



P.O. Box 1970 Richland, WA 99352

October 22, 1990

9057482



Mr. J. R. Hunter
Operations Division
U.S. Department of Energy
Richland Operations Office
Richland, Washington 99352

Dear Mr. Hunter:

ACTION PLAN FOR DISPOSITION OF PLUTONIUM FINISHING PLANT SCRAP HOLDINGS

In response to questions raised by Mr. Leo Duffy, we are submitting an action plan for disposition of scrap holdings at the Plutonium Finishing Plant.

The plan includes a preliminary characterization and classification of materials, likely additional characterization and processing requirements, as well as a detailed decision tree to assist in determining the appropriate disposition path.

If you have any questions regarding the attached information, please feel free to call Mr. M. Haas, 373-3309, Mr. C. M. Kronvall, 373-4085 or myself on 373-2059.

Very truly yours,

J. C. Fulton, Manager
Defense Programs Department
Defense Operations Division

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Attachment

DOE-RL - R. O. Puthoff (w/o attachments)
J. E. Mecca (w/o attachments)



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Reviewing
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Date: 6-8-93

The Plutonium Finishing Plant (PFP) vaults (2736Z) at the Hanford Site currently store in excess of 14.5 metric tons of plutonium bearing scrap distributed throughout approximately 6,500 individual items. These scrap forms result from plutonium nitrate, oxide and plutonium metal production activities which have been carried out at PFP and other DOE Sites since 1950, as well as research and development materials, and other specialized plutonium/uranium compounds in a wide range of matrices. Isotopic distribution varies from weapons grade to 40 percent Pu-240.

The majority of these materials will require some degree of further characterization to determine their stability and their suitability for long-term storage or for shipment to a designated permanent repository. Some may require additional processing. Current identification of the chemical constituents is mostly limited to process knowledge. A unique Hanford specific material categorization index has been assigned as well as the DOE complex accepted scrap form identification.

As a result of the U.S. Department of Justice ruling at the Rocky Flats Plant, it is anticipated that some of these scrap forms could be subject to regulations as dangerous waste, and will require at the minimum; vault permitting, thorough characterization, inventory turnover, a limited holding period and possible permitting of treatment processes. The oxide is the most desirable form for both storage and or shipment. As a result, proposed treatment processes will include appropriate preliminary steps as well as conversion to an oxide product of yet-to-be-designated purity. Chemical adulteration or mass modification (vitrification or grouting) were not considered due to uncertainty regarding future demand for purified plutonium and the interactivity of those forms. Priority selection of candidate scrap forms for stabilization/processing will be based upon their current stability, i.e. solutions, sludges, and gassing forms will be treated first.

Based on these assumptions an action plan has been developed and is described in the following sections. Elements of the action plan include; (1) initial characterization of vault holdings and (2), a detailed decision tree to assist in determining the appropriate disposition path.

An unclassified listing of characterized scrap holdings is shown in Table 1 in which the required processing steps have been identified. The technology is largely available and in most cases the equipment is in place but must be reactivated. Some forms will require additional characterization and few have been determined not to warrant further processing and likely will be discarded following application of the economic discard limit (EDL).

A detailed decision tree has been developed (Figure 1) to define the disposition of special nuclear material (SNM) presently stored at the PFP. Items contained in the PFP inventory will be evaluated using the decision tree to determine how the material will be treated/processed. Decisions within the tree are based on criteria such as material form, the stability of the material, the ease of SNM recovery, the technological feasibility of recovery, and the desired product form. Decisions will be made such that an item will be placed in stable storage either immediately or following treatment processing. Once treatment/processing options have been determined for each

category of item, time line schedules identifying more detailed implementation steps and the durations of these steps will be developed. An evaluation will be performed to determine category priority based on factors such as safety, quantity, form of material availability of technology, documentation requirements and, duration of effort. Detailed implementation schedules for the highest priority items categories will be prepared once priority has been established and agreed to by Westinghouse and the Department of Energy.

TABLE 1
 PFP PU RECOVERY PROCESSING REQUIREMENTS

CATEGORY CODE	SCRAP CODE	CATEGORY DESCRIPTION	PFP	PUREX/PFP	RETAIL STANDARDS	BUTTON BURNING	S & C DISSOLUTION	SILVER PERSULFATE DISSOLUTION	MT-5 DISSOLUTION	HYDROLISIS	SAMPLE & CHARACTERIZE	EQUIP. NOT AVAILABLE	UNECONOMICAL TO PROCESS	DIRECT TO SK PROCESS
1	14	Plutonium conversion slag and crucible	X				X							
3	1	Plutonium conversion scrap metal	X			X			X					
5	6	Plutonium conversion other scrap	X			X			X					
10	6	MMA 212 PIAP scrap	X			X			X					
18	15	HEPA filters											X	
19	6	Plutonium rec miscellaneous scrap	X						X	X	X			
21	15	Centrifuge sludge	X						X	X	X			
22	11	Plutonium nitrate process	X											X
24	13	Plutonium Incinerator ash	X					X						
25	13	Plutonium rec Incinerator ash	X					X						
28	15	Dried lab oil sludge	X					X		X				
29	15	PUREX miscellaneous	X						X					
35	6	Oxide from polystyrene	X						X					
36	6	PUREX scrap oxide	X						X					
37	12	Waste drums for burial											X	
38	17	Z-1A sand											X	
41	6	Analytical laboratories miscellaneous scrap	X			X			X					
43	7	Analytical laboratories scrap with uranium		X		X			X					
51	6	Cil miscellaneous scrap	X			X			X					
52	6	Cil miscellaneous scrap	X			X			X					
55	7	Cil scrap with U		X					X					

