

ASOTIN COUNTY, WASHINGTON — A SMALL COUNTY CAN MAKE INTEGRATED WASTE MANAGEMENT WORK

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Since 1972 Asotin County, Washington, has been providing regional solid waste disposal services for all Asotin County residents as well as for Nez Perce County and the City of Lewiston, both located in Idaho. Currently a total of approximately 45,000 tons of waste annually is generated within the service area, most of which is disposed of at a landfill site located in Asotin County. Asotin County is currently in the process of updating its Solid Waste Management Plan and evaluating options for continuing to serve the waste management needs of this Southeastern Washington–Northcentral Idaho area well into the 21st century.

The recent designation of an aquifer underlying Asotin County's landfill as "sole source" has the effect of limiting landfill usage of the site to the 76.5 acres now under permit, more than half of which has already been filled. Ultimate capacity and remaining active life of this critical facility are now determined by the quantity of wastes to be disposed, by the in-place waste densities that can be achieved, and by the cross-sectional profiles and heights that can be developed within landfill permit requirements.

Waste minimization and source-separation programs are expected to play a part in controlling the amounts of wastes requiring disposal and a number of program options have been or are being evaluated by the County and participating cities. To supplement and complement source-separation activities, Asotin County plans to provide new mechanized facilities which can remove other selected recyclable and compostible materials

from the waste stream as a means of further minimizing the amount of waste remaining to be landfilled. In addition to separating organic residuals for composting and shredding other residuals for high-density fill compaction, the new facility will further process the source-separated materials and other recyclables recovered at the facility to prepare them for shipment to markets.

Because of the feasibility of use by a major local industry, the facility may also produce refuse-derived fuel (RDF) from the combustibles remaining after selective recovery of recyclables. Initial discussions determined that RDF would have to be in densified form (pelleted or cubed) to be acceptable. An optional facility addition to produce densified RDF (DRDF) has been developed in the preliminary design report, process tests of key equipment are being conducted by potential vendors, and preliminary negotiation of fuel purchase agreements have been initiated.

THE CURRENT MANAGEMENT SYSTEM

Management of solid wastes in the Asotin County system is currently limited for the most part to collection and delivery of the wastes to the landfill for disposal. About 70% of the wastes come from Idaho sources and, except for minor quantities self-hauled by some businesses and a few individuals, go through the City of Lewiston Transfer Station. These wastes are delivered to the landfill in enclosed transfer trailers.

The balance of the wastes from Asotin County sources are brought in by city or private collection vehicles or by self-haulers. Based on 1989 weight records the average quantities received at the landfill are 847 tons/week and 121 tons/day. Peak quantities are 1168 tons/week and 212 tons/day. The landfill is open 7 days per week and daily averages are reported on a 7 day basis.

Average daily deliveries for all vehicle types approximate 72 vehicle trips. Peak daily deliveries number about 129. Based on available recent records, resident haulers bring an average of about 373 lb per vehicle to the landfill. Vehicles operated by a variety of municipal, commercial, and institutional entities average 5.31 tons; the range for such vehicles is very wide, ranging from very small loads similar to resident haulers, up to the two or more tons delivered by commercially-operated transfer vehicles hauling from the Lewiston Transfer Station.

Acceptable waste at the landfill currently includes, but is not limited to: garbage, rubbish, refuse, residential heating and cooking ash, waste paper, cardboard, commercial waste, industrial waste, demolition waste, manure, dead animals, and yard waste. Other wastes that require special handling may also be accepted on a limited basis. Some waste categories will be unacceptable for processing through the planned new facilities, so certain categories and types of waste, such as dead animals, medical wastes, and heavy rubble, will continue to be directed to the landfill face for disposal.

PLANNING FOR INTEGRATED WASTE MANAGEMENT

Protecting and extending the remaining life of the Asotin County Landfill and bringing it and other waste management functions into full compliance with Washington State Department of Ecology (WDOE) requirements will involve numerous changes. New lined cell capacity, closure of filled areas and other major improvements to the landfill will be accompanied by implementation of waste reduction and recycling programs by the County and several of the participating cities. New entrance facilities to be located on the 50 acres adjacent to the permitted landfill will provide the additionally needed services and functions to fully integrate the County's waste management system. These new facilities include drop-off facilities for source-separated recyclables and household hazardous wastes, an improved and relocated scale facility, an administration and maintenance facility, and a waste processing and material recovery facility.

