Draft 3-74

AREA C

INTRODUCTION

Area C is located on Pajarito Road. To the north of it is TA-50, to the west is Pecos Drive, to the south is Pajarito Road. It is defined by the following coordinates beginning with the northeast point and moving in a clockwise direction. N.28+93, E.101+05: N.26+70, E.100+79: N.26+74, E.100+43; N.24+55,E.100+18; N.25+36, E.93+23; N.27+37, E.89+31; N.28+64, E.87+52; N.30+36, E.88+52; Its location can also be given using township and range as on the Mesa in E 1/2 sec. 22, T.19 N., R.6 E. The approximate acerage for Area C is 11.80. (Ref. 33.)

A memo dated May 10, 1948 states "On May 6, 1948 we forwarded an X priority #153078 to the Zia company signed by Mr. Dittmar for the construction of a new contaminated dump. The work of digging the ditch commenced Friday morning, May 7, and was continued through Saturday, May 8. Work is being resumed this morning, Sunday work having been skipped.

The location for this new contaminated dump has been agreed to by authorized safety and health personnel and by CMR Division. Since it is located near the junction of the Alpha Site Road and the Pajarito Road, we are for record purposed considering it as part of the Alpha Site installation." (Ref. 86)

Pit 1 was in use by November 24, 1948.(Ref. 23) In June 1949 (Ref. 12) it had been reported that the present dump (Alpha Site Dump) had been in use for a year and that one pit had been filled. Another pit was in use and was expected to last until June 1950. This information is in slight conflict with that given in Reference 23.

John Enders in a memo to Wayne Hanson (Ref. 23) listing LA notebooks used for logging solid waste disposal implies that Pit 1 was in use from 1948 through April 1953. Pits 2 and 3 show use dates from April 1950 through April 1953. Pit 4 shows a use date from April 1950 through February 1955. Pit 5 shows a use date from April 1953 to September 1962. Pit 6 shows a use date from October 1956 to June 1958. The preceeding information is from Reference 23. Reference 23 is in conflict with other references written by the same source, John Enders. Pit 6 was put into use in February 1956 (Ref. 52) and the last routine contaminated trash taken to Pit 6 was in December 1958. (Ref. 54) In the second quarter of 1957 Area G had been located and Pit 1 had been dug. (Ref.) In

1959 the history of Pit 6 as a chemical disposal area began. It was proposed "the southwest corner of Pit #6 become the permanent chemical disposal area for at least the next ten years. A fence should be constructed to partition off the southwest corner section from the rest of Pit #6, and one disposal pit should be provided along the north side of the newly fenced area. This pit should be approximately 12' deep, 10' wide, and 60' long, and the dirt should be piled along the north side of the pit." The use of Pit 6 and the pit to the south of it, not the north, as chemical disposal areas was to cease by July 1, 1964. (Ref. 88) In March 1964 (Ref. 89) Area J was considered for chemical disposal. The final designation of Area L for chemical disposal was in May 1964. (Ref. 90)

The first shafts dug in Area C were in February 1958. (Ref. 54) They were twelve holes dug between Pit 4 and Pit 5, for use by the CMB-DO-GS better known as the CMB dogs. The part of Pit 6 which contained routine contaminated trash was covered October 2, 1959.(Ref.56)

