AFB, IL 62225

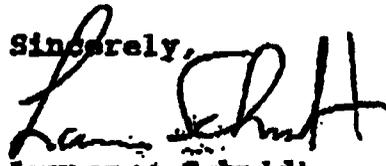
RE: BOMARC

Dear Ms. Gail:

The Office of Program Coordination of the New Jersey Department of Environmental Protection has completed its review of the Final Environmental Impact Statement for the BOMARC Missile Site. The New Jersey Department of Environmental Protection concurs with the selection of the off-site disposal of radioactive waste as the preferred alternative for the remediation of the BOMARC Missile Site. We offer the attached comments regarding potential impacts to groundwater for your consideration. We hope that they will be helpful to the Air Force as this project proceeds to the remediation stage.

Please contact Gwen Barunas (609-633-1455), Case Manager, in the Department's Bureau of Federal Case Management of the Division of Responsible Party Remediation if you have any question regarding the Department of Environmental Protection and Energy's review of the Remedial Investigation/Feasibility Study.

Thank you for giving the New Jersey Department of Environmental Protection and Energy the opportunity to review the Final Environmental Impact Statement.

Sincerely,  
  
Lawrence Schmidt  
Director  
Office of Program Coordination

c: Gwen Barunas

Attachment



State of New Jersey  
Department of Environmental Protection and Energy  
Division of Publicly Funded Site Remediation

CN 413  
Trenton, NJ 08625-0413  
Tel. # 609-984-2902  
Fax # 609-633-2360

Scott A. Welner  
Commissioner

Anthony J. Fano  
Director

JUL 06 1992

MEMORANDUM

JUL 10 1992

To: Gwan Barunas, Case Manager  
Bureau of Federal Case Management  
Division of Responsible Party Site Remediation

From: Jeff Story, Geologist  
Bureau of Ground Water Pollution Abatement  
Division of Publicly Funded Site Remediation

Subject: Final Environmental Impact Statement for the BOMARC  
Missile Site, McGuire AFB, May 1992

Background

The above-referenced Environmental Impact Statement (EIS) pertains to the investigation of the impact of weapons grade plutonium (WGP) and its daughter products on air, soil, structures, surface water and groundwater resulting from a missile fire and explosion which occurred at the site in June 1960. The EIS was revised to incorporate comments provided to the USAF by the Department and USEPA - Region II during the January 9, 1992 meeting on the Remedial Investigation/Feasibility Study (RI/FS) and the EIS, in subsequent correspondence, and a public hearing held on October 3, 1991 regarding same.

The EIS is not acceptable to this bureau since information obtained in the RI/FS is inadequate, particularly regarding the potential for impact to the groundwater at and near the site. The following comments denote deficiencies in the EIS. Comments regarding cleanup of contaminated soils which may impact groundwater are deferred to the Technical Coordinator.

General Comments

1. Information obtained during the RI/FS indicated that there is no WGP in groundwater at the site. Therefore, the environmental impact of plutonium in groundwater was not considered in the EIS. It is considered by this bureau that there is, in general, a lack of information regarding site-specific groundwater quality to determine if it has been impacted by radionuclides. Likewise, the potential for

Gwen Barunas

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colloidal transport of plutonium in groundwater, if any, was not sufficiently evaluated in the RI/FS.

2. The preferred alternative is offsite disposal of contaminated materials. This bureau concurs with this alternative. However, additional information on groundwater quality must be obtained to determine if it has been impacted by activities at the site.

#### Specific Comments

3. Section 2.2; NEPA No Action Alternative

- a) Included in this alternative are radiological surveys. These surveys would include "sampling of 10 on-site groundwater-monitoring wells". Monitoring of offsite wells is not included in the proposal.

Information regarding water quality and groundwater flow directions and rates is needed in both onsite and offsite areas. Additional monitoring of groundwater both on and off the site must be conducted under a supplemental RI to determine the potential impact to groundwater quality. The results must be included in a revised EIS.

- b) The frequency, duration and monitoring parameters were not specified.

The frequency, duration and parameters for groundwater monitoring must be specified.