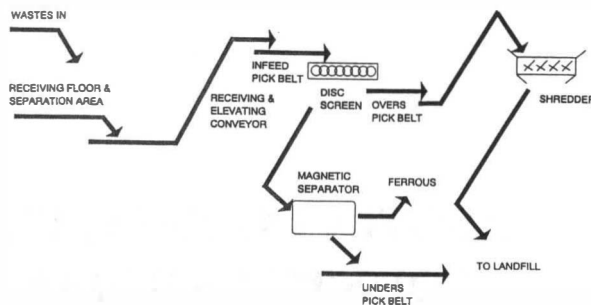


FIG. 1 BASIC PROCESS CONFIGURATION

A primary criterion for design of the process facility is that it must receive and process all waste from Asotin County, and the wastes remaining after source separation of recyclables from Lewiston, Nez Perce County, and Clarkston. The facility must also provide adequate and separate areas for receiving and temporary holding of wastes brought in by individual members of the general public in automobiles, small trucks, and utility trailers and by municipal or commercial haulers in packer trucks, transfer vehicles, and a range of other trucks and container types.

The objectives of the waste processing that will take place at the facility are to:

- (a) Extend landfill life by shredding waste residuals to prepare them for high-density fill placement.
- (b) Facilitate source-separation recycling programs by providing secondary processing needed to prepare recyclable materials for consistent acceptance in the market place.
- (c) Further reduce wastes requiring landfilling by supplementing source-separation programs through in-facility recovery of additional materials.
- (d) Facilitate further large reductions in waste quantities requiring landfilling by compatibility with add-on process options, such as composting and refuse-derived fuel production.

PROCESS FACILITY DESCRIPTION

A screen/shred process incorporating manual picking lines and mechanical separation has been chosen as the most versatile and desirable process that satisfies these four design objectives. This simple process is illustrated schematically in Fig. 1. A brief description of the process operations follows.

This process involves some initial separation activity on the receiving floor to remove bulky or non-processable items or to segregate high-grade loads for separate processing. From the floor, the mixed waste is