By the third quarter of 1958 the twelve shafts between Pits 4 and 5 had been filled and an additional 55 shafts were ordered to be dug between Pits 1 and 3.(Ref. 56) At the end of 1959 Pit 5 was still open and being held in reserve from drums of Tu chips from the Shops (Ref. 57) Pit 5 was not filled and back filled to ground level before the end of 1964.(Ref. 73) This is in conflict with information given in Reference 23. During the third quarter of 1962(Reference 65) 20 new shafts were dug. I assume these 20 shafts run from the southwest corner of Pit #1 along the western margins of Pit 1, 3, and 2. During the first quarter of 1964 an additional 20 shafts were dug.(Ref. 70) I assume these run acrossed the western margin of Pit 4 toward the southwest corner of Pit 5, ending with shaft 97, then a new row parallel to the old began from the south toward the north ending with shaft #107. During the first quarter of 1965, it was understood that when these new shafts were filled there would be no additional ones dug in Area C. (Ref. 74) At this time there were reported to be twelve shafts left. At the end of the second quarter of 1966 there was report to be one shaft left.(Ref. 78) From mid 1966 until the end of 1969 the records on the shafts make no sense. During the third quarter of 1966 (Ref. 79) we somehow gained a shaft. At the end of 1966(Ref. 80) there are one shaft in use and three available, a gain of 2 shafts. At the end of 1967 there are four shafts(Ref. 81) At the end of the second quarter of 1968 (Ref. 82) there are two shafts left. At the end of 1968 there was one shaft left.(Ref.83) This brings us back to the one shaft we had left in the second quarter of 1966. At the end of 1969, (Ref. 84) nothing about Area C is mentioned. I am left to assume that there is at least one shaft out there unfilled. Therefore, the history of Area C begins

in May 1948 and extends to present, February 1974. While there seems to have been an informal closing of the area sometime between 1968 and 1969, I have run acrossed no memo that says that Area C was formally closed out. There is reference to a formal closing of the pits in Area C. However, this doesn't make sense either considering that Pit 5 and Pit 6 were in use past the time of this "formal closing". It is true that Pit #6 and Pit #5 passed the date of the "formal closing " were not in use for routine contaminated trash. However, we are still left with the disposal shafts and it appears to me that there is no record of this area formally being closed out.

GEOLOGY AND HYDROLOGY

Tshirege member of the Bandelier Tuft forms the surface of the mesa at Area C. (Ref. 91) The surface of the mesa slopes gently eastward. The soil covering is approximately 3' to 5' thick.[8] There are two prominent nearly verticle joint sets which intersect at approximately 60°.[91] Most major joints are filled with sediments or altered material to a depth of approximately 10'.[91] Facing of the major joints is approximately 10'.[8] All of the pits are dug in the Tshirege member.[91] As I would expect are all of the shafts. There are canyons approximately a thousand feet north and south of the pits. They are approximately 100' to 150' deep.[8] "The soil cover on the surface of the mesa prevents most of the water on the surface from infiltrating underlying tuft. Where the soil has been removed or distrubed water might infiltrate the underlying tuft and and open joints in the tuft. Beneath the soil there is about 850' of the Bandelier Tuft which consists of a series of Ash fall and Ash flows of a friable to welded rhyolite tuft. This Tuft is underlain by about 575' of volcanic depris of the Puye Conglomerate.

The main zone of saturation occurs in the Puye at a depth of about 1300'. Perched water may occur above the main zone of saturation, although none was encountered in Test Well 8 located 1.5 miles northeast of Area C."[92]

TYPE OF WASTE

Records of solid radioactive waste going into Area C can be found in LA notebooks 2587, 3478, 4644, 6030, 7277, 8453, 9593, and 12442.[23] Waste records for pits and shafts since 1954 are good. Prior to 1954 they are incomplete.[8] The following values taken from reference 32 are decayed corrected from original magnitude to that as of December 31, 1972. There are in the disposal pits of Area C 25 Ci of uranium, 22 Ci of plutonium-239 and 149 Ci of americium-241. In the shafts of Area C there are 1400 Ci of tritium, 40 Ci sodium-22, 20 Ci of Cobalt-60, 31 Ci of Strontium-90-yttrium-90, 1 Ci of radium-226, 5 Ci uranium-233,.05 Ci of uranium-235, 50 Ci fission products induced activity of 250 Ci. Total Ci for the pits is 196 and total Ci for the shafts is 1797.05. In regard to reference 32 (my copy is dated January 15, 1974) Dean Meyer, personal communication has said that a lot of the generators have given the waste management section figures that have al ready been decay corrected. Therefore, the figures in Reference 32 may have been corrected, decay corrected twice. I understand that Merle Wheeler is looking into this possibility. Dean Meyer, personal communication and Merle Wheeler[32] give the amount of tritium in the shafts in Area C as better than 91,400 Ci. Routine contaminated trash for the period consisted of cardboard boxes of material generated in the Chem Labs, barrels of sludge from the waste treatment plant at Building 35 at DP West, and TA-45. This routine

