Bemlo

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DATE: August 13, 1991
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RECEIVED AUG 20 1991

Mr. Donald George
Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, New Mexico 87544

Dear Mr. George:

SUBJECT: RESOLUTION OF COMMENTS ON THE ENVIRONMENTAL ASSESSMENTS FOR THE PROPOSED TRANSURANIC WASTE COMPACTOR AND THE DRUM STORAGE BUILDING

Comments on the subject environmental assessments (EA) were transmitted from J. Themelis of the Department of Energy Albuquerque Operations Office (DOE/AL) to J. L. Bellows (DOE Los Alamos Area Office) on June 4, 1991. C. Jarman of DOE/AL provided clarification and additional information. The revised EAs are enclosed along with the resolution of individual comments. Please forward these materials to J. Halpern, at DOE/AL, for his action.

COMMENTS ON TRANSURANIC WASTE COMPACTOR EA:

Comment 1

Text revised per comment

Comment 2

Clarification from C. Jarman (telephone conversation on July 7) indicated that concern was that the EA text did not differentiate the procedures used for drums containing transuranic (TRU) waste from those containing TRU mixed waste. The applicable waste handling procedures require that any drum containing hazardous material be so labeled and be accompanied by documentation to describe the hazardous contents. The Waste Isolation Pilot Plant (WIPP) waste acceptance criteria place restrictions or prohibitions on certain characteristics of the waste such as corrosivity or the presence of free liquids, pyrophoric materials, or explosive materials. Segregation of the drums is not necessary because the existing

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storage area meets the requirements for storage of mixed TRU waste. These requirements are more stringent than those for radioactive TRU waste. The EA text has been modified to clarify these issues.

Comment 3

The comment stated that some value less than 99.95 % be used for High Efficency Particulate Air (HEPA) filter efficiency but did not recommend a value. These filters are tested in place to a removal efficiency of at least 99.95 % for particles in the 0.3 micron size range; the size most likely to penetrate a HEPA filter. During a discussion (telephone call, July 7), C. Jarman accepted the use of 99.95 % for the first HEPA filter and 99.9 % for the next two downstream HEPA filters for the assessment of atmospheric releases in this EA. Quantification of doses to workers and the public have been added as requested.

Comment 4

The requested detailed comparison has been added.

Comment 5

The original wording, which stated that slightly more than one drum per week will be processed, has been changed to clarify that 1.25 drums per week will be processed.

Comment 6

The calculation of the releases has been changed to reflect the commenters request that we follow DOE/AL's recommended values: 99.9 % for the first stage HEPA filter and 99.8 % for subsequent HEPA filter stages for calculating atmospheric releases from accidents. However, we believe it is unreasonable to apply these values universally to accident situations and that individual situations need to be considered. As described by Elder and others (1986), the DOE/AL practice of using 99.9 %, 99.8%, and 99.8 % for the first three filters during accident conditions is based on the assumption of accident-caused filter degradation. The accident for the TRU waste compactor would not result in any degradation to the HEPA filter. Thus, there is no reasonable justification for assuming that HEPA filter efficiencies in this particular accident would be less than during routine operation.

Comment 7

Reference to the EPA AIRDOS-PC methodology has been added to the text.

COMMENTS ON DRUM STORAGE BUILDING EA:

Comment 1

C. Jarman clarified that the comment does not require additional impacts to be addressed but rather that the building structural criteria for applicable natural phenomena events be added. The information and appropriate references have been added to the EA.

Comment 2

Reference to the EPA AIRDOS-PC methodology has been added to the text.

We would appreciate your keeping us informed of the status of the EAs.

Sincerely,

Thomas C. Gunderson
EM Division Leader

TCG/AJT/DK:smm

Enclosures: a/s

Cy: D. Garvey (EM-8:91-27), EM-8, MS K490, w/enc.
Circ. File
CRM-4, MS A150

1.0 STATEMENT OF PURPOSE AND NEED

In the proposed action, a twenty-ton hydraulic press would be used to compact approximately 500 lbs/wk of Transuranic (TRU) waste, reducing the volume at a ratio of up to 4:1. These wastes are currently being compacted slightly by hand. The proposed action does not involve new waste producing operations but rather increasing the efficiency of waste volume minimization. Minimization of TRU waste volume is a critically important activity because there is currently no area for permanent disposal of these wastes and available space in interim storage sites is very limited. The capacity of the permanent disposal site for TRU wastes (currently expected to be the Waste Isolation Pilot Plant, WIPP) will also be limited. Furthermore, volume is one of the principal factors controlling the cost of handling and ultimately disposing of the waste. The project is needed to reduce the volume of solid, compressible, TRU and TRU mixed wastes, primarily polyethylene bags and paper, to help alleviate the TRU waste storage and disposal problem.