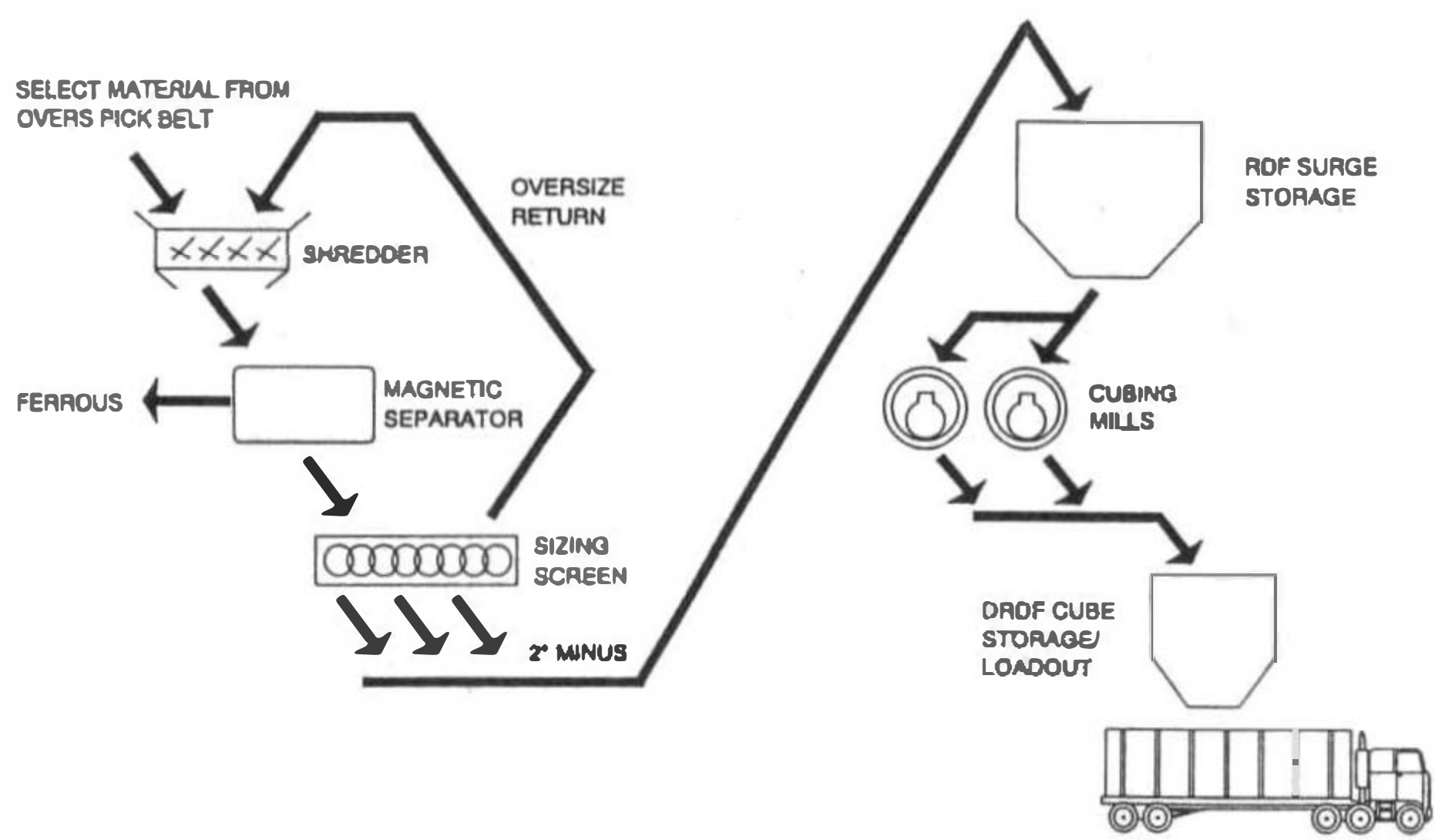


FIG. 2 DRDF PRODUCTION PROCESS

placed on an elevating conveyor, from which large objects are removed by pickers. The elevating conveyor transfers the waste onto a picking conveyor where pickers remove targeted recyclables and nonprocessable items. The waste is then directed over a screen where it separates into two streams: overs (larger objects that pass over the screen), and unders (smaller objects that drop through the screen). The overs are transferred to a conveyor where additional manual picking of targeted items occurs. The remaining overs waste continues to the shredder where it is shredded and fed by another conveyor into a truck for transfer to the landfill. From the screen, the unders are conveyed past a magnetic separator for removal of magnetic ferrous metal items, and then to another conveyor where additional picking of targeted recyclable materials occurs. The remaining unders, which contain most of the food wastes and other putrescible organics, are fed by another conveyor into a truck for transfer to the landfill or, alternatively, to composting.

The facility can also serve as an intermediate processing facility in support of either co-collection ("Blue Bag") or separate collection-type source separation recycling programs. Provisions have been made to allow co-collected or separately collected recyclables to be introduced into the system just upstream of the magnetic separator using a separate infeed conveyor. After passing through the magnetic separator to remove tinned cans, the recyclable materials can pass onto the picking conveyor, where they can be manually separated by type. Nontargeted or otherwise unacceptable materials can discharge to another conveyor to be fed into a truck for transfer to the landfill.

The facility design includes an optional system that may be added when fuel production is determined to be feasible. This system, schematically illustrated in Fig. 2, allows DRDF to be made from the predominantly paper fraction segregated on the overs pro-

cessing line. The system includes an additional disk screen, conveyors, surge storage for interim and final products, and pelletizers or cubers.

MATERIAL TYPES AND QUANTITIES

Working with the separate drop-off facility located near the scalehouse on the same site, this process facility will accept mixed residential and commercial solid wastes, recyclable materials from source separation programs, and other selected waste materials such as yard wastes, wood and brush. Tires and bulky wastes can also be accepted and periodically shredded, either for recovery or for facilitating disposal.

The Asotin County processing facility is designed to process about 25 tons/hr of mixed municipal solid waste. The anticipated initial operation of this facility at about 39,000–43,000 tons/year (depending on the degree of source-separation activities implemented), will require mixed waste processing on a single shift basis 5–6 days/week. Growth can be handled through extension of processing hours.

As shown in Table 1, the 39,000–43,000 annual tons of mixed waste is based on recent landfill records and assumptions that the residential and nonresidential portions of the Lewiston, Nez Perce, and Clarkston waste streams will be subject to materials recycling programs. Programs under consideration by the County and participating cities include potential "Blue Bag" recyclables co-collection, alternative curbside collection programs, drop-off type recycling programs, and diversion or collection of yardwastes. Lewiston already prohibits the delivery of yardwastes to its transfer station and is considering establishing curbside collection services to direct yardwastes to a private composting facility. Clarkston also encourages its citizens to use the composting facility for yardwaste disposal and may establish separate yardwaste collection at a later time. Such programs are expected to result in an overall 10–15% diversion of generated waste from Lewiston, Nez Perce, and Clarkston. Anticipated recycling rates are based on the current performance of similar recycling programs in demographically similar areas.

Recyclable materials received and processed at the process facility can come from three sources: self-haul source-separated materials, source-separated materials from curbside collection programs, and additional materials remaining in the waste stream and recovered through mixed waste processing.

