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EVALUATION OF CONTINUED STORAGE OF SAMPLES AT THE 325 LABORATORY

C. B. McVey

Westinghouse Hanford Company, Richland, WA 99352

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Abstract: This report provides identification of potential Program users for samples that are archived at Pacific Northwest National Laboratory (PNNL) facilities, establishes cost related to packaging and transportation of these samples to 222-S, for continued storage at 325 facilities, disposal and transfer costs. The report provides a recommendation to dispose of 20 samples, transfer 99 samples to PNNL and to continue storage of the remaining samples at PNNL's 325 facility.

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EVALUATION OF CONTINUED STORAGE OF SAMPLES
AT THE 325 LABORATORY

by

Charles B. McVey
Principal Engineer
Laboratory Engineering

for

Program Management and Integration
Analytical Services

January 22, 1996

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ENGINEERING EVALUATION

EVALUATION OF CONTINUED STORAGE OF SAMPLES
AT THE 325 LABORATORY

Issued by

Hanford Analytical Services
Laboratory Engineering
Westinghouse Hanford Company
Richland, Washington

January 1996

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1.0 INTRODUCTION

In May 1995, Pacific Northwest National Laboratory (PNNL) 325 Analytical Chemistry Laboratory (ACL) performed an inventory of samples stored at the ACL in fulfillment of a Westinghouse Hanford Co. (WHC) milestone. This inventory listing was forwarded to Westinghouse Hanford Company (WHC) (Shubert 1995) with a request for a disposition of the samples. A total of 237 samples with a total mass of 7,137.27 grams are in storage. These samples are being archived by PNNL in their facility. Funding for continued operation of this facility was in question during this period.

To determine the demand for retaining these samples, a request was sent to various programs (Kelley 1995). Each program was requested to identify specific samples needed and to what use was intended for these samples. After the receipt of the responses to this request, an evaluation of the archiving requirements was requested.

The purpose of this report is to provide the following:

- 1) Identification of potential Program users for the archived samples and their specific requirements.
- 2) Establish a cost related to the packaging and transportation of archive samples to the 222-S Laboratory.
- 3) Establish a cost for the continued storage of samples.
- 4) Establish the associated disposal costs at the Analytical Chemistry Laboratory (ACL) for the samples not requiring further storage.
- 5) Recommendation for disposition of archive samples.

2.0 SUMMARY

The purpose of this report is multipurpose. The report is to identify potential Program users and their specific requirements, establish a cost for packing and transporting samples to 222-S Laboratory, a cost for continued storage at 325 facility, a cost for disposal of samples no longer required and a recommendation for disposition of samples at 325 facility.

The preferred recommendation is for 99 samples of the 237 samples presently stored at the 325 facility be transferred to PNNL and 20 of the samples be processed for disposal. The remaining 138 samples are recommended to continue storage at the 325 facility.

Four alternatives were investigated and evaluated for their safety, cost effectiveness, affects on productivity, and storage space availability. Appendix A discusses the criteria for evaluation and shows the results of the investigation. The four alternatives selected for evaluation were "Do nothing"; dispose, transfer and ship to 222-S; dispose, transfer and store at 325; and, transport all samples to 222-S. The alternative selected was to dispose, transfer and store remainder of the samples at the 325 facility.

This recommendation was provided primarily due to the lack of available storage space at the 222-S facility. Insufficient archive space at 222-S facility to absorb these samples from PNNL will impact the capability to support TWRS's aggressive core sampling program. The identification of samples no longer required by WHC will reduce costs associated with storage and maintenance and the responsibility for disposal in the future. A majority of these samples have been requested by PNNL to be composited together for development testing by PNNL. Once these samples are composited they can be transferred along with the future responsibility associated with these samples.

The costs associated with this alternative is approximately \$740,000 over a ten year time period. The costs were escalated at a three percent a year. The initial cost of \$91,000 includes all costs associated with combining samples for transfer, preparation for disposal, disposal and the first years storage and maintenance charges.

3.0 RECOMMENDATIONS & CONCLUSIONS

3.1 RECOMMENDATIONS

It is the recommendation of this report that the samples which are no longer required by various programs should be disposed and/or reassigned. During this investigation it was determined that another owner is interested in a portion of the samples that are identified as waste. It would be to our advantage to formalize the transfer of those samples no longer needed by WHC to PNNL. This will reduce the amount of waste that WHC would be responsible for and move that responsibility to PNNL, also the cost for storage.