4. Section 3.3.3.2; Groundwater Flow Characteristics

It is stated that "a groundwater divide exists adjacent to Ocean County Route 539. However, no groundwater elevation data to the west of the site is available, and a definitive groundwater divide cannot be established."

A monitoring well(s) must be installed west of the site to verify groundwater flow characteristics in that area. This activity must be included in a supplemental RI work plan. The results must be included in a revised EIS.

5. Section 3.3.3.3; Groundwater Quality

- a) It is stated that "Limited groundwater quality information is available for the BOMARC Missile Site. The data collected at the site have focused on site-derived contamination". No site-specific information was provided in the RI/FS on major ions, organic carbon content and oxidation state of the groundwater.

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Submittal of this information must be included in a supplemental RI report. It will indicate if the groundwater environment is conducive to colloidal transport, and therefore, the migration of radionuclides adsorbed to the colloids. Evaluation of these data must be included in the revised EIS.

- b) It is stated that "It is not clear whether the plutonium detected at various times and in varying wells represents samples contaminated with the surface-contaminated soils, or if it reflects the actual presence of plutonium in the groundwater."

To fully assess the presence of plutonium and to determine the impact to groundwater from plutonium, if any, additional groundwater monitoring must be proposed in a supplemental RI work plan. Results must be discussed in a revised EIS.

- c) "It should be noted that because plutonium has low solubility and high sorption, it can be transported through groundwater with soil colloids. However, this type of transport is very erratic and difficult to predict. Relatively long-term pumping and sampling would be needed to actually detect its presence in a monitoring well."

A long-term groundwater monitoring program (e.g., annually) must be proposed in the supplemental groundwater RI report. Data obtained during this monitoring must be used to verify that plutonium is not present in groundwater at or near the site and to evaluate the potential for migration (e.g., by colloidal transport) of plutonium or its daughter products due to the existing groundwater characteristics (e.g., oxidation-reduction potential and organic carbon content, both natural and anthropogenic).

- d) It is stated that "Standard water supply parameters (i.e., inorganic species and others) have not been evaluated at the site."

Such data, including oxidation-reduction potential ( $E_H$ ), dissolved oxygen and total organic carbon (TOC), must be submitted in a supplemental RI report. Results, and their bearing on radionuclide migration, must be discussed in the revised EIS.

6. Section 3.3.3.4; (Groundwater) User Inventory

It is stated that "The BOMARC Missile Site is located within the area supplied by the Lakehurst Naval Air and Engineering Center (NAEC) Water System. A few other private, industrial, and agricultural groundwater users exist within the region (Battelle Columbus Division, 1988). The USAPOEHL

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(1988) study identified several private residence wells within one to three miles of the site." In Volume 3, Methodology Development, it is stated that "Individual private wells may exist in the region near the site, however, additional research and/or survey work is needed to confirm the existence and use of all wells in the area."

It is not clear if the additional survey work has been completed or whether a formal well search of Department well records was conducted. Clarification is required. A well search must be conducted of all domestic wells within a half-mile radius of the site and all public supply wells within a one-mile radius of the site. Results must be discussed in the revised EIS.

7. Sections 4.1.2.2, 4.2.2.2, 4.3.2.2, 4.4.2.2, and 4.5.2.2; Groundwater

The impact to groundwater resulting from each of the five remedial alternatives is evaluated. It is stated that, "As discussed in Section 3.3.3.3, groundwater sampling and analysis indicated that no radioactivity associated with plutonium could be detected" and, "Due to the insoluble nature of the contaminants and their adsorption to soils, contaminants are not likely to be found in the groundwater." The information provided in the RI/FS left doubts regarding the presence of plutonium in groundwater and no information was provided on the solubility of plutonium or americium.

Solubility data must be provided in the supplemental RI report. To determine if plutonium is present in groundwater, the USAF must perform additional groundwater monitoring. Results must be discussed in a revised EIS.

8. Section 4.2; NEPA No Action Alternative

Operational procedures implementing this alternative would include "quarterly visual inspections" and "radiological surveys once every 5 years".