TABLE 1 MIXED WASTE INVENTORY

Participant	Distribution of Wastes			Recycling Rate Assumptions				Range of Total Recycled Materials	Remaining Materials to Processing
	Total	Residential	Non-Residential	Residential 7% to 14%		Non-residential 4% to 8%			
	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy
Lewiston and Nez Perce County	31,500	15,750	15,750	1,108	2,205	630	1,260	1,733 to 3,465	29,767 to 28,035
Clarkston	5,850	3,510	2,340	246	491	94	187	340 to 678	5,510 to 5,172
Asotin City and County	7,650	5,355	2,295	375	750	92	184	467 to 944	7,183 to 6,706
Total	45,000	24,615	20,385	1,724	3,446	815	1,631	2,540 to 5,087	42,460 to 39,913

Self-Hauled Recyclables

Source-separated recyclable materials will be accepted from self-haulers at the recyclables drop-off facility. Although an average of 373 lb of waste per residential hauler vehicle has been calculated for the facility, no estimate has been made of the amount of source-separated recyclables that self-haulers will contribute. The quantity of self-hauled, source-separated recyclables is not expected to be large.

Curbside Collected Recyclables

Asotin County and other system users are considering implementing "Blue Bag" residential recycling programs or other curbside collection programs. If implemented, the Blue Bags containing source-separated and homeowner prepared material items will be co-collected with the mixed residential solid waste in packer trucks and separated from the mixed waste on the receiving floor. As shown in Table 2, approximately 3850 tons/year of recyclable materials could be collected through curbside programs in Lewiston, Nez Perce County, and Clarkston. This averages out at approximately 75 tons/week and 15 tons/day for processing (5-day basis). The component breakdown of materials is based on pilot curbside program data from Vancouver, Washington, but has been adjusted to account for differences in waste stream characteristics and collection methods.

The selection of materials to be accepted in Blue Bag or alternative recycling programs depends on the costs of collection, processing, and transport of each product

TABLE 2 MATERIALS FROM RESIDENTIAL CURBSIDE COLLECTION

Targeted Materials	Collected Materials		Net After Secondary Processing	
	% by weight (a)	annual tons	% by weight	annual tons
Glass	13	501	6	231
Aluminum	1	39	1	39
Tinned Ferrous	8	308	6	231
Old News Print	40	1,541	38	1,464
Corrugated Cardboard	10	385	9	347
Mixed Waste Paper	26	1,002	24	924
PET/HDPE	2	77	1	39
reject materials	0		15	578
Total	100	3,852	100	3,852

a Based on actual pilot program data from Vancouver, WA source-separated curbside collection program.

to a suitable market. Periodic review of market economics will determine which materials are accepted.

Recyclables Recovered from Mixed Waste

Using the component breakdown used in the composition studies done by WDOE in 1987 to calculate annual amounts for each component that will be disposed of in the mixed waste and subtracting the potential curbside collected tonnage, the net tonnage available for material recovery is calculated. Applying potential

**TABLE 3 FACILITY RECOVERY ESTIMATES
(With Curbside Residential Recycling Program)**

Materials	Disposed Waste ^a %	Annual Tons ^b	Potential Curbside Tonnage	Net Tons Available @ MRF	Recovery Rate %	In-Plant Tons Recovered	Residual Waste to Landfill	Total Tons Secondary Processing
Recyclables:								
Glass	4.6	1,980	501	1,479	25	370	1,109	871
Aluminum	0.7	305	39	266	60	160	106	199
Ferrous	6.7	2,885	308	2,577	80	2,062	515	2,370
White Goods	0.5	215	0	215	75	161	54	161
Newsprint	4.0	1,725	1,541	184	15	28	156	1,569
Corrugated	7.6	3,270	385	2,885	50	1,442	1,443	1,827
mixed waste paper/ office	12.5	5,380	1,002	4,378	15	657	3,721	1,659
PET	0.2	90	39	51	50	26	25	65
HDPE	0.3	130	39	91	50	45	46	84
other plastics	6.5	2,795	0	2,795	0	0	2,795	0
Tires	0.9	390	0	390	75	292	98	292
Lawn & Garden waste	18.1	7,790	0	7,790	0	0	7,790	0
wood waste	6.3	2,715	0	2,715	25	679	2,036	679
Non-recyclables/other	31.0	13,330	0	13,330	0	0	13,330	0
Total	100	43,000	3,852	39,146	n/a	5,922	33,224	9,774

^a From WDOE 1987 Southeast Region total Disposed Waste Stream Survey.