waste was always buried in the pits. In 1956[52] there were 26,471 cardboard boxes of waste and 638 barrels of sludge that went into Pit 6 at Area 5. In 1957, there were 26,138 boxes of contaminated trash, 13,022 barrels of sludge and 743 plastic bags of routine trash that went into Pit 6 as well as all of the debris from Bayo Canyon as it was being dismantled plus a few property items.[95] During 1956 and 1957 waste was not covered weekly and it was decided to demonstrate the difference in weathering for different types of packing materials. There is a picture, 583502 which shows a cardboard box with the date August 8, 1958 on it and a plastic bag with the same date. The cardboard box has weathered considerably, It has broken open. The plastic bag is still in tact and this was after an exposure of three months. From 1957 onward we see a change from the cardboard boxes to the plastic bags. In 1958[54] we have 25,401 boxes, 908 sludge barrels, and 3,612 plastic bags going into Pit 6. During 1958 the first 12 shafts were dug for gamma active waste from 10 Site and were used by the CMB DOGS. In December 1958, the last routine contaminated trash was placed into Pit 6. Then contaminated concrete and acid sewer lines from Ta-1 were placed in Pit 6. During the first quarter of 1959[55] the eastern half of Pit 6 was reserved for chemical containers from DP West Dump. During the second quarter of 1959 Pit 6 received duct work, dirt and concrete and equipment plus classified material.[99] Pit 6 received a total of 8,857 cu yds of routine trash from February 1956 through December 1958.[56] It also received 10,000 cu yds of nonroutine trash from December 1958 through September 1959. The part of Pit 6 that was used for radioactive contaminated waste was covered during the last quarter of 1959.[57] During 1959 Pit 5[57] was held in reserve for drums of Tu chips the Shops Area. Disposal shafts

#56 through 67 were used by Ten Site, DP-West, TA-48, and TA-46 for gamma active waste.[57] At the beginning of 1960 Pit 6 was still open but being used for disposal of hazardous chemicals and Pit 5 was still open and being used to dispose of drums of Tu chips from the Shops area. Shafts 56-67 between Pits 4 and 5 had apparently been filled. During the first quarter of 1960[100] shafts #1-4 between Pits 1 and 3 were filled with gamma waste from Omega Site, DP-West, Ten Site. Also 557 drums of Tu chips from Tu Shops were covered in Pit 5. During the second quarter of 1960[101] shafts # 6 and 7 were filled with beta gamma waste. This waste originated from various sites besides the routine Ten Site disposals. Shaft #10 was in use and Shaft #5 was used by Group N-5. During the third quarter of 1960 Shafts 10, 11, and 12 were filled with beta gamma waste.[58] Shaft #13 was in use. Shaft #5 was still being used for storage by N-5. Don't know what happened to shafts 8 and 9, whether they were skipped or filled. At the end of 1960[59] Pit 5 is still being used by the Shops area for the storage of scrap material as well as drums of Tu chips. Of the 557 drums which were covered, 22 were removed. Shafts #13-15 were filled and #16 was in use. Beta gamma waste was put into these shafts. There is some question[59] whether the Safety Group was also using the southwest portion of Pit 5 for disposal of hazardous chemicals. It was definitely using Pit 6 for disposal of hazardous chemicals. During the first quarter of 1961[60] Shafts #16-20 were filled with beta gamma waste. During the second quarter of 1961 Shafts #21-28 were filled with gamma active waste. Shaft #29 was in use.[61] At the end of 1961[62] I assume that Shafts #29-37 had been filled with beta gamma waste. Pit 5 is still being used for