The frequency of groundwater monitoring must be on an annual basis, at a minimum. Additional information on radionuclide presence and transport in groundwater is necessary prior to determining an acceptable, ongoing monitoring program. Such a monitoring program should be proposed following the supplemental RI conducted in accordance with Department recommendations.

9. Volume 3, Appendix 3-2, Section 2.2.4; Flow Net Characteristics

It is stated that "Groundwater movement to the north is not

Gwen Barunas

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expected, although water level data are not available to verify this condition."

Verification of the directions of groundwater flow must be included in a supplemental RI report. Results must be discussed in a revised EIS.

Should you have any questions regarding this memorandum, I can be reached at 2-8427.

GW0379

c. Gary Crock, BGWPA  
Irene Kropp, BGWPA  
Jill Monroe, BGWPA  
Teruo Sugihara, BEERA



State of New Jersey  
Department of Environmental Protection and Energy  
Division of Responsible Party Site Remediation  
CN 028  
Trenton, NJ 08625-0028

Scott A. Weiner  
Commissioner

Karl J. Delaney  
Director

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED  
NO. P 642 608 849

13 JUL 1982

Ms. Sharon Geil  
BOMAC/LEEV  
Scott AFB, IL 62225-5001

Dear Ms. Geil,

Re: BOMARC Missile Site  
McGuire Air Force Base  
Wrightstown, Burlington Co.  
Draft Proposed Plan

The New Jersey Department of Environmental Protection and Energy (NJDEPE) has reviewed the draft Proposed Plan (PP) for the BOMARC missile site and has the following comments:

- 1) The proposed New Jersey Cleanup Standards utilize a health risk basis of  $10^{-6}$ . Remediation to a health risk level of  $10^{-4}$  is not acceptable.
- 2) The issue of chemical contaminants at this site was to be evaluated by a parallel investigation (the IRP). This investigation was canceled due to a lack of funding. The presence of chemical contaminants on site must be addressed.
- 3) Page 1, para. 2 - The plutonium loss was described as "a small amount." This contradicts the RI/FS (page ES-1, para. 5) which states "a substantial amount of plutonium was exhausted from Shelter 204 during the incident." The description that the loss was substantial is supported in the RI/FS which indicates that up to 300 grams of weapons grade plutonium was involved (Section 4.1.5.3.2, para. 3). The characterization of the loss as "small" should be corrected.
- 4) Page 1, para. 5 - The proposed plan does not comply with "applicable state cleanup standards". This statement must be amended accordingly.
- 5) Page 3, Nature and Extent of Contamination - Information provided in the RI/FS report and SIS were inconclusive regarding the presence of weapons grade plutonium (WGP) in ground water at the site. Information on general ground water quality (e.g. oxidation/reduction potential, dissolved oxygen and total organic carbon) was not provided so an evaluation of colloidal transport of WGP, if any, in ground water could not be performed. A monitor well was not installed and sampled in the ponded area which received significant amounts of runoff during and after the fire fighting activities. Surveys have detected significant levels of radioactivity in soils in this area.

In order to evaluate this area, a supplemental RI work plan for ground water must be submitted to the Department.