TAB I
 PFP PU RECOVERY PROCESSING REQUIREMENTS

CATE GORY CODE	SCUAP CODE	CATEGORY DESCRIPTION	PFP	PUREX/ PFP	RETAIN STANDARDS	BUTTON BURNING	S & C DISSOLUTION	SILVER PERSULFATE DISSOLUTION	HT-S DISSOLUTION	HYDROLISIS	SAMPLE & CHARAC- TERIZE	EQUIP. NOT AVAILABLE	UNECO- NOMICAL TO PROCESS	DIRECT TO SH PROCESS
61	6	Stabilized oxide	X						X					
62	15	Stabilized scrap	X						X					
63	6	Stabilized PAF scrap	X						X					
64	15	Stabilized C-line scrap	X						X					
67	6	BNW scrap pwd	X						X					
70	9	Plutonium zirconium scrap 04	X			X		X						
71	6	BNW miscellaneous scrap oxide	X						X					
76	7	BNW uranium scrap		X					X					
77	7	BNW uranium scrap 04		X					X					
80	9	Plutonium zirconium scrap others	X						X					
88	11	BNW plutonium & DEPL-uranium storage only		X							X			X
107	6	oxide for recovery	X						X					
173	16	Oxide fuels grade	X						X					
175	16	Oxide fuels grade other		X					X		X			
199	16	Product nitrate	X											X
300	11	HCl solutions	X						* X					
301	11	HNO ₃ , HCl solutions	X						* X					
302	11	HNO ₃ , HCl, HF solutions	X						* X					
303	11	Solutions w/ miscellaneous impurities	X											X
304	11	Solutions w/ miscellaneous impurities and thorium		X					* X		X			
316	7	Plutonium ENR uranium oxide		X					X		X			

alate precipitate, Wash (NaOH neutralize acid is pH is too low)

TABLE 1
PEP PU RECOVERY PROCESSING REQUIREMENTS

CATEGORY CODE	SCRAP CODE	CATEGORY DESCRIPTION	PEP	PUREX/PEP	RETAIN STANDARDS	BUTTON BURNING	S & C DISSOLUTION	SILVER PERSULFATE DISSOLUTION	MT-S DISSOLUTION	HYDROLISIS	SAMPLE & CHARAC-TERIZE	EQUIP. NOT AVAILABLE	UNECONOMICAL TO PROCESS	DIRECT TO SK PROCESS
417	7	Plutonium-ENR uranium oxide CR		X					X		X			
423	7	Plutonium-ENR uranium oxide		X					X		X			
426	7	Plutonium-Pu or DEPL uranium alloy		X							X			
436	7	Plutonium-ENR uranium oxide powder pellets		X					X		X			
439	9	Plutonium-uranium-zirconium oxide		X					X		X			
440	9	Plutonium-uranium-zirconium oxide samples		X					X		X			
444	2	Plutonium-DEPL uranium alloy		X										
452	7	Plutonium-ENR uranium oxide sic		X					X					
453	7	Plutonium-ENR uranium-Sn		X										
461	7	Plutonium-Pu-DEPL uranium oxide		X					X					
462	7	Plutonium-Pu-DEPL uranium-fissium oxide		X					X					
465	6	Plutonium-aluminum oxide or scrap	X						X					
466	7	PuO ₂ -ENR uranium 04		X					X					
471	2	Plutonium-ENR uranium alloy		X										
478	7	Plutonium - Pu - DEPL uranium oxide		X					X					
486	1	Plutonium/aluminum-y VYCOR melt residue	X				**							
492	7	Plutonium-ENR uranium oxide		X					X					
500	11	Plutonium, europium HNO ₃ , HCl, HF, thorium		X					X					+
502	11	Plutonium, europium, HNO ₃ , HCl, HF, thorium, HClO ₄		X										+
522	7	PuO ₂ Eu contaminated		X					X					
531	6	PuO ₂ /graph fuel rod clad				X	***	X						

HF dissolution of VYCOR
ion exchange processing @ Chem Lab

*Dissolve aluminum clad, oxidize graphite in calcine furnace, dissolve PuO₂ with silver persulfate process