The final recommendation is that the 325 facility continue storage and maintenance of the remaining samples in the Shielded Analytical Laboratory (SAL) and High Level Radiochemistry Facility (HLRF) cells. Sample storage at the 222-S facility is very critical and relief of this space shortage has not been satisfactorily addressed in the past. Some creative and innovative storage techniques have been applied to increase the storage capability, but has not eliminated the space problem. Future increase of storage of samples at the 325 facility may be required to eliminate any possible impacts to commitments for the support of milestones for waste tank characterization archiving.

3.2 CONCLUSIONS

It is the conclusion of this evaluation that to optimize the archiving space at the 222-S Facility and the hot cell space at the 325 facilities, the following actions take place.

- (1) The samples identified as not being needed by any program be transferred to another owner or disposed of if another owner cannot be immediately determined. A total of 108 samples have been identified for transfer and 20 have been identified for disposal.
- (2) The remaining 164 samples that are required for support of other programs should be archived and maintained at the 325 facilities (SAL and HLRF).

These actions will reduce the annual costs from the projected \$116,000 per year to a new estimated cost of \$55,000 per year. These estimates are subject to yearly escalation rates. Space for archiving at the 222-S Facility will continue to be critical for the TWRS tank waste sampling program, but the 325 facilities offer potential relief during these periods of space deficiency.

4.0 UNCERTAINTIES

Several uncertainties persist to affect future decisions at Hanford that are common for all activities. These are funding, schedules and resources availability. Resources availability such as space allocation has been discussed in this and other reports, but funding and schedules continue to fluctuate.

Presently the escalation rate being used for forecasting future budgets is at 3% per year. This rate may increase or slightly decrease in the out years. For planning purposes the 3% per year escalation rate is used for the 10 year projections. Any change in this rate will correspondingly impact the 10 year projections.

Funding projections for the Hanford Site continue to be questionable for the continued operations of Hanford facilities. In the recent past, the funding for the continued operations of PNNL's 325 facility was suspended. This suspension was later rescinded and the facility operation is again being supported. The continual changing of funding support will persist and cannot be predicted in the future.

Another uncertainty is the sampling schedule requirements of TWRS characterization program of the waste tanks. This schedule fluctuates due to resources, funding, weather, and tank priority changes. These schedule changes are addressed for the 222-S laboratories in the Hot Sample Archiving Engineering Study (McVey 1995). The study address the available archiving space at the 222-S laboratory and has in the past addressed the availability of space in the 325 facility.

5.0 DISCUSSION

5.1 PROGRAM USERS

To determine the demand for retaining samples stored at PNNL, a request was sent to various programs (Kelley 1995). Each program was requested to identify specific samples needed and to what use was intended for these samples. At the beginning of this evaluation a confirmation of each programs response was issued (McVey 1995). This request resulted in confirmation from each program. The programs interested in retaining samples and identification of the samples to retain are recorded in Appendix A.

SAMPLE ASSIGNMENT

PROGRAM	NUMBER SAMPLES	WEIGHT (GRAMS)
PRETREATMENT	77	4195.47
SAFETY	28	799.08
OTHER	13	70.00
DISPOSAL	119	2078.72
TOTAL	237*	7143.27

*Pretreatment and Safety have identified one common sample for their use and this sample is counted twice in the Number Samples column and divided in the grams column.

A discrepancy exists between the sample total given in the Shubert, 1995 letter and the latest total given by PNNL. This is due to some samples listed have more than one jar and were not listed individually in the original count. The total grams were not affected.

5.1.1 Low Level Waste

The Low Level Waste Program no longer requires sample storage at PNNL. This program is in the process of privatizing under Storage and Disposal Program (Vigue 1995). A total of 119 samples with a weight of 2078.72 grams were identified as no longer being required.

5.1.2 TWRS Safety Basis

The TWRS Safety Basis program (McVey 1995) identified 28 specific samples to be retained in storage at PNNL. The samples will be used for testing in FY-96 by PNNL in the 300 Area. No analytical work will be required by the 222-S Facility. The specific samples weigh 799.08 grams of which three

samples have an undetermined weight. These samples represent approximately 12 percent of the total samples stored at PNNL (Schubert 1995).