The assessment of effects presented in this Environmental Assessment (EA) is based on conservative assumptions that are intended to maximize the estimates of environmental impacts. Actual environmental consequences are expected to be less than those presented here.

2.0 DESCRIPTION OF PROPOSED ACTION AND NO-ACTION ALTERNATIVE

2.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action involves the installation of a 20-ton hydraulically-activated press in a glovebox in Room 432 in the Plutonium Facility (PF) Building PF-4 at Technical Area 55 (TA-55) at Los Alamos National Laboratory (LANL or Lab). The press is approximately sixteen feet tall; the hydraulic rod penetrates the top of the glovebox through a sealing mechanism which is designed to ensure that negative pressure is maintained in the glovebox. Wastes are conveyed to the glovebox line in the TA-55 trolley system and are introduced into the glovebox through an adjacent, open-front enclosure. The waste, primarily paper and plastic from PF-4 operations, which is currently being compacted by hand into steel 55-gal drums will be compressed by the compactor into the same type drums. Drums with TRU waste are stored temporarily at TA-55 until they can be certified according to the WIPP waste acceptance criteria. These criteria include restrictions or prohibitions on free liquid content, corrosivity, pyrophoric materials, and explosivity. Any drums containing hazardous materials must be labeled accordingly and the documentation accompanying the drum must specify any hazardous materials that are contained. The drummed TRU and TRU mixed waste will presumably be disposed of at WIPP or whatever site is ultimately chosen as the permanent repository for TRU waste.

In the compaction process, empty bags are placed in the drum, a thick polyethylene liner is placed in the drum to hold the bags open as they are being filled (the bags would tend to collapse otherwise because of the negative pressure in the glovebox), the drum is placed below the glovebox, and the bags are secured to a rim on the outside base of the glovebox. Waste is then dumped into the bagged and lined drum and is compacted. The filling/compaction cycle is repeated until the drum is full. The compactor is capable of reducing the volume of the waste to approximately 25% of its original volume. The full drums may weigh up to approximately 500 lbs and approximately one and one quarter drums of compacted TRU waste will be generated each week.

Process air from the glovebox line that contains the TRU waste compactor passes through one stage of high efficiency particulate air (HEPA) filters on the glovebox line itself and two stages in the building air ventilation plenum, before it is released to the environment. These three stages of HEPA filtration would greatly reduce the quantity of particulate material that becomes airborne in the glovebox from being released to the environment. Any wastes, such as wet rags, that contain liquid will be compressed in a small compactor to eliminate any free liquids before the wastes are placed in the twenty-

ton press. The rags are usually wet with household-type cleaning solutions that have been used to clean the insides of gloveboxes. All material will be visually inspected before being placed in the drums to ensure that noncompressible items are not compacted inadvertently.

After wastes are compressed into 55-gal drums, the full drums are taken to the basement for temporary storage. Storage facilities meet the requirements for storage of mixed waste. Because these requirements are more stringent than those for TRU waste, the current procedure of storing TRU waste and mixed TRU waste in the same facility is acceptable. After certification under WIPP waste acceptance criteria, the drums are delivered to a temporary TRU and mixed TRU storage facility operated at TA-54 by the Health, Safety, and Environment division at LANL. The TRU waste and TRU mixed waste are expected to be shipped eventually to WIPP or other site licensed to receive TRU waste for permanent disposal.

2.2 DESCRIPTION OF THE NO-ACTION ALTERNATIVE

The no-action alternative involves the compaction of waste, by hand, into 55-gal drums. The activities take place in the same location in the glovebox line where the hydraulic press would be placed in the proposed action. In the no-action alternative, wastes are placed in lined drums and compressed manually with a hand plunger. Hand compaction does not result in appreciable volume reduction. The atmospheric protection and safety systems in the no-action alternative are the same as for the proposed action.

3.0 THE POTENTIALLY AFFECTED ENVIRONMENT

A detailed description of the Lab environs is presented in the Laboratory Environmental Surveillance reports (most recent edition is LANL 1989). Supplementary information pertaining to the geology, hydrology, climatology, and meteorology of the site is presented in the Laboratory Environmental Impact Statement (DOE 1979). The Laboratory supports an ongoing environmental surveillance program, as required by DOE orders (DOE 1981, 1988a). This surveillance program maintains routine monitoring for radiation, radioactive materials, and hazardous chemicals at the Laboratory and in the surrounding region and is explained in detail in the annual reports prepared by the Laboratory Environmental Protection Group (HSE-8) in the Health, Safety, and Environment Division (for example, see "Environmental Surveillance at Los Alamos During 1988", LANL 1989).