^b The value of 43,000 tpy disposed waste includes amounts potentially diverted through blue-bag or other curbside recycling programs.

recovery efficiencies to each targeted recyclable produces an estimate of up to about 5900 tons/year of additional recoverable materials that might result from process facility operations, as shown in Table 3. This value is considered to represent a readily achievable recovery potential in the facility, but is dependent on the economic feasibility of recovering each material. Materials will not be targeted in the picking lines unless they are economically viable.

Secondary Processing Requirements

The aggregate quantity of recyclables for secondary processing could approach 9900 tons/year (about 190 tons/week). This includes recyclables from curbside collection programs and additional materials from

mixed waste processing. These quantities are average values and will vary.

RESIDUALS

Residuals result from both mixed waste processing and from the secondary processing of recyclables for market. The mixed waste residuals include non-recyclable items found in solid waste, once-recyclable materials that have been rendered unrecyclable since entering the mixed waste stream (such as broken glass or foodwaste-contaminated paper products), and targeted recyclable items that the processing and sorting were not able to recover. The residuals from secondary processing of curbside collected recyclables will consist

TABLE 4 EFFECTS OF RECYCLING PROGRAMS AND MIXED-WASTE PROCESS OPTIONS ON LANDFILLING

One Shift Operation, 6 days/week @ 21 tons/hour	Asotin & Nez Perce Counties			
	8% Recycling 10% Recovery	8% Recycling 15% Recovery 25% Compost	15% Recycling 15% Recovery 35% dRDF	15% Recycling 15% Recovery Compost & RDF
Base Tonnage	45,000	45,000	45,000	45,000
Source Separation Program	(2,115)	(2,115)	(3,533)	(3,533)
Yard Waste Program	(1,013)	(1,013)	(2,025)	(2,025)
Mixed Waste to MRF, subtotal	41,873	41,873	39,443	39,443
In-Plant Recovery, 10% or 15%	(4,187)	(6,281)	(5,916)	(5,916)
Fines to Compost, 0% or 25%	0	(10,468)	0	(9,861)
Overs to RDF, 0% or 35%	0	0	(13,805)	(13,805)
Residual Waste, subtotal	37,685	25,124	19,722	9,861
Secondary Process Residuals	527	1,154	826	1,319
Waste to Landfill, subtotal	38,212	26,378	20,548	11,180
Compost Product, 55% of Fines		5,737		5,423
DRDF Product, 90% of overs			12,424	12,424
Landfill Rate (% of Base)	85%	58%	46%	25%

Assumptions:

Source separation diverts 8 to 15 percent of residential waste stream, assumed to be 45 percent of total wastes, plus 2 percent of balance. Yard waste separation rates at 5% and 10% of residential wastes are linked to source separation program levels of 8 and 15 percent, respectively. Residues from secondary processing are: source separated materials at 15%; materials from in-plant recovery at 5%; compost screening at 5% of fines.

of unrecyclable materials that are wrongly put into the recyclables collection containers (such as nontargeted types of plastics), trash and other contaminants in the recyclables, and broken glass or other rejected materials.

With a curbside program in operation, and with the processing facility functioning at anticipated levels, the residual wastes to be landfilled are expected to approximate 33,200 tons/year, or about 640 tons/week. This represents an in-plant recovery rate of about 12–15% and an overall waste reduction rate of about 25% through the combination of residential source-separation programs and supplemental in-plant processing of mixed wastes. In-plant recovery rates between 8% and 15% or somewhat higher are considered achievable depending on the staffing levels applied to picking functions and the extent to which markets exist for additional materials not targeted by source-separation programs. At maximal operation, the processing operation could include the optional densifica-

tion system, that would divert a majority of the paper waste to RDF production, and composting facilities to convert much of the separable organic fines to a usable product.

EFFECTS ON LANDFILL USAGE

The overall effect on landfill usage is determined by the extent to which conventional materials recovery activities can be supplemented by composting of the organic-rich residuals from screening and by other options, such as RDF production from combustible residuals. Options such as large scale composting and RDF production can have considerably greater effect than recycling programs in reducing the quantity of wastes going into the landfill. These options add their own feasibility criteria to a project and may require choices about the use made of all or portions of certain organic material categories, such as paper, wood and plastics.

Such options may be particularly important, however, where transport costs limit access to material markets or where existing and developable landfill capacity is critically limited.

The potential for minimizing landfill usage through various levels of intensity and combinations of mixed

waste processing options is illustrated in Table 4. The Asotin County project could involve staged implementation of both composting and DRDF production options and, when completed, could achieve an overall waste reduction rate in the range of 70–75%.