5.1.3 Pretreatment/Disposal

A total of 78 samples with a combined weight of 4,195.47 grams has been identified by Process Control (Kupfer 1995) for use in future process development testing at the 325 facility in FY-96 and beyond as funding is available. No analytical work is required by 222-S Laboratory. These samples represent 59 percent of the total samples in storage at PNNL.

5.1.4 Others

The Process Chemistry Group and the Chemistry Separation and Slurry Process Group of the Process Technology Department have express an interest in 108 of the 119 samples identified for disposal. If these samples were to be transferred to these groups for their use then no further charges would be made and all responsibility would be transferred to PNNL.

5.2 COSTS

Samples are stored at PNNL in two distinct hot cell banks (i.e. HLRF and SAL) and managed by two different organizations. As a result, the cost to continue storage and maintenance of samples is also different for each hot cell bank. Yearly costs to store and maintain samples at the HLRF and SAL facilities are approximately \$610 and \$110 per sample respectively (Appendix B).

To reduce the number of samples in fume hoods versus hot cells has no impact on the costs previously described. These samples were not counted in the inventory figures. All archived samples are stored in hot cells and not laboratory fume hoods. It is the position of the ACL that samples in the greater laboratory including fume hoods are now waste and no longer viable samples.

The cost to dispose of samples are in two different categories. Category 1 is the disposal of identified samples according to PNNL disposal requirements. Category 2 is the elimination of sample identity by combining the material into one large sample and turning the material and responsibility over to another organization. The samples identified as a result of this evaluation to be disposed of are being requested for further investigations by PNNL. The total number of samples to be disposed of is 10 from HLRF and 10 from SAL at a cost of \$1,000 per sample. This covers the waste drums, loading of the drums and burial costs. There is a cost involved with the transfer of 108 samples to PNNL of approximately \$150 per sample. This will cover the cost to composite the samples and to transport them from SAL to HLRF. Once the sample material is composited it will become the responsibility of the Chemical Process Technology Group of the Process Technology Department at PNNL.

To package and return the remaining 164 samples varies greatly with the assumptions used in the process. The ACL has reviewed several shipping scenarios and selected the two most practical methods. It should be noted that the "Barney Boxes" were considered earlier but due to sample activity (i.e. type B shipments vs. type A), this method of shipment was eliminated. The second method uses Onsite Transfer Casks (OTC) and was found that the samples would require repackaging into containers that would be compatible with the OTC casks. Additional costs would be incurred to perform the sample repackaging effort but would yield a clean well labeled archive bottle with an accurate sample weight. The liners could be filled remotely and placed in the cask ready for return to 222-S. The advantages are that both laboratories understand the operation of the casks, numerous casks are available on site and the cask provides a reduction of dose to the staff.

The second method is to utilize the 325-B Waste Disposal Cask. This cask was designed for movement of radioactive waste. The cask has also been used to move extremely radioactive samples between PNNL facilities as well as the two hot cells at the 325 facility. The cask is compatible with both hot cell banks in the 325 facility and procedures are available for its use. The cask has the capacity to hold 3-paint style waste cans (i.e. 1 gallon capacity). Each paint can will hold three 250 ml sample jars thereby allowing 9 archive samples in each shipment. Road closure would be required between 325 ACL and the 222-S Facility.

The extraction process from the hot cells includes loading the samples into the appropriate casks. These costs for the SAL and the HLRF are approximately \$430 and \$370 per sample respectively.

Transportation or shipping costs is estimated at \$1,500 by Transportation. The cost reflects the fact that patrol is now working 12 hour shifts and does not require overtime charges.

5.2.1 Alternative #1

Alternative #1 is identified as a "do nothing" alternative to continue storage and maintenance of all samples at the SAL and HLRF facilities at PNNL. This is estimated to cost approximately \$105,500 per year. It is assumed that this cost will escalate at the current escalation rate of 3% per year. It is assumed for this report that no further additions or deletions to the inventory will be made and that all samples will be retained for a period of 10 years.

Disadvantages to this option are that potential storage space for future samples or potential analytical space in the hot cells will be occupied by these samples. Continued funding for the administrative, storage and maintenance of these samples will continue until all samples are disposed of or reassigned. These costs are assumed to escalate at a 3% per year rate until disposal.

Certain advantages to this alternative are that no further action is required by WHC or PNNL. No further movements, packaging, exposures or transportation would be required.