4.0 ENVIRONMENTAL IMPACTS FROM THE PROPOSED ACTION AND THE NO-ACTION ALTERNATIVE

4.1 THREATENED AND ENDANGERED SPECIES, CULTURAL RESOURCES, FLOODPLAINS AND WETLANDS

The proposed action and the no-action alternative are located in an existing building. There will be no impacts on State or Federally listed threatened or endangered species, historical or archaeological resources, sole-source aquifers, or floodplains and wetlands in either the proposed action or the no-action alternative.

4.2 AIRBORNE EMISSIONS

4.2.1 Radioactive Emissions

<u>Proposed Action</u>

Very small amounts of TRU particulate material will become airborne in the glovebox during the compaction operations. Because of the higher pressures involved in hydraulic compaction, somewhat more

material may become airborne in the glovebox than would occur in the hand compaction of the no-action alternative. In either case, the three stages of HEPA filtration (one HEPA filter on the glovebox line and two in the building ventilation plenum) will reduce the quantity of airborne material by more than nine orders of magnitude. The HEPA filters are tested, in place, to a removal efficiency of at least 99.95%. Calculations of the quantity of airborne material released to the environment assume a removal efficiency of 99.95% for the first stage of HEPA filtration and 99.90% for each of the second and third stages. The radionuclide material is adsorbed to materials undergoing compaction and is not in a readily dispersible form. If it is conservatively assumed that 0.1% of the 200 g maximum quantity of radionuclide in the drum is released to the glovebox during compaction, then, less than 1×10^{-10} g of Pu would be released to the atmosphere each week (less than 5×10^{-9} g annually), during the compaction of the waste in each drum. The maximum dose to a worker who is conservatively assumed to stand 300 meters northeast of the stack for an entire year, is calculated to be 9.9×10^{-9} mrem committed effective dose equivalent. The maximum off-site dose to a member of the public at an occupied location (the Royal Crest Trailer Park) is calculated to be 5.6×10^{-6} mrem committed effective dose equivalent. These doses were calculated using the EPA AIRDOS-PC methodology.

No-Action Alternative

In the no-action alternative, waste will be compacted by hand plungers. This method might produce somewhat less airborne material in the glovebox than would be produced in the proposed action. The no-action alternative has the same atmospheric protection system (three stages of HEPA filtration) as does the proposed action, and atmospheric releases are expected to be less than those reported above for the proposed action.

4.2.2 Hazardous Emissions

No hazardous air emissions are expected from either the proposed action or the no-action alternative.

4.3 RADIOACTIVE WASTE

Radioactive wastes are not *produced* in either the proposed action or the no-action alternative but are *received* from ongoing operations in PF-4.

Proposed Action

Approximately 500 lbs/wk of compressible TRU waste will be processed in the proposed action which is equivalent to 1.25 drums each week. The waste will be compacted at a ratio of up to 4:1 so the volume of the final waste could be approximately 25% of the original volume.

No-Action Alternative

The same quantity of waste (500 lbs/wk) will be processed in the no-action alternative as in the proposed action, but the waste will not be compacted other than by a hand plunger which is considerably less effective at reducing the waste volume than the hydraulic press of the proposed action would be. Approximately five drums per week will be processed in the no-action alternative.

4.4 TRANSPORTATION

Proposed Action

The drums with compacted TRU and TRU mixed waste will be transported approximately 2 miles to TA-54, Area G where they will be stored until a permanent disposal site is identified. Because of the reduction in waste volume in the proposed action, the number of shipments to TA-54 and to the ultimate TRU waste repository (presently planned as the WIPP site) should be reduced by approximately 75% relative to the no-action alternative.

No-Action Alternative

The no-action alternative will involve the transport of approximately four times the quantity of drummed waste that will be shipped in the proposed action because the waste volume reduction will be much less in the no-action alternative.

4.5 IMPACTS TO WORKERS

4.5.1 Radiation Exposures

Proposed Action

The compaction and handling operations will result in some radiation exposure to workers. Administrative procedures in TA-55 specify that the dose rate at the surface of drums containing TRU waste be less than 200 mrem/hr. The exposure from all TRU waste compaction and handling operations will be maintained as low as reasonably achievable and is expected to be small. Workers will be monitored by health physics personnel from HSE division.