- 6) Page 3, para. 5 - This paragraph implies that little movement potential for the plutonium exists. This is seemingly contradictory to Section 4.1.5.2.1, para. 2 and 3 in the RI/FS which imply or state "movement to and out of the ponding area has probably taken place during major storms since the ditch was asphalted."
- 7) Page 4, Summary of Health and Environmental Risks - The evaluation of the potential risks to future on-site residents did not include the potential risk of unrestricted use of ground water at the site. Insufficient information was provided in the RI/FS to determine if WGP is present in ground water. The most abundant isotope of WGP has a half-life of approximately 24,000 years. It is uncertain if site access restrictions can be maintained for that period of time. The NJDEPE requests that this issue be discussed.
- 8) Page 5, Cleanup Levels - Cleanup levels for ground water, surface water and air were not established since "no concentrations of radionuclides attributable to the missile accident were detected in" these media. A supplemental RI to investigate the presence of WGP in ground water at and near the site must be completed to determine whether plutonium found in some wells during the first round of sampling was the result of the drilling operation or if it is indeed in ground water at the site. If present, cleanup levels for WGP must be developed using the Department's proposed Cleanup Standards for Contaminated Sites and the maximum contaminant levels (MCLs) for radionuclides contained in the New Jersey Safe Drinking Water Act (N.J.A.C. 7:10-1 et seq.). The cleanup levels must be protective of a Class I-PL (Pinelands Preservation Area) aquifer.
- 9) Page 9, The Preferred Alternative - The USAF prefers to dispose of the BOMARC waste in a Department of Energy (DOE) low-level radioactive waste facility. This alternative is acceptable provided that a supplemental RI work plan for ground water is submitted to the Department.
- 10) Page 10, para.2 - The Air Force is apparently reserving the right to modify the results of the RI/FS process at some time in the future based on its own to-be-developed evaluation of the cost-effectiveness of the preferred alternative. This is questioned on the basis that cost analysis is already a part of the FS. The FS figures should be sufficient to evaluate the cost-effectiveness of the alternatives and this analysis should have already been a part of the process in which the Air Force identified the preferred alternative.
- 11) Page 10, para.4 - The excavation of source material at 8 picocuries per gram will not address the ponding area on the other side of Route 539 which is the most contaminated site outside the confines of the BOMARC installation proper. As this site is unsecured and is a source of radioactive material potentially subject to movement into a downstream wildlife area, this is unacceptable.

Should you have any questions, please do not hesitate to contact me at (609) 663-1455.

Sincerely,



Roman S. Luzicky, Section Chief  
Bureau of Federal Case Management

cc. Gwan Barunas, BCWPA  
Teruo Sugihara, BEKRA  
Jeffrey Story, BGWPA

W122EZYBOMARC

Municipal Clerk (908) 759-2241  
Tax Assessor (908) 759-1518  
Tax Collector (908) 759-0288  
Finance Office (908) 759-9161  
Mayor's Office (908) 759-2262  
Construction Dept. (908) 759-1517  
FAX (908) 759-0128

# Township of Plumsted

Municipal Offices  
P.O. Box 398  
New Egypt, New Jersey 08533



July 14, 1992

Ms. Sharon Geil  
HQ. AMC/CEUR  
Scott Air Force Base  
Illinois 62225-5001

As the host Municipality to the BOMARC Missile Base plutonium contamination, Plumsted's Governing Body, the Township Committee and our Environmental Commission have been active participants in the public hearings process.

During the June 20th public hearing, two issues of significant concern were discussed.

First, while the contamination around silo 204 is a fenced-in site specific area with unlikely breach of containment, the plutonium is also off-site in a drainage ditch in a culvert, and directly under heavily traveled Route 539. Undoubtedly, there will be land disturbance to this public highway and culvert in the future for reconstruction. With the likelihood of land disturbance being unavoidable, serious consideration must be taken to safely remove the contaminate.

Secondly, this proposal has a window of opportunity for both permitting and funding. As of January 1, 1993, a federal deadline takes effect after which no low-level radioactive waste can be shipped from New Jersey because of a law that requires states to fund their own regional disposal area. Not only could the BOMARC site be a final resting place for this plutonium, but our township could become the State's depository for low level radioactive waste notwithstanding present day Pinelands regulations.

Confronted with this limited window of opportunity, Plumsted Township caveats the U.S. Air Force preferred alternative of off site disposal with the following comments:

- The Plumsted Township Committee, Plumsted's Environmental Commission and Plumsted's Office of Emergency Management must be involved in all phases of site remediation planning and activities. Prior to the commencement of the next phase, Implementation Planning, Plumsted Township requests that our representatives from the aforementioned Bodies be appointed to ensure our input and involvement.

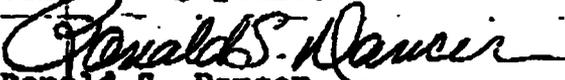
Ms. Sharon Geil - Page 2 -

- Discuss the practicality of constructing an impermeable "Bubble" for all excavating areas.

- Prior to Implementation, further mitigate any risk by developing a contingency plan in the event of a transportation accident and spill.