uranium chips and turnings from the Shops Areas.[62] During the first quarter of 1962[63] Shafts #38-44 were filled. Number 45 is in use. Gamma active waste is being deposited in it. Shaft #55 is being used Group N-5 for storage. During the second quarter of 1962[64] fifteen new shafts were located. One of which was reserved for N-5 for storage of thermocouples. I assume that shafts #45-48 had been filled and that Shafts #49-54 were in use. Pit #5 is still receiving material from the Shops. At the end of 1962[65] Pit 5 is still receiving drums of uranium chips and turnings from the Shops Area. There is nothing specific about the shafts. During the first quarter of 1963[66] Shafts # 49-54 were filled. Shaft #55 is still being used for storage by N-5. Also Shafts #68-73 are filled. Eleven drums of uranium chips and turnings were taken to Pit 5. During the second quarter of 1963[67] 41 drums of D-38 material went to Pit 5 from the Shops. Shafts #74 thur 76 I assume were filled. Number 77 was in use. These shafts were getting gamma active and/or classified contaminated waste. During the third quarter 1963[68] there was a clean-up of Area C and all the material was put into Pit 5. There is reference to 5 shafts being left.. I assume the shafts left unused were #83-88 and 20 new shafts were ordered dug. At the end of 1963[69] Pit 5 is continuing to receive D-38 material from the Shops. They had received a total of 3 shipments of this material during the year for a total of 109 drums. Also Pit 5 received the metal framework of Clementine, one of the early reactors. Shafts #71-84 had been filled with beta gamma waste. The new shafts, 20 in number, were to be used for irradiated plutonium contaminated waste. During the first quarter of 1964, 56 drums of d-38 from the Shops went to Pit 5. Three shafts were filled. I assume these to be #85-87.[70] During the second

quarter of 1964 Shaft #88 is in use receiving gamma active and/or classified contaminated waste. Pit 5 is receiving scrap material from the cleanup of the Ten Site "hot cell".[71] During the third quarter of 1964[72] Shafts #88 and 98 are in use. Five plutonium contaminated sodium loops from Ten Site were placed into 5 empty shafts. I don't know which shafts they were placed in. D-38 drums continued to be placed in Pit 5 plus the combustible material from TA-1 demolition. At the end of 1964[73] Pit 5 had been filled and backfilled. It was originally dug to contain material from demolition of D Building, TA-1 and in recent years it had been used for a depository for D-38, then it was finished with more debris. Nothing specific was stated about the shafts. During the first quarter of 1965[74] 5-3' diam shafts were left unused and 7-12" diam shafts were left unused. I don't know which shafts these were. During the second quarter of 1965[75] 3-3' diam shafts were left and 7-12" diam shafts were left. During the third quarter of 1965 605 g of ^{233}U solid residues were placed in 12" diam shafts. I don't know which shafts.[76] Also there are 2-3' diam shafts left and 6-12" diam shafts left. At the end of [77] there was 1-3' and 5-12" diam shafts left. It was reported[77] that 7-3' diam shafts were filled during 1965 and 4-12" diam shafts were filled during 1965. It was also stated[77] that all high-level waste went to C or sea? This was beta gamma waste. These figures given don't exactly coincide with the figures given for the quarterly reports. During the first quarter of 1966[102] the last remaining disposal shafts were in use. I don't know what numbers these are. They were receiving high-level gamma active waste (greater than R/h at contact with containing package) plus contaminated animal tissue plus classified contaminated waste. During the second quarter of 1966 there is one 12" diam