5.2.2 Alternative #2

The second alternative would dispose of 20 samples and transfer ownership of 108 samples from WHC to PNNL. The remainder of the samples would be packaged into shipping containers and shipped to the 222-S facility for continued storage. This alternative would require a one time approximate charge of \$125,000. It is assumed for this report that no further additions or deletions to the inventory will be made and that all samples will be retained for a period of 10 years.

Disadvantages to this alternative is that the 222-S facility has very limited space for sample storage (McVey 1995). Available storage space will be very critical to continue support for the archiving requirements of the TWRS Characterization Program. This program spans a time period of approximately three years and requires storage of samples for approximately six and one half years for each sample. In addition, this alternative would require transportation from PNNL to the 222-S Laboratory, and additional handling of the samples.

This alternative offers the advantage of no further funding after the completion of transfer and transportation. This option also would free up hot cell space for other functions which PNNL may wish to use them.

5.2.3 Alternative #3

This alternative would dispose of 20 samples and transfer ownership of 108 samples from WHC to PNNL. The remainder of the samples would continue to be stored at the SAL and HLRF facilities. This alternative would require a one time charge of approximately \$91,000 with a yearly charge thereafter of approximately \$55,000 per year escalated at 3% a year. It is assumed for this report that no further additions or deletions to the inventory will be made and that all samples will be retained for a period of 10 years.

Disadvantages to this option are that potential storage space for future samples or potential analytical space in the hot cells will be occupied by these samples. Continued funding for the administrative, storage and maintenance of these samples will continue until all samples are disposed of or reassigned. These costs are assumed to escalate at a 3% per year rate until disposal.

Advantages to this alternative are that a portion of the samples identified will either be disposed of or transferred to another ownership. This will reduce the yearly charges for storage and maintenance from Alternative #1 by approximately 50% (\$50,500). This alternative also will

free up critical hot cell space at HLRF and SAL facilities for other samples or possible analytical space. No further movements, packaging, exposures or transportation would be required for the samples remaining at the PNNL facilities.

5.2.4 Alternative #4

Alternative #4 would package and transport all samples from the SAL and HLRF facilities to the 222-S facility for continued storage and maintenance. All 237 samples being stored at PNNL would be repackaged and transported to 222-S at an estimated cost of \$116,715. Costs for continued storage and maintenance is not estimated for the 10 year period at 222-S. It is assumed that this can be absorbed into the current and projected operating budget for 222-S complex. It is assumed for this report that no further additions or deletions to the inventory will be made and that all samples will be retained for a period of 10 years.

The primary disadvantage of this alternative is the space allocation at the 222-S facility. The 222-S laboratory is committed to supporting the ongoing tank waste characterization program and storing archive samples for a minimum period of six and a half years. Space for archiving has been projected to be critical during FY-98. The addition of 237 samples would impact the ability to support the TWRS program during FY-97, -98, and -99. This reduction of capability is not an acceptable alternative due to the major implication on Tri-Party Agreement milestones and the DNFSB commitments.

The major significant advantage to this option is that the hot cells at PNNL would be free for additional samples or analytical use and that no further expense charges would be required for the PNNL service.

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APPENDIX A

SELECTION MATRIX

Weight	10	8	10	3	
Category	Safety	Cost	Space Avail.	Product-ivity	Total
Alt. #1 - "Do nothing".	10/100	2/16	8/80	7/21	217
Alt. #2 - Dispose, Transfer and Ship to 222-S.	5/50	6/48	5/50	6/18	166
Alt. #3 - Dispose, Transfer and Store at 325.	7/70	5/40	10/100	9/27	237
Alt. #4 - Transport all samples to 222-S.	3/30	10/80	3/30	3/9	149

All alternatives discussed in section 5.0 were evaluated against four (4) criteria. These criteria were selected due to their relative importance. The criteria were assigned a weighted value of their significance to one another. These criteria and their assigned values are discussed below.

(1) Safety (10) - The safe operations for transfer and transportation of the samples and the personnel is assigned the greatest value. A value of 10 represents the least risk to personnel and the environment and a 0 will represent a high risk.

(2) Cost (8) - This is related to cost involved to implement the alternative. A 10 represents low cost and a 0 will represent a high cost.

(3) Space Availability (10) - The available space at 222-S and 325 facilities for archiving of samples and continue to maintain commitment to TWRS for tank waste characterization archiving. A value of 10 represents the least impact to the TWRS program and a 0 will represent the highest impact.