No-Action Alternative

Worker exposures may be somewhat higher in the no-action alternative than the proposed action because more direct handling of the waste is required during hand compaction operations than would be needed with the automated compaction in the proposed action. Monitoring for radiation exposures will be performed as described for the proposed action.

4.5.2 Hazardous Material Exposures

No on- or off-site exposure to hazardous chemicals is expected to occur as a result of the proposed action or the no-action alternative.

5.0 ABNORMAL EVENTS

Abnormal events that could cause the release of radioactive or hazardous chemicals to the work area and the environment have been selected as a basis for comparing the risk of the proposed action and the no-action alternative. Scenarios were developed to describe accident situations that could be expected to occur one or more times during the operations assuming that standard operating procedures are followed and that all suppression and protection systems function according to design expectations.

5.1 SELECTION OF ABNORMAL EVENTS FOR ANALYSIS

Several abnormal events were evaluated to determine the appropriate bounding accidents that are likely to occur during the lifetime of the facility. The presence of an automatically activated water sprinkler system in the room makes a large fire in the room highly unlikely. With the exception of the possibility of small quantities of organic solvents absorbed on waste materials, there are no other highly volatile materials in the glovebox line so a fire there is considered to be very improbable.

An explosion during compaction was also considered but disregarded because of the low probability of the event. Some of the TRU waste material may have been in contact with flammable solvents and it is possible that small amounts of solvents will remain absorbed to the waste material. Concerns about the explosive potential of the TRU waste in PF-4 prompted Nuclear Materials Technology (NMT) personnel to monitor the insides of bags containing the TRU waste with an organic vapor analyzer. The monitoring indicated that the concentration of organic solvents was below the limit of detection and that these materials did not present an explosion hazard.

One scenario that was considered initially involved the crushing of a partially filled drum by the hydraulic ram. Based on a consideration of this accident possibility, the final glovebox design will

incorporate active and passive measures to protect against this occurrence by ensuring that the drum is correctly aligned below the hydraulic ram, and based on incorporation of these protective measures, this accident is considered unlikely to occur during the life of the facility.

The accident that has been determined to be the most serious accident that could occur during the life of the facility is a puncture of the drum bags and liners. This accident is discussed in the following section.

5.2 ANALYSIS OF ABNORMAL EVENT

5.2.1 Proposed Action

Puncture of Drum Bags and Liners

In this scenario, a screwdriver or other rigid, pointed object is overlooked during the precompaction visual inspection and, during compaction, is forced through the bags and liner, thus breaching the containment and allowing radioactive material to escape into the room. The following text describes the scenario and the basis for the assumptions used to calculate the quantity of radioactive material released to the room and the environment.

The puncture occurs during the first compaction cycle and creates a tear that extends almost the entire length of the drum. Because the tear occurs in the first cycle, a maximum of approximately 50 g of radioactive material is in the drum at the time. A cloud of fine radioactive aerosol forms above the compacted trash. The cloud contains approximately 0.5 g of radioactive material which is 1% of the total radioactive material in the drum. Of the 0.5 g of airborne material, approximately 0.005 g (1%) leak from the liners into the space between the liners and the drum, and eventually to the room. A leak of 0.005 g into the room should activate the continuous air monitor (CAM) alarms within a few seconds, causing a stop in operations. Workers would evacuate the room within 15 seconds.

Workers in the room could be exposed to concentrations of approximately 4×10^{-5} g/m^3 of plutonium-239 (Pu-239) for a period of fifteen seconds. The two stages of HEPA filtration provide a reduction factor of approximately 2.0×10^{-6} and capture all but 1×10^{-8} g of the Pu-239, which are released to the environment through elevated stacks at TA-55. This reduction factor is based on very conservative values of 99.9 % and 99.8 % efficiency for the first and second stages of HEPA filters respectively during accident conditions (Elder et.al. 1986) and is probably overly conservative because the accident here would not affect the efficiency of the HEPA filters which are tested in place to at least 99.95 % efficiency. The environmental impacts of this release are discussed in Section 5.3.

5.2.2 No-Action Alternative

An accident similar to that described above for the proposed action is possible in the no-action alternative but the releases and consequences would be smaller. Assuming that during hand compaction, a sharp metallic object punctures the bags and liner, the rip would be small because the worker presumably would not be strong enough to cause a large rip in two bags and a liner and because a large rip would likely be visible and would cause the worker to discontinue the operation. If a small rip occurred and the worker were unaware of it and continued to introduce and compact waste, approximately 5×10^{-4} g of plutonium might be released to the room. Of this quantity, approximately 1×10^{-9} g could pass through the HEPA filters and be released to the environment. The worker would be exposed to a concentration of approximately 4×10^{-6} g/m^3 of Pu-239 in air for approximately fifteen seconds. The environmental release and impacts would be approximately 10 % of those reported for the proposed action, corresponding to the smaller release in the no-action alternative.