shaft in use. I don't know which one.[78] During the third quarter of 1966 shafts #93 and #100 have not been filled.[79] The third quarter report comflicts with the second quarter one. At the end of 1966[80] there is one 3' diam shaft in use and 3-12" diam shafts available. Again there is a conflict with previous numbers. During the third quarter of 1967[103] 5 shafts were plugged at Area C. I don't know which these are. At the end of 1967[81] the last 3' diam shaft was in use and there were 2-12" diam shafts available. Again a conflict with previous numbers. One 3' diam shaft was used to store uranium-235 contaminated pipe removed from Ten Site. During the second quarter of 1968[82] one-12" diam shaft was filled and 2-12" shafts left. Again we have a conflict with numbers in previous reports. At the end of 1968[83] there is one-12" diam shaft being used. Reports in 1969 do not mention the disposal shafts at Area C. H-1's files contain detailed reports on the disposal of contaminated waste starting with an annual report for 1956. I am assuming that prior to 1956 the detailed reports of this type were not made. This conflicts with the statement made in reference 8 that records of waste placed in pits and holes since 1954 are good and prior to 1954 are incomplete. Perhaps there is no conflict in these two statements, perhaps record is being used in two different senses. Reference 8 also states that plutonium and americium sludges were mixed with vermiculite or cement before being placed in 55 gal drums. It also mentions barium and lanthanum waste. These barium and lanthanum wastes were placed in steel casings and buried in 2' diam shafts.[8] Reference 32 has no mention of any barium or lanthanum waste in Area C. I don't know how to explain the discrepancy between the two reports.

"While burial of contaminated waste was the method of disposal, it was recognized that other ideas should be investigated. Dr. Jette decided that sea burial should be considered. A number of large steel containers was fabricated with gasketed lids and sea cocks. These were used for a period of time; however, when they were filled, the cost of transportation and fabrication of more boxes was so high that the idea was dropped and the full boxes were placed in pits in Area C."[108] I assume that these were buried before 1956 and I don't know which pits they were put into.

MODE OF DISPOSAL

Area C contains both pits and shafts. Pits #1-4 are located in the southwest quarter of the Area. See Engineering ENG-R12-64 These Pits are 610' long by 40' wide. On the engineering drawing it is stated that these are scaled dimensions. Apparently the Engineering Department was not asked to stake these pits or they have no record of it. Pits #1-4 received radioactive/contaminated waste exclusively. Pit #5 located to the north of Pits 1-4 is 110' wide by 705' long and has a maximum depth of approximately 18'. There is some question as to whether Pit 5 received some hazardous chemical as well as routine and nonroutine radioactive contaminated waste. Pit 6 in the northwest quarter of Area C is 100' wide by 505' long with a maximum depth of approximately 23'. It received routine and nonroutine radioactive contaminated waste as well as hazardous chemical waste. I question whether it was indeed the eastern one half of Pit #6 that was reserved for the disposal of hazardous chemicals. It seems to me it would make better sense if it were the western one half that was reserved for this type of disposal. There is a chemical pit which presumably received only hazardous chemical disposal located adjacent to the southwestern edge of

Pit #6. There is some question in Dean Meyer's mind (personal communication) whether some radioactive contaminated waste didn't get mixed in with the hazardous chemical disposal. The chemical pit on Engineering Drawing R-1264 appears to be about 25' wide by approximately 180' long. There are 107 disposal shafts in Area C. Numbering of the shafts is not in accordance with the dates that they were used or the waste. Shafts #56-67 are located between Pit #4 and Pit #5 and are the first shafts used and drilled. Shafts #1-55 are between Pit #1 and Pit #3. They were the next shafts to be used. They are followed by Shafts #68-97 and run along the western ends of Pit #1-4 up to, just shy of the southwestern corner of Pit #5. Shafts #98-107 are parallel to Shafts #68-97 and begin next to Pajarito Road and run north. Like the pits the shafts vary in size and depth. The first 12 holes Shafts #56-67 were 2' in diam by 10' deep.[54] Shafts #1-55 were 2' diam by 15' deep.[56] Shafts #68-107 include both 3' diam shafts as well as 2' diam shafts. I can't identify which is which. Also, they may vary in depth from 20' to 60'.[8] In this series of shafts #68-107 some are concrete lined. On Eng. drawing R-1264 there is a strontium-90 disposal shaft without a number located a few feet from the corner of the fence designated by coordinance N.25+36 E.93+23. The fence which runs north - northeast acrossed the eastern third of Pit 6 to Pajarito Road was erected to end confusion between the contaminated radioactive contaminated/disposal waste and hazardous chemical disposal. (Personal communication from John Enders) At that time it was common for hazardous chemicals to be placed in the chemical disposal pits and then burned. Frequently John Enders received a telephone call saying the contaminated dump was on fire which created problems. Therefore, the fence was erected to end the confusion of what was on fire.

