Summary Notes for Coffin Butte Landfill Field Trip
April 27, 1999 – Prepared by Jeff Shultz

A trip to Coffin Butte Landfill
Location: Camp Adair, OR, just north of Corvallis
Guide: John Keeney, Site Supervisor

Statistics:
Owned by Emcon, Inc.
Operated by Valley Landfills, Inc.
2nd Largest landfill in state.
1200-1700 tons of trash received per day.
Subtitle D landfill (as predicted, quite proud of that)
"New" Landfill started in 1972, inherited old, unlined, Camp Adair landfill as well

Size:

700 acres, 110-120 "fillable" acres. We were about 50-100 feet above bottom of valley floor, plan is to put another ~150 feet of garbage above our elevation.

Estimated life of landfill: 85 years - currently they are ahead of their estimate though.

Take garbage from Benton, Linn, Polk, Marion, Coos Counties, looking at going statewide.

Space for 8 "cells" on one side of road, possibly as many on other side.

Cell 1 is full, Cell 2 is about full, Cell 3 will fill in-between 1 and 2. 1 and 2 are sloped away from Cell 3, Cell 3 will "interlock" and slope outward over 1 and 2. Sort of a pyramid structure to the cells.

Plan to completely fill valley between two hills.

Lining system:

Two HDPE (high density polyethylene) liners

One Bentenite volcanic clay liner - replaces 3 ft of clay

On top of that is <unknown> (1-3 ft???) depth of tire chips to protect lining and allow leachate to flow down to be collected.

Built to take 8.6 (open ended Richter scale) earthquake without flinching.

Costs $300,000 per acre to line a cell. Cell 3A (1/3 of Cell 3) is 7 acres.

3 ½ months to line cell - 22 foot wide sheets of liner have to be hand welded, inspected and tested - sometimes destructively - as laid.

Gundle Lining system, Texas Plastics is contractor doing the work. All these companies seem to be based around Houston. Space spinoff?

The Dump:

3 man crew effectively runs the garbage end of things - 2 compactors, 1 D-9 Cat (currently replaced with D-8 Cat)

One spotter to keep HAZMAT out.

HAZMAT:