5.3 IMPACTS OF ABNORMAL EVENTS

Proposed Action

The worker exposed to a concentration of $4x10^{-5}$ g/m^3 of Pu-239 in air in Room 432 would receive a 50-yr committed effective dose equivalent of approximately 4 rem. This exposure is less than the DOE Radiation Protection Standard annual limit of 5 rem to an occupational worker (1988b).

Doses from airborne emissions were calculated using the EPA AIRDOS-PC methodology. The release of plutonium aerosol (through the ventilation and air filtration systems, and approximately $1x10^{-8}$ g out the stack) would result in a 50-yr committed effective dose equivalent to a worker in the vicinity but outside the building of approximately $5x10^{-8}$ rem. This maximum on-site exposure is approximately 8 orders of magnitude less than the 5 rem annual exposure limit of the DOE Radiation Protection Standards for occupational workers. The atmospheric release of $1x10^{-8}$ g of Pu-239 would result in a 50-yr committed effective dose equivalent to the maximally exposed member of the public of approximately $3.3x10^{-8}$ rem. This exposure is many orders of magnitude less than the 100 mrem DOE Radiation Protection Standard for exposure from all pathways for members of the public (DOE 1990), and it is more than eight orders of magnitude less than the Environmental Protection Agency radiation limit of 10 mrem/yr from airborne releases at DOE facilities (EPA 1989).

No-Action Alternative

The releases and concentrations from the accident in the no-action alternative are approximately 0.1 of those in the proposed action, thus, the committed effective dose equivalents from the exposures are 0.1 of those in the proposed action.

6.0 RELATIONSHIP OF THE PROPOSED ACTION TO APPLICABLE FEDERAL, STATE, REGIONAL, AND LOCAL LAND USE PLANS AND POLICIES

No known conflict exists with any federal, state, regional, or local land use plans. LANL is a DOE facility; the land was withdrawn by the Federal Government in 1942. The proposed action does not require the use of any additional land because all activities are in an existing building.

7.0 AGENCIES AND PERSONS CONTACTED

This environmental assessment was reviewed by Laboratory personnel in the following organizations:

* Health, Safety, and Environment Division

* Nuclear Materials Technology Division

8.0 REFERENCES

DOE 1979: "Final Environmental Impact Statement: Los Alamos Scientific Laboratory Site, Los Alamos, New Mexico," U.S. Department of Energy report DOE/EIS0018 (1979).

DOE 1981: "Environmental Protection, Safety, and Health Protection Information Reporting Requirements," U.S. Department of Energy Order 5484.1 (1981).

DOE 1988a: "General Environmental Protection Program," U.S. Department of Energy Order 5400.1 (1988).

DOE 1988b: "Radiation Protection for Occupational Workers," U.S. Department of Energy Order 5480.11 (1988).

DOE 1990: "Radiation Protection of the Public and the Environment," U.S. Department of Energy Order 5400.5 (1990).

Elder 1986: J.C. Elder, J.M. Graf, J.M. Dewart, T.E. Buhl, W.J. Wenzel, L.J. Walker, and A.K. Stoker, "A Guide to Radiological Accident Considerations for the Siting and Design of DOE Nonreactor Nuclear Facilities," Los Alamos National Laboratory report LA-10294-MS (1986).

EPA 1989: "National Emissions Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration, "U.S. Environmental Protection Agency, Code of Federal Regulations, Title 40, Part 61, 54 F.R. 240, 51654-51715 (December 15, 1989).

LANL 1989: "Environmental Surveillance at Los Alamos During 1988," Los Alamos National Laboratory report LA-11628-ENV (1989)

9.0 GLOSSARY

EXPONENTIAL NOTATION

An exponent is the power to which a number or expression is raised. The following examples illustrate the use of exponential notation:

$1x10^4 = 10,000$
$1x10^2 = 100$
$1x10^0 = 1$
$1x10^{-2} = 0.01$
$1x10^{-4} = 0.0001$

UNITS/TERMS

Ci	Curie - a unit of radioactivity; the amount of any nuclide that undergoes exactly $3.7x10^{10}$ radioactive disintegrations per second.
g	gram - unit of mass and weight in the metric system, equal to the mass of one cubic centimeter of water.
kg	kilogram - 10^3 grams
m^3	cubic meter
mrem	millirem - 10^{-3} (one thousandth) rem
rem	the amount of ionizing radiation required to produce the same biological effect as one roentgen of high-penetration x rays; unit of dose equivalent for a single individual, used in the field of radiation dosimetry.