To be added to Area C

MODE OF DISPOSAL

Packaging trash[54] " at the CMR Building and at Sigma Building loose office and change room trash is being packaged in plastic bags. Seven 6- bushel capacity trash dollies have been purchased for this operation. Five mill (thickness) 40" by 24" plastic bags are used as liners for the trash dollies. When these bags are filled they are sealed with masking tape and placed into the dempster dumpster containers. It is estimated that one plastic bag will hold more trash than 4 or 5 13" by 13" by 24" cardboard boxes. The time spent by Zia Janitors in preparing the bags, filling and sealing them is about 1/2 that needed to do the same operation using cardboard boxes. It has been observed that these bags are more easily emptied at the disposal pit from the dempster dumpster containers than are the cardboard boxes which have a tendency to hang up inside the containers. At the disposal pit the bags also withstand the effects of weathering much better than the cardboard boxes."[54] (1959) "Prior to putting the trash dollies into use, the plastic bags used in the Labs for holding contaminated trash were 2-mill thick. The bags were removed, sealed, and placed into cardboard boxes. After the trash dollie system was started, these bags are also being placed into the trash dolly and because of this it was felt that an additional safety factor would be needed so 5-mill thick bags were used as liners for the trash cans in the laboratories."[54] In 1959[57] "cardboard boxes located in the utility quarters of the CMR Building Laboratory Wings are being replaced with metal cans provided with a plastic bag liner. The changeover was made in order to provide a more fire proof container for solid

radioactive waste." During the second quarter of 1958[97] there was a changeover from picking up contaminated trash by truck to use of dempster dumpster boxes. Before the dempster dumpster boxes "were put into use they were painted on the interior and the doors marked with the wording "For Radioactive Trash Only". A yellow band was painted around the top of the box with black wording designating the site location of the box."[97] "In most areas the trash was packaged and placed in these boxes by the Zia janitors."[97] "During this quarter, 55 - 5 gallon drums from TA-45 and Building 35, DP-West were hauled to the dump by truck. It is hoped that during the next quarter, dempster dumpster boxes suitable for holding these drums will be put into use."[97] This hope was not realized. "Pick up of the 5 of the 55-gallon drums containing sludge from TA-45 and Building 35 of DP-West is now done on Friday of each week. Other material/that cannot be hauled by dempster dumpster is also taken to the disposal pit by truck."[98] (October, 1958) The following is taken from the annual report for 1958;[54] "Early in 1958 a comparative study was made of the use of dempster dumpster boxes . the hauling by truck. The comparison indicated that the use of dempster dumpster containers for hauling routine packaged trash was the more economical means of delivery of trash to the dump than the use of a truck. As a result of this study it was decided to purchase dempster dumpster boxes for use at the sites where there was a need for them. At some sites the pickup is still done "call in" basis. A listing was prepared showing the location for the boxes at the various sites and the estimated frequency that the boxes would have to be emptied. The frequency study was based on records over the space of a year on the number of cardboard cartons picked up at each of the sites where contaminated trash originated. The boxes located at DP laundry

and HRL Building were provided with padlocks so as to prevent unauthorized entry.

The Zia Refuge Department is called when a box is full and arrangements to have it picked up and emptied.

The 55 gallon drums from TA-45 and Building 35, DP-West Waste Treatment Plants are still being picked up by truck. On the days these drums are picked up other nonroutine contaminated materials is also picked up. An H-1 monitor escorts the truck to the disposal pit and logs each entry into the dump run log book."[54] A memo dated February 5, 1957 , subject - COVERING CONTAMINATED TRASH AT CONTAMINATED DUMP[110] states " it is my understanding that the dump was formerly covered once per week. This was done at a time when trash was piled into the dump and covering once a week was a means of reducing the danger of fire.