Plumsted Township acknowledges and thanks Congressman Jim Saxton for his writing efforts and tenacity to provide our Community with this window of opportunity for funding and permitting to restore the area's environmental integrity.

Very truly yours,

  
Ronald S. Dancer,  
Mayor

RSD:j

Cert-KRR

cc: Congressman Saxton

Chemical Waste Management, Inc.  
140 Stoneridge Drive  
Columbia, SC 29210  
803/779-0900

July 15, 1992

Sharon Gell  
Program Manager  
HQ MAC/LEEV  
Building P, 40 West  
507 A Street  
Scott AFB, IL 62225-5022

Subject: Comments on Proposed Plan - BOMARC Missile Site

Dear Ms. Gell:

Chemical Waste Management, Inc. suggests that you consider utilization of volume reduction and waste minimization techniques prior to off-site transportation and disposal of the plutonium contaminated wastes from the BOMARC site. These technologies are commercially available today, and would result not only in a substantial cost savings, but also would minimize the risk from transportation, and conserve disposal space.

We believe volume reduction will also meet the intent of EPA regulations, and policies for waste minimization.

We are prepared to work with you to develop a detailed understanding of this approach, and to demonstrate that it can be done safely and cost effectively. We also believe that this approach would meet with a wide degree of public acceptance based on a complete understanding of the waste minimization effort. Please do not hesitate to contact me (803-758-1857) if I can be of assistance with this.

Sincerely,

*F. Gardner*

Fred Gardner  
Senior Manager  
Federal Programs

FWG/do  
DOC-026092

Enclosure: 19 Page Handout



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

JACOB K. JAVITS FEDERAL BUILDING

NEW YORK, NEW YORK 10278

**JUL 15 1992**

Ms. Sharon Geil  
HQAMC/CEVR  
Building P40-W  
507 A Street  
Scott Air Force Base, Illinois 62225-5022

Dear Ms. Geil:

The Environmental Protection Agency (EPA) has reviewed the final environmental impact statement (EIS), the final remedial investigation/feasibility study (RI/FS), and the proposed remedial action plan (PRAP) for the U.S. Air Force's (USAF) proposed remedial actions for the radioactive contamination at the BOMARC Missile Site at McGuire Air Force Base (AFB), New Jersey. This review was conducted in accordance with Section 309 of the Clean Air Act, as amended (42 U.S.C. 7609 12(a) 84 Stat. 1709), and the National Environmental Policy Act. Moreover, our review also reflects the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA/SARA).

The final EIS and RI/FS evaluate the impacts of five alternatives for the cleanup of weapons-grade plutonium (WGP) and americium-241 that were released into the environment at the BOMARC Missile Site as result of a June 7, 1960 fire. These include: unrestricted access; no-action; limited action; off-site disposal; and on-site treatment. Based on the analysis provided in the final EIS and RI/FS, the USAF has identified off-site disposal as the preferred alternative. However, the final EIS and RI/FS indicate that the no-action alternative may be implemented if sufficient funding is not received. The PRAP summarizes the alternatives for addressing radioactive contamination at the site, and presents the final EIS and RI/FS preferred alternative as the proposed remedial action for the site.

EPA previously provided the USAF with comments on this project in our October 28, 1991 review of the draft EIS, our November 6, 1991 evaluation of the baseline risk assessment and radiological modelling results, and our December 9, 1991 review of the draft RI/FS. Moreover, EPA and the USAF discussed our comments and concerns about those documents during a January 9, 1992 meeting in Edison, New Jersey. Based on our review of the final EIS,

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RI/FS, and PRAP, we believe that many of the concerns that EPA raised in our previous reviews have been addressed. However, we have some remaining concerns that should be addressed prior to proceeding with the project; the following are our comments.

The draft EIS indicated that more than one kilogram of WGP remained on site after the cleanup actions following the fire. In our comments on the draft EIS and RI/FS, we asked the USAF to develop a more accurate estimate of the amount of WGP remaining at the site. Given that this information is classified, EPA, New Jersey Department of Environmental Protection and Energy, and USAF agreed during our January 9, 1992 meeting that an unclassified summary discussing potential residual WGP on site would be adequate.