ENVIRONMENTAL ASSESSMENT
DRUM STORAGE BUILDING
Los Alamos National Laboratory

1.0 STATEMENT OF PURPOSE AND NEED

In the proposed action, drums of solid transuranic (TRU) waste will be stored temporarily (as they await certification and transport to a longer term storage area at TA-54) in a prefabricated, concrete-floored, metal building, which will be located adjacent to the Plutonium Facility (PF) Building PF-4 at Technical Area (TA) TA-55 at Los Alamos National Laboratory (LANL).

Drummed TRU solid wastes and TRU solid mixed wastes are currently being stored in the basement of Building PF-4 at TA-55 for periods of up to 90 days while they await transport to TA-54. The drums can not be transported to TA-54 until they have been certified according to Waste Isolation Pilot Plant (WIPP) acceptance criteria, a process that generally takes one to two months. The space in the basement is inadequate for proper storage of the approximately 190 drums currently being stored. Movement of personnel within the basement area, adequacy of personnel emergency access corridors, access to some of the instrumentation, and adequacy of the drum access corridors are being effected by the presence of the drums. The access and space problems will worsen if more drums are brought to the basement area.

The proposed action is needed to alleviate the space problem at PF-4 by providing an interim storage area external to PF-4 that is adequate to meet existing and foreseeable short-term storage demands.

The assessment of effects presented in this Environmental Assessment (EA) is based on conservative (generous) assumptions that tend to maximize the estimates of environmental impacts. Actual environmental consequences are expected to be less than those presented here.

2.0. DESCRIPTION OF THE PROPOSED ACTION AND THE NO-ACTION ALTERNATIVE

2.1 DESCRIPTION OF THE PROPOSED ACTION

A 40 ft x 60 ft x 8 ft prefabricated metal building will be located on a concrete pad on the south side of Building PF-4 at TA-55 and will be used to store a maximum of approximately 300 55-gal drums. The facility is considered to be a General-Use Facility (DOE 1989). Construction of the building for seismic loading is in accordance with the 1988 Uniform Building Code (UBC) with a site specific maximum horizontal ground acceleration of 0.18 (from Coats 1984). Wind loads are based on ANSI A58.1 (ANSI 1982) for a site-specific 77 mph wind (DOE 1989). Individual drums may be stored for periods of up to 90 days. Full drums will be handled by a worker using a forklift that is equipped with a drum-hauler mechanism designed to increase the safety of the drum moving operations. Electricity, to power the lights, is the only utility that will be supplied to the building. A wide sliding door on the west side of the building will facilitate forklift entry. The building will not have fire-suppression, radiation monitoring/alarm, or air filtration systems.

Drums will contain solid radioactive TRU waste or solid mixed TRU waste (with a maximum radionuclide content of 200 g per drum) generated by operations in PF-4. The proposed building will also be used for the storage of empty drums. Full drums will be transferred to the proposed building from the basement of PF-4 and will be kept in this building for less than 90 days as they await the waste certification necessary to allow their shipment to the longer-term storage facility at TA-54. The waste will be kept at TA-54 until a permanent repository (such as WIPP) is licensed and in operation. Storage in the basement at PF-4 will be limited to a few (less than 60) drums at a time and the storage will be of short duration, only until the drums are certified according to WIPP waste acceptance criteria.

2.2 DESCRIPTION OF THE NO-ACTION ALTERNATIVE

In the no-action alternative, waste drums will continue to accumulate in the basement of PF-4, pending waste acceptance certification and shipment to TA-54. Approximately 190 drums are stored there now and are adversely affecting the movement of personnel within the area, access to instruments and equipment, emergency paths, and drum access corridors. The addition of more drums would exacerbate these problems, causing a deterioration in the safety and the efficiency of operations in the basement area.

3.0 THE POTENTIALLY AFFECTED ENVIRONMENT

A detailed description of the Lab environs (archaeology, geology, hydrology, seismology, climatology, and meteorology) is presented in the Laboratory EIS (DOE 1979) and the Laboratory Environmental Surveillance report (LANL 1989). The Laboratory supports an ongoing environmental surveillance program, as required by DOE orders (DOE 1981, 1988a). This surveillance program maintains routine monitoring for radiation, radioactive materials, and hazardous chemicals at the Laboratory and in the surrounding region and is explained in detail in the annual reports prepared by the Laboratory Environmental Protection Group (HSE-8) in the Health, Safety, and Environment Division (for example, see "Environmental Surveillance at Los Alamos During 1988", LANL 1989).