At present, it seems that the dump is covered whenever: (a) requested by Engineering 4, (b) when there is a slack period for Zia Road Section. After talking to Mr. Anglin and Mr. Raper of the Zia Road Section, I find that they point out that the more frequent the covering, more fill dirt is used.

At present, the trash is placed into the dump in single layers of boxes, etc., which cover about 1/2 of the width of the dump. The fire hazard is reduced because the fire department's efforts to extinguish a fire in a single layer should be successful.

Therefore, I am suggesting that the routine dump covering operation should be done only after single layer of trash is placed into the dump. The width of the layer to be about 1/2 the width of the dump."[110] I am not sure but I think John Enders in this memo when he refers to dump is actually referring to a single pit within the dump. In 1966 John Enders reports[79] that he anticipates some

fill dirt being made available as the result of the demolition of TA-45 and that he would like to see this dirt placed in Pit 4 at Area C. "as the ground has sunken over a large area of this pit, as much as 2' in places, and filling in of these areas should be done."[79] The shafts in area C, which are lined, are 3' in diam They have a 12" diam pipe in the center which is surrounded by 12" of concrete. They were designed for the disposal of irradiated plutonium contaminated waste.[70] In 1962[62] "metal covers were fabricated and installed over the 'active' disposal well and wood covers were obtained for use on unused wells. At each corner of the wood covers metal stakes have been located so as to prevent movement of the covers."[62] In 1959[57] "metal stakes with number tags have been placed next to each hole as permanent markers. Each delivery made to these disposal holes is logged into the log book number 95 and 93."[57] In the annual report for 1958 on disposal of contaminated solid waste[54] John Enders describes the way the CMB-DO-CX group handles disposal to the disposal shafts, "at infrequent intervals CMB-DO-GS group at Ten site has beta gamma active waste material that has to be buried. In the past the material was taken to the disposal pit where a hole was dug into the ground and the material thrown into the hole and covered with dirt. In February 1958, an order was submitted to have a dozen holes drilled measuring 2' in diam and about 10' deep. The holes were located between Pits 4 and 5 Area C. These holes are now being used for disposal for the gamma active waste from Ten Site. Space is available at this location for at least 30 to 50 more holes for future disposal.

Comment - While the space is available it was never used and the site of the disposal shaft was shifted to the area between Pits 1 and 3. For what reason I don't know.

The technique used by CMB-DO-GS for handling this waste is briefly as follows: (1) the material to be thrown away is evaporated to dryness in a "hot cell" at Ten Site and then placed inside a Dural container. This container is then sealed and placed inside a steel container which is in turn sealed. (2) The steel container is then removed from the "hot cell" and placed into a lead transfer case which is thick enough to handle up to 40 Ci of material. (3) The transfer case is positioned on the back of a 1 1/2 Ton truck and fastened securely with a chain. (4) The truck is then driven to the disposal area and positioned above one of the holes. (5) A tripod with a long boom arm attached is used to transfer the material from the transport case to the hole. The steel container is pulled up out of the case by means of a string to which is attached a rope that runs through a pulley on the end of the boom. When the container is over the hole, the string is cut and a few shovels of dirt are shoveled on top of the container so as to reduce the gamma radiation at ground level to less than 1 mr per hour."[54]

In the annual report for 1959[57] John Enders reports "this year Ten Site personnel modified the equipment used for containing and shielding their waste material during transit to the disposal area. This modification included an improved container and tuballoy cast that is provided with a trap door on the bottom that permits dropping the waste material (sealed in the canister) from the cast directly into the disposal well through a hole in the truck bed. This design improvement has permitted handling of waste that range up to 400 Ci of activity with very little personnel exposure. CMB-11, DP-West has planned to use this equipment when possible for their waste disposal from the "hot cells"."[57] In 1957 John Enders made a

proposal for sealing disposal shafts by H-1[111] "Disposal shafts located in Area C and G are used for disposal of solid radioactive materials which, for various reasons, is more adequately contained in shafts rather than in the disposal pits.