Based on the USAF's review of classified information pertaining to the recovery of material from the accident versus the plutonium inventory of the warhead, the final EIS and RI/FS estimate the amount of unrecovered WGP at the site to be between 60 and 300 grams. Although we recognize that these estimates cannot be verified independently, EPA accepts them for the purpose of this evaluation. Nevertheless, if significant changes in the estimate arise during the implementation of the remedial action, we recommend that the dose assessment evaluations, including the residual radioactivity program (RESRAD) model, be updated.

During our January 9 meeting, the agencies also agreed that final RESRAD modelling runs would utilize the guidance in Gilbert et al.<sup>1</sup> for non-homogeneous distribution of contamination, with the exposure parameters used being those found in OSWER Directive 9285.6-03. The "clean-up" level presented in the final EIS and RI/FS (i.e., 8 pCi/g of residual activity), which was derived from the RESRAD model, is based on an effective dose equivalent of 4 mrem per year. This represents a lifetime cancer risk of  $<10^{-4}$ , which is consistent with risk levels achieved at other site cleanups.

The documents state that the no-action alternative would be implemented by default if permission is not secured or if disposal options are not cost effective. Given the half-life of plutonium-239, we believe that it is reasonable to assume that the USAF will lose institutional control of the site before the radioactive material becomes stable. With this in mind, we believe that the ultimate result of the no-action alternative would be similar to the unrestricted access alternative, which the USAF found unreasonable in the draft EIS due to the excess lifetime cancer risk of greater than  $10^{-4}$  to users of the site.

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<sup>1</sup>Gilbert, T.L. et al, *A Manual for Implementing Residual Radioactive Material Guidelines*, DOE/CH/8901, Argonne National Laboratory, Argonne, Illinois, 1989

Accordingly, EPA believes that the no-action alternative is acceptable only as an interim action while the USAF secures adequate funding and makes arrangements for permanent off-site disposal of radioactive contamination.

Moreover, it must be noted that EPA has concerns about the no-action alternative being implemented on an interim basis. Specifically, we believe that the USAF must formally commit to addressing potential contamination in the ponding area adjacent to Route 539 and the culvert below the road. Although the ponding area and culvert were slated for study under the preferred alternative, the no-action alternative did not sufficiently address the possible contamination in those areas. Under the no-action alternative, the ponding area would be fenced and a monitoring program would be developed for the culvert. However, because of the potential for earth disturbance during road maintenance activities, a characterization of conditions and need for possible remediation of both the ponding area and culvert should be included in the no-action alternative.

Additionally, even with present institutional controls, EPA has concerns about the maintenance of the BOMARC site. Specifically, based on my staff's site visits last fall, the final EIS's characterization of conditions at the site does not appear to reflect current management practices. In fact, in our January 9, 1992 letter to LTC William Drake, Base Civil Engineer, McGuire AFB, we expressed concern about the present condition of the BOMARC site, including gaps in concertina wire, limited number of signs indicating the radiological hazard, evidence of trespassing, and cracks in the apron in the vicinity of Shelter 204. The USAF's response discussed commitments to address those concerns. However, until a permanent remedy is implemented, we recommend that visual site inspections be performed more frequently than the quarterly inspections presented in the final EIS and RI/FS. Moreover, we believe the USAF's decision to perform annual radiological monitoring (ground water sampling, soil and sediment sampling, and the use of field instrumentation to detect low energy radiation) will be effective in tracking site conditions should the no-action alternative be implemented on an interim basis. Accordingly, we concur with the USAF's proposed measures to improve the existing maintenance program at the BOMARC site, and believe that these commitments must be reflected in the project's ROD.

The preferred alternative (off-site disposal) involves the removal of all contaminated material above the threshold level established in the final EIS and RI/FS. This alternative would include the excavation of soils, demolition of Shelter 204 and other structures, removal of caps and contaminated soil underneath, and location and removal of the missile launcher. Material would be collected and shipped to an appropriate

licensed off-site facility for disposal. After removal of the material, the site would be restored to pre-accident conditions.