(4) Productivity (3) - A goal is to increase production output, increase operating efficiency and improve cost efficiency of the laboratory to meet its mission goals for the present and in the future. A value of 10 represents the most increase in productivity and a 0 will represent a low increase.

The alternatives were independently evaluated against these criteria by the author. All alternatives were then totaled and reviewed to select potential recommendations and/or combination of alternatives for recommendations. The recommendation was selected from the matrix which offered the optimum space availability at the 222-S Facility and the 325 facilities.

APPENDIX B

COST DATA FOR STORED SAMPLES AT THE 325 LABORATORY

Introduction:

The 325 Laboratory has been an active player in the Hanford Waste Tank Characterization effort since 1989. Samples from multiple Single and Double Shell Tanks have been analyzed at the 325 Laboratory by the Analytical Chemistry Laboratory (ACL) and the Chemical Process Technology (CPT) Group formally the Process Chemistry Group. As a result, archive and residual sample materials are located in both hot cell banks in the 325 Building. The attached tables provide sample location, sample identification (tank Number), and sample volume information. This information, along with direction from WHC on sample disposition, has been utilized to complete this cost estimating task.

Scope:

The following bullet items have been requested by the WHC point of contact to assist in completing the archive/disposal study.

- Cost to continue storage and maintenance of the archive samples in the 325 Laboratory.
- How the cost may be affected by the reduction of the number of samples, in general terms (i.e. hot cell vs. hood storage).
- Costs associated with disposal of samples identified.
- Cost to package the archive samples and to transport to the 222-S Laboratory.

Each item was addressed in this effort utilizing the limited information and developing assumptions.

Bullet # 1:

As previously mentioned, samples are stored in two distinct hot cell banks (i.e. HLRF and SAL) and managed by two different organizations. As a result, the cost estimates to continue storage and maintenance of samples is also different for each hot cell bank. Listed below are the relative costs for sample storage and maintenance in the 325 Laboratory for one year.

Location	Cost	Comments
----------	------	----------

Shielded Analytical Laboratory (SAL)	30 K	includes sample tracking, inventory management and administration.
High Level Radiochemistry Facility	10 K	administrative costs only

Bullet # 2:

The reduction in the number of samples in fume hoods versus hot cells has no impact on the costs described above. As all archived samples are stored in hot cells and not laboratory fume hoods. It is the position of the ACL that samples in the greater laboratory including fume hoods are now waste and no longer viable samples.

Bullet # 3:

The cost to dispose of samples identified in the work request memo are addressed in two different categories. Category 1 is the disposal of identified samples according to PNNL disposal requirements. Category 2 is the elimination of sample identity by combining the material into one large sample and turning the material and responsibility over to another individual and organization. The material is being requested for further pretreatment and disposal investigations.

Category 1: Sample Disposal

Location	Number of Samples	Cost	Comments
HLRF	10	3 K	estimate to load waste drums
		7 K	cost for drums and burial
SAL	10	3 K	same as above
		7 K	"

Category 2: Combining Samples

HLRF	45	5 K	estimate to composite samples
SAL	63	8 K	estimate to composite samples
		3 K	Transport from SAL to HLRF

Note: Once composited the sample material becomes the responsibility of the Chemical Process Technology Group (Gregg Lumetta is the lead for this effort).

Bullet # 4:

Cost to package and return identified archive samples varies greatly with the assumptions used in the estimating process. The ACL has reviewed several shipping scenarios and selected the two most practical methods with the highest potential for success. It should be noted that the "Barney Boxes" were considered earlier but due to sample activity (i.e. type B shipments vs type A) this method of shipment was abandoned. Two methods of returning sample material were further evaluated to determine the advantage and disadvantage of each method. Using the On-site Transfer Cask (OTC) was our first choice in reviewing the task. However, this would require the repackaging of samples into container that would fit inside the liners used in the shipment of core samples. It is estimated that six 100 ml sample container could be loaded into each core sample liner. Additional cost would be incurred to perform the sample repackaging effort but would yield a clean (not smearable) well labeled archive bottle with an accurate sample weight. The liners could be filled remotely and placed in the cask ready for return to 222-S. The beauty of this method lies in the remote handling and reduction of dose to staff. In addition, the cask is well understood by both laboratories and should not pose any operational issues. Also, there are numerous casks available on the Hanford Site. The cost information presented below reflects the repackaging of samples and preparation for shipment. The cost does not reflect the movement of samples from the 325 Laboratory to the 222-S Laboratory.