4.0 ENVIRONMENTAL IMPACTS FROM THE PROPOSED ACTION AND THE NO-ACTION ALTERNATIVE DURING ROUTINE OPERATIONS

4.1 SENSITIVE AREAS

Surveys of the already disturbed construction site and surrounding areas have determined that there are no sensitive areas that would be affected by the proposed action. Sensitive areas include floodplains, wetlands, State- or Federally-listed threatened or endangered species, sole-source aquifers, and cultural resources. The no-action alternative occurs within existing facilities and does not affect sensitive areas.

4.2 RADIOACTIVE WASTE

Radioactive wastes are not *produced* in either the proposed action or the no-action alternative but are *stored and handled* after being drummed from ongoing operations in PF-4. **The amount of radioactive waste that would be handled in the proposed action is the same as for the no-action alternative.**

4.3 TRANSPORTATION

The drums will be transported approximately 2 miles to TA-54, Area G where they will be stored before being disposed of at WIPP or whatever site is ultimately licensed for the permanent disposal of TRU waste. **The number of drums to be transported is the same in the proposed action as the no-action alternative.**

4.4 IMPACTS TO WORKERS

The TRU waste will contain plutonium, americium, and trace amounts of other radioisotopes. Administrative procedures in TA-55 specify that the dose rate on the surface of drums containing TRU waste be less than 200 mrem/hr, although many of the drum handling operations involve considerably less exposure. Radiation doses will be maintained as low as reasonably achievable and the exposure from all operations is expected to be small. Workers will be monitored by health physics personnel from HSE division. **The doses to workers is expected to be approximately the same in the proposed action as in the no-action alternative.**

5.0 ABNORMAL EVENTS

Abnormal events that could cause the release of radioactive or hazardous chemicals to the work area and the environment have been selected as a basis for comparing the risks from the proposed action and the no-action alternative. Scenarios were developed to provide bounding accident situations that could occur during the lifetime of the facility assuming that standard operating procedures are followed and that all suppression and protection systems function according to design expectations.

5.1 SELECTION OF ABNORMAL EVENTS FOR ANALYSIS

Several abnormal events were evaluated to determine the appropriate bounding accidents that are likely to occur during the lifetime of the facility and that should be analyzed in detail. A fire is considered an unlikely event because all flammable materials are in drums and are therefore isolated from ignition sources. Although there may be some residues of organic solvents in the drums, past monitoring with a combustible gas meter has shown that the gases in the drums are not ignitable. Furthermore, WIPP waste acceptance criteria require that there be no free liquid in the drums.

The accident that is considered to be the most probable cause for a release of radioactive material is a fork-lift puncture of a drum.

5.2 ANALYSIS OF A DRUM PUNCTURE ACCIDENT

In general an accident involving forklift puncture of a drum is unlikely because the forklifts that are used to handle the drums are equipped with a drum-hauler mechanism, which completely covers the tines. Nonetheless, there are instances in which drums (on pallets) will be moved directly by a forklift without the drum-hauler mechanism and the accident is considered to be the most serious accident that is reasonably likely to occur. The event could occur in the no-action alternative or the proposed action but the potential releases and impacts are different in each case and are described separately below. The accident may be more likely in the proposed action because there will be an additional handling operation (when the drums are transferred out to the drum storage building. On the other hand, the cramped conditions and potentially inadequate access corridors in the basement of PF-4 may make an accident more likely in the no-action alternative.

<u>Proposed Action</u>

The accident is as follows: The forklift tine punctures the drum, the drum bags, and the drum liner creating a hole approximately 1.5 in. x 5 in., thus breaching the drum containment. Because the drum contains solid waste with very small amounts of organic solvent residues, a fire is not likely to occur. Very little of the material is expected to escape the drum because, after the puncture and initial release have occurred, there would be no continuing energy source to drive subsequent releases. Approximately 0.002% (0.0034 g) of the radioactive material in the drum is released to the immediate area. The conservative estimation of this release fraction is based on the fractional area of the surface of the drum that has been breached.

The operator of the fork lift and any other personnel in the building leave the building within thirty seconds. The building is not airtight and does not contain an active ventilation or atmospheric filtration system. Approximately 1% of the mass of radionuclide released from the drum into the building will then be released from the building to the environment. Therefore, approximately 3.4×10^{-5} g of radionuclide (assumed to be plutonium-239 for conservatism) will enter the atmosphere, essentially at ground level.