The documents indicate that three commercial low-level radioactive waste disposal facilities (i.e., Chem-Nuclear in Barnwell, South Carolina; U.S. Ecology in Beatty, Nevada; and U.S. Ecology in Hanford, Washington) are currently licensed to receive the radioisotopes present at the BOMARC site. Additionally, the documents note that the USAF has contacted a fourth facility, Envirocare, Inc. in Utah, that has applied for an amendment to its license to allow plutonium disposal. Nevertheless, because of the significant cost difference, the USAF has stated a preference for disposal of the BOMARC waste in the Department of Energy's (DOE) low-level radioactive waste facility located at the Nevada Test Site (NTS). However, the documents state that DOE will consider disposal at the NTS only if the commercial sites refuse permission for disposal of the BOMARC waste.

The documents specifically evaluate the feasibility of waste disposal at the U.S. Ecology (Hanford) and NTS facilities. However, similar analyses of the other commercial sites is not presented. Consequently, it is difficult to assess whether these facilities are the best choices for the disposal of the BOMARC waste. In a related matter, it must be noted that the provisions of the Low-Level Waste Policy Act (LLWPA) would allow states containing commercial disposal sites to ban disposal of radioactive waste generated outside of their respective state compacts after January 1, 1993. This impending deadline may impact the implementation of the off-site disposal alternative. In view of the potential impact of the LLWPA on disposal at the various sites, alternative sites that will remain open after the cutoff date should be examined further. Accordingly, the feasibility of disposing of the BOMARC radioactive waste at the other three sites identified in the documents must be reanalyzed and presented.

Clearly, a full evaluation of all the alternative disposal sites is critical because the documents indicate that "cost effectiveness" is a key factor in determining whether the no-action alternative will be implemented by default. However, the documents do not clearly indicate the basis for such a determination (e.g., site-specific disposal fees or funding availability). With this in mind, EPA requests the opportunity to review the factors used in determining cost effectiveness of the alternative sites being considered for off-site disposal prior to the issuance of the project's record of decision (ROD).

As indicated in our previous comments, we believe that off-site disposal offers a permanent solution for the radioactive contamination at the BOMARC site. However, we indicated that stringent management practices and pollution abatement control

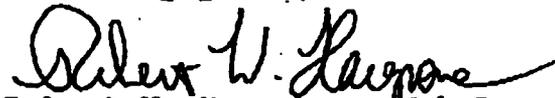
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measures are needed to ensure that radioactive contaminants are not lost from the site. As such, we recommended that future project documents discuss the preparation of a site specific contingency plan that would prevent the transport of contamination off-site. The final EIS provides mitigation measures for all alternatives requiring excavation to control soil erosion, decrease fugitive dust emissions, and lessen occupational and public health impacts. We believe the measures identified in the final EIS effectively eliminate the potential resuspension of contamination during the remediation of the BOMARC site. We concur with the commitment of the USAF to incorporate the mitigation measures into the remedial design specifications, and request a copy of the specifications when they are available.

In conclusion, based on our review of the final EIS, RI/FS, and PRAP, we believe that the USAF's preferred alternative, off-site disposal, offers an effective permanent solution to address the radioactive contamination at the BOMARC site. Further, we believe that the no-action alternative is not a permanent solution for the site; rather, it can serve only as an interim action. Nevertheless, in the event that the USAF decides to implement the no-action alternative on an interim basis, we recommend that the project's ROD include commitments identified in the final EIS, RI/FS, and EPA's recommendations to ensure that the no-action alternative would not result in significant adverse environmental or public health impacts. I would appreciate a copy of the ROD and Responsiveness Summary when it is completed.

I commend the USAF for its efforts in addressing EPA's concerns and look forward to continued coordination in the subsequent phases of this project. In the interim, if you have any questions, please feel free to call me at (212) 264-1892 or John Filippelli, Chief, Federal Activities Section, at (212) 264-6723.

Sincerely yours,



Robert W. Hargrove, Chief  
Environmental Impacts Branch

cc: Col. D.R. Case, HQ/USAF/SGPA  
LTC W. Drake, USAF, McGuire AFB  
T. Simms, USAF, Atlanta, Georgia  
L. Schmidt, NJDEPE