METHOD # 1

Packaging and Shipping Archive Samples to 222-S

Location	Number of Samples	Cost	Comments
SAL	74	5 K	estimate to repackage samples
		5 K	sample movement from SAL to HLRF
HLRF	90	6 K	estimate to repackage samples
		27 K*	estimate 3 hr/sample to extract from hot cell and load cask

METHOD # 2

The alternate approach to method # 1 is the utilization of the 325-B Waste Disposal Cask. This cask was designed for movement of radioactive waste. The cask has also been used to move extremely radioactive samples between PNNL facilities as well as the two hot cell banks within the 325 Laboratory. The cask is compatible with both hot cell banks in the 325 Laboratory and

procedures are available for its use. The cask has the capacity to hold 3-paint style waste cans (i.e. 1 gallon capacity). Each paint can will hold three 250 ml sample jars. Each shipment using this style of cask could accommodate 9 archived samples.

To ship this cask between laboratories (i.e. 325 and 222-S) the road would need to be close as the cask is no longer DOT Approved. This would be similar in nature to method # 1. In addition, the 222-S would have to verify their ability to handle this type of cask. Again, this was our second choice based on the number of samples that could be ship at any one time.

APPENDIX C
SAMPLE ASSIGNMENT

TANK	CORE	COMP/SEG NUMBER	ARCHIVE	DISPOSE
B110	01	Segment 2	Pretreat	
		Segment 3	Pretreat	
		Segment 4	Pretreat	
		Segment 5	Pretreat	
		Composite 1	Pretreat	
		Composite 2	Pretreat	
B110	02	Segment 2	Pretreat	
		Segment 3	Pretreat	
		Segment 4	Pretreat	
		Segment 5	Pretreat	
B110	03	Segment 2	Pretreat	
		Segment 4	Pretreat	
		Composite 1	Pretreat	
		Composite 2	Pretreat	
		Composite 3	Pretreat	
B110	04	Segment 1	Pretreat	
		Segment 2	Pretreat	
		Segment 3	Pretreat	
		Segment 4	Pretreat	
B110	09	Segment 2	Pretreat	
		Segment 3	Pretreat	
		Segment 4	Pretreat	
		Segment 5	Pretreat	
		Composite	Pretreat	
B110	10	Segment 1	Pretreat	
		Segment 2	Pretreat	

	Segment 3	Pretreat		
B110	Segment 4	Pretreat	10	
	Segment 5	Pretreat		
	Composite	Pretreat		
B110		Pretreat	12	
B110	Segment 1	Pretreat	16	
	Segment 2	Pretreat		
	Segment 3	Pretreat		
	Segment 4	Pretreat		
	Segment 5	Pretreat		
	Composite	Pretreat		
B111	Segment 2		29	
	Segment 3			
	Segment 4			
	Segment 5			
	Composite 1	Pretreat		
	Composite 2	Pretreat		
B111	Segment 3		30	
	Segment 4			
	Segment 5			
	Composite 1	Pretreat		
	Composite 2	Pretreat		
B201	Segment 1		26	
	Segment 2			
	Segment 3			
	Segment 4			
	Segment 5			
	Segment 6			
	Segment 7			

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		Segment 8		X
		Composite		X
B201	26	(U)nidentified		X
		U		X
		U		X
		U		X
		U		X
		U		X
B201	27	Segment 1		X
		Segment 2		X
		Segment 3		X
		Segment 4		X
		Segment 5		X
		Segment 6		X
		Segment 7		X
		Segment 8		X
		(U)nidentified		X
		U		X
		Composite 1		X
		Composite 2		X
B202	24	Segment 3	HOLD	
		Segment 5	HOLD	
		Segment 7	HOLD	
		Composite 1	HOLD	
		Composite 2	HOLD	
B202	25	Segment 8	HOLD	
		Composite 1	HOLD	
		Composite 2	HOLD	
		HC Blank	HOLD	

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		B202	HOLD	
		B202	HOLD	
		B202	HOLD	
B202	25	B202	HOLD	
BX107	40	Segment 5		X
		Segment 7		X
		Composite 2		X
BX107	41	Segment 2		X
		Segment 5		X
		Composite 1		X
		Composite 2		X
C109	47	Composite 1B	Pretreat	
		Composite 1C	Pretreat	
		Composite 1D	Pretreat	
		Particle Size		X
		Wash Solids 1		X
		Wash Solids 2		X
		Rheology		X
		Liner Solution		X
C109	48	Composite 1D		X
		Composite		X
		VOA		X
		Particle Size		X
		Liner Solution		X
		Ion Exchange		X
C109	49	Composite 1A		X
		Composite 1B		X
		Composite 1C		X
		Composite 1D		X