TABLE 1
 PFP/PU RECOVERY PROCESSING REQUIREMENTS

CATEGORY CODE	SCRAP CODE	CATEGORY DESCRIPTION	PFP	PUREX/PFP	RETAIN STANDARDS	BUTTON BURNING	S & C DISSOLUTION	SILVER PERSULFATE DISSOLUTION	IMP-S DISSOLUTION	HYDROLISIS	SAMPLE & CHARACTERIZE	EQUIP. NOT AVAILABLE	UNECONOMICAL TO PROCESS	DIRECT TO SK PROCESS
573	1	Plutonium foils	X				X							
850	17	Radiation sources			****									
900	17	Taiwan Reactor Sub Mat on hold	X						X					
950	7	Plutonium/europium scrap from 324 Building		X					X		X	X		

****Retain radiation sources

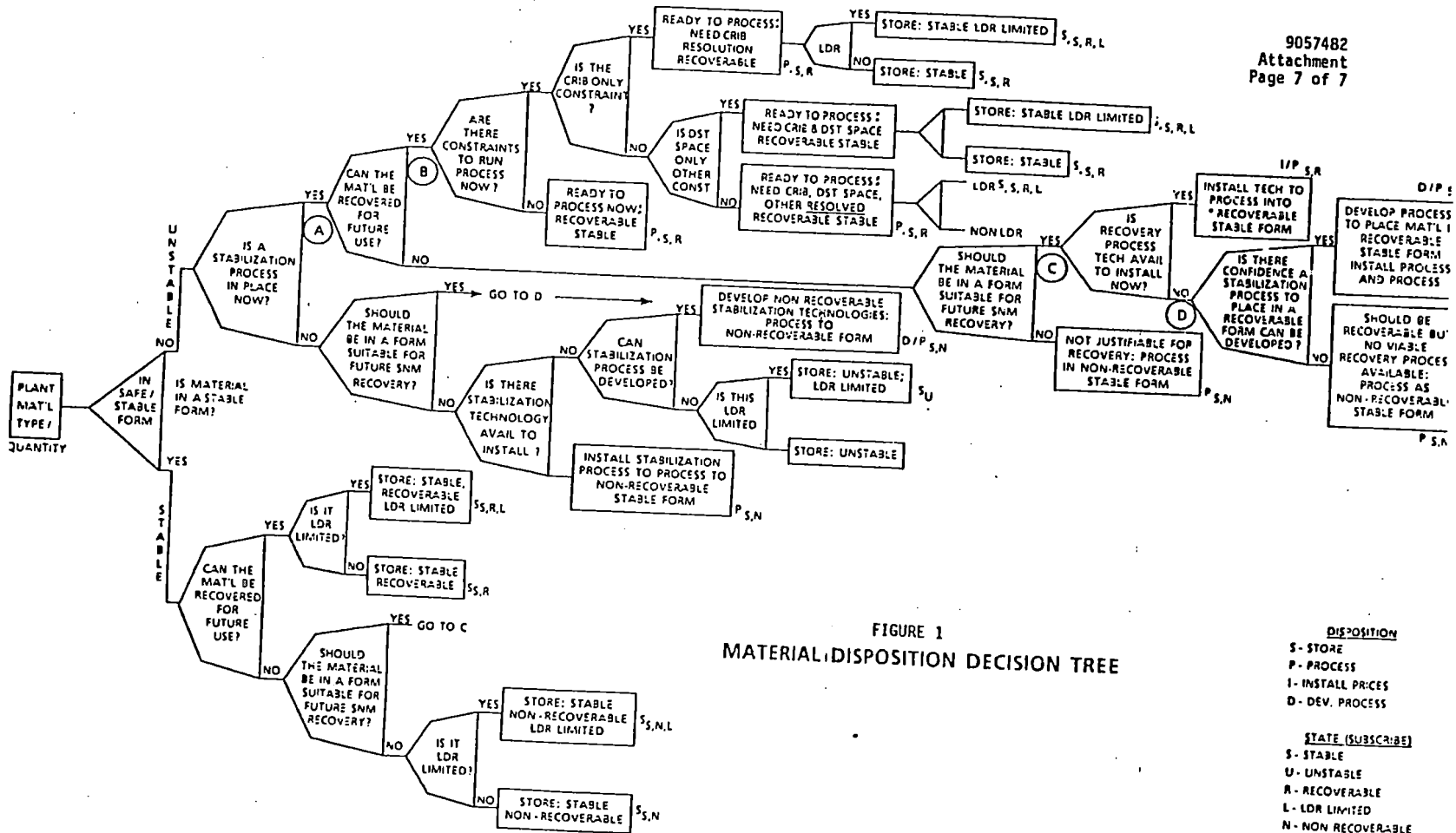


FIGURE 1
MATERIAL DISPOSITION DECISION TREE

DISPOSITION
 S - STORE
 P - PROCESS
 I - INSTALL PRICES
 D - DEV. PROCESS

STATE (SUBSCRIBE)
 S - STABLE
 U - UNSTABLE
 R - RECOVERABLE
 L - LDR LIMITED
 N - NON RECOVERABLE

*MAY HAVE LDR LIMITATION

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Addressee

Correspondence No.

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Mr. J. E. Mecca

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