No-Action Alternative

The scenario in the no-action alternative is the same as for the proposed action but, because the accident would occur in the basement of PF-4 rather than in a prefabricated building outside PF-4, the consequences are different. Radioactive aerosol that is released from a drum in the basement and suspended in the air will be drawn into the ventilation system, which contains two stages of high efficiency particulate (HEPA) filters. Assuming that each HEPA stage reduces the amount of particulate material by approximately 99.95% (Elder 1986), the release to the atmosphere would be approximately 8.5×10^{-10} grams and would be vented through a stack at Building PF-4.

The release of plutonium-239 into the room should activate the continuous air monitor (CAM). The operator of the forklift and any other personnel should be able to evacuate the area in less than thirty seconds and are expected to be exposed to approximately the same concentration of radionuclide as that to which the worker(s) in the proposed action would be exposed.

5.3 IMPACTS OF ABNORMAL EVENTS

Doses to workers and public who could be exposed from abnormal events were calculated using the EPA AIRDOS-PC methodology.

Proposed Action

A release of 0.0034 g of plutonium 239 into the drum storage building would result in a 50-yr committed effective dose equivalent to the fork-lift operator of approximately 5.5 rem. The 5.5 rem dose is marginally greater than the DOE Radiation Protection Standard *annual* limit of 5 rem to an occupational worker (DOE 1988b). The ground-level atmospheric release of 3.4×10^{-5} g would result in a 50-yr committed effective dose equivalent to the maximally exposed member of the public of approximately 0.2 mrem approximately 0.4 mrem to a worker in the vicinity but outside the building. The committed dose to the worker is many orders of magnitude less than the 5 rem annual exposure limit in the DOE Radiation Protection Standards (1988b). The committed dose to the maximally exposed member of the public is almost two orders of magnitude below the Environmental Protection Agency radiation limit of 10 mrem/yr from airborne releases at DOE facilities (EPA 1989) and almost three orders of magnitude less than the 100 mrem DOE Radiation Protection Standard for exposure from all pathways for members of the public (DOE 1990).

No-Action Alternative

A release of 0.0034 g of plutonium 239 into the PF-4 basement would result in a 50-yr committed effective dose equivalent to a worker in the basement of approximately 5.5 rem; the same dose as reported above for the fork-lift operator in the proposed action and with the same consequences.

The atmospheric release of 8.5×10^{-10} g would result in a 50-yr committed effective dose equivalent to the maximally exposed member of the public of approximately 8×10^{-9} mrem and a committed effective dose equivalent to a worker in the vicinity but outside the building of approximately 1.3×10^{-8} mrem. These doses are many orders of magnitude below any applicable standard or guideline and are considered to be negligible.

Summary of Accident Related Environmental Impacts

The most serious radiation exposure would occur to the operator of the forklift and is the same in the proposed action as the no-action alternative. Doses to the public would be considerably larger in the proposed action than in the no-action alternative because the accidents occur in a building without atmospheric protection systems. Nonetheless, the doses to members of the public and on-site personnel outside of the building are several orders of magnitude below applicable guides and standards and are not considered to present a significant environmental impact.

6.0 RELATIONSHIP OF THE PROPOSED ACTION TO APPLICABLE FEDERAL, STATE, REGIONAL, AND LOCAL LAND USE PLANS AND POLICIES

No known conflict exists with any federal, state, regional, or local land use plans. LANL is a DOE facility; the land was withdrawn by the Federal Government in 1942. The proposed action does not require the acquisition of any additional land.

7.0 AGENCIES AND PERSONS CONTACTED

This environmental assessment was reviewed by Laboratory personnel in the following organizations:

* Health, Safety, and Environment Division

* Nuclear Materials Technology Division

8.0 REFERENCES

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9.0 GLOSSARY

EXPONENTIAL NOTATION

Many values in the text are expressed in exponential notation. An exponent is the power to which a number or expression is raised. The following examples illustrate the use of exponential notation:

$1x10^4$ = 10,000
$1x10^2$ = 100
$1x10^0$ = 1
$1x10^{-2}$ = 0.01
$1x10^{-4}$ = 0.0001

UNITS/TERMS

Ci — Curie - a unit of radioactivity; the amount of any nuclide that undergoes exactly $3.7x10^{10}$ radioactive disintegrations per second.

g — gram - unit of mass and weight in the metric system, equal to the mass of one cubic centimeter of water.

kg — kilogram - 10^3 grams

m^3 — cubic meter

mrem — millirem - 10^{-3} (one thousandth) rem

rem — the amount of ionizing radiation required to produce the same biological effect as one roentgen of high-penetration x rays; unit of dose equivalent for a single individual, used in the field of radiation dosimetry.