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		VOA		X
		Particle Size		X
		Liner Solution		X
C110	37	Composite 1	Pretreat	
C110	37	Composite 2	Pretreat	
C110	38	Composite 1	Pretreat	
		Segment 1		X
		Segment 4		X
C110	39	Composite 1	Pretreat	
		Composite 2	Pretreat	
		Segment 2		X
		Segment 3		X
C112	34	Segment 1D		X
		Segment 2B		X
		Segment 2C		X
		Segment 2D		X
C112	36	Composite 1C	Pretreat	
		Composite 2A		X
		Composite 2C		X
		Composite 2D		X
		Rheology		X
S104	42	Segment 1	Pretreat	
		Segment 6	Pretreat	
		Composite 1	Pretreat	
		Composite 2	Pretreat	
S104	43	Composite 1	Pretreat	
		Composite 2	Pretreat	
		Segment 1	Pretreat	
		Segment 6	Pretreat	

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S104	44	Segment 5	Pretreat	
		Segment 6	Pretreat	
		Composite 2	Pretreat	
S104	45	Segment	Pretreat	
		Segment	Pretreat	
S104	45	Segment	Pretreat	
		Segment	Pretreat	
		Segment 9	Pretreat	
T102	55	(U)nidentified		X
		Homo	Pretreat	
T105	54	Segment 1	Pretreat	
T105	57	Segment 1	Pretreat	
		Segment 2		X
T107	50	Segment 1		X
		Segment 2		X
T107	51	Segment 2		X
		Segment 3		X
		Segment 4		X
T107	52	Segment 1		X
		Segment 2		X
		Segment 3		X
		Composite	Pretreat	
T111	31	Segment 5		X
		Segment 7		X
		Segment 9		X
		Composite 1	Pretreat	
		Composite 2	Pretreat	
T111	33	Segment 1		X
		Segment 3		X

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		Segment 7		X
		Segment 9		X
		Composite 1	Pretreat	
		Composite 2	Pretreat	
		(U)nidentified		X
		U		X
SY101	819	Core 25	Safety	
	818 Visual STDS	Seg 15 Win E	Safety	
		Seg 15 Win E	Safety	
	817	Crust	Safety	
	816	T-111	Safety	
	815	Core 25	Safety	
	814	Core 25	Safety	
	560		Safety	
	558	Seg 4 Win C	Safety	
	556		Safety	
	555		Safety	
	554		Safety	
	1195	Win E	Safety	
	1199	Win E	Safety	
	1200	Win E	Safety	
	1203	Win E	Safety	
	1204	Win E	Safety	
	1206	Win E	Safety	
	1207	Win E	Safety	
	1211	Win E	Safety	
	1212	Win E	Safety	
	1213	Win E	Safety	
	1215	Win E	Safety	

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	1232	T-111	Safety	
	1229	Seg 3 Win E	Safety	
	1227	Seg 13 Win E	Safety	
	1224	Seg 8 Win E	Safety	
	1223	Seg 19 Win e		X
	1295-B	Win E		X
	1296	Win E		X
SY101	1296-B			X
	1297	Win E		X
	1298	Win E		X
	1299	Win E		X
	1307	Win E		X
	1309	Win E		X
	1310	Win E		X
DST's	105AW SOL 5			X
	105AW SOL 1			X
	103AW 8 WD	Segment 8		X
	103AW CompC	Composite		X
	102SY	Lin 2		X
	102SY	3/4 SOL	Pretreat	
	102AN Sup	Supernatent		X
	102AN 3DISS	Pretreatment		X
	102AN 2DISS	Pretreatment		X
	102AN 2	Segment 2	Pretreat	
	102AN 1DISS	Pretreatment		X
	101SY Solids	Composite	Safety/ Pretreat	
	101AZ C1 WashC			X
	101AZ C1 WSH			X

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	Evaporator	108AP R3633		X
		108AP R3637		X
		108AP R3639		X
		108AP R3641		X
		108AP R3644		X
		108AP R3645		X
	Grout			X
	Grout			X

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