Often it is highly desirable for radiation safety and/or security reasons (or both) to seal items placed in the shafts immediately with concrete. It is now standard practice to seal filled disposal shafts with concrete.

The current procedure of obtaining Ready Mixed Cement for the above operations is to (1) write a memo to Eng. 4, through H-1 group office, requesting the work to be done, (2) Eng. 4, upon receiving the memo, may or may not issue a work order, apparently depending upon whether Eng. 4 thinks the request is necessary or not. There have been instances where the H-1 Group Office has had to repeat the request and by the time the Ready Mix finally arrives there has been a time lag of (in some cases) several months.

The simple logistics of the operation are also involved in that the Ready Mix truck, Eng. 4, representative, H-1 representative all need to be at the area at the same time -- and this has also been difficult at times. In the event of a "emergency delivery" it would be almost impossible to schedule delivery of Ready Mix to the disposal shaft."[111] John Enders wanted to purchase a small cement mixer and some cement and one wheelbarrow so that H-1 could do the job themselves. I don't know whether this was ever carried out. This information came from Reference 111. This concludes Area C Mode of Disposal.

APPEARANCE OF SITE

Area C is fenced with cyclone fence, barged wire running along the top. It is marked as Area C and contains faded radioactive contamination signs along the Pajarito Road segment. I don't know how many such signs there are along the other segments of the fence. There two gates, at least, into the area. One is off of Pajarito Road and leads into the eastern two-thirds of the area and the other one is off of Pecos Drive and leads into the area where the present meteorological tower is and where chemical, hazardous chemicals were disposed of. The entire area is grassy. Pit #5 is a swell.

MONITORING

The USGS infiltration tests made in 1958 and 1959 by Abrahms, Weir, and Purtymun WEre not really done in Area C. They were done on the north side of Pecos Drive.[50] In 1962[92] Abrahms and Purtymun considered the question of 60' deep shafts at Area C. "There is no serious objection to the burial of radioactive waste in holes 60' deep at Area C, although several precautions should be taken. They are· solid waste should be packaged for normal underground burial; (2) liquids and sludges should be contained so no leakage occurs; (3) the soil zone on the mesa should be disturbed as little as possible near present and future waste disposal areas. After the holes are filled, the surface should be sealed with 2' to 3' of of packed clay soil; (4) adequate erosion and drainage maintenance should be provided; (5) the holes should be drilled at least 100' from the edge of the mesa in Area C. The principle concern is to prevent water from carrying the radioactive materials to the underlying bodies of ground water."[92] In April 1971[109] Bill Purtymun,

reported the results of test drilling and penetration tests in Area C. The purpose of this report was to help establish the location for the meteorological tower. All cuttings were monitored by Robert Sandoval, H-1. "No radioactive contamination was detected."[109] "Tests at the 120 SW Guy indicated that the location is underlain by disposal pit, probably the chemical pit."[109] None of the work done in and around Area C was for the specific purpose of monitoring movement of radio contaminated material out of Area C. I understand that Wayne Hanson, Ecology Section, H-8 has some data on uptake of tritium by. Clover in Area C.

CONCLUSIONS

Area C was the first site that had the approval of the USGS, (personal communication from Dean Meyer). I have not seen the USGS report which confirms this. There is no information to indicate that Area C is unsuited to its use.

RECOMMENDATIONS

Area C be formally closed as a contaminated waste disposal area. Deep down geologic mapping of Area C should be done. Since Wayne Hanson already has information concerning uptake of tritium by the clover in the Area, the monitoring network should be set up with all due haste. Also, in 1963[8] The USGS recommended that the fill be compacted and mounted to minimize erosion and ponding of water on the surface of the pits. There is still a swell over Pit 5. I think that the 1963 recommendations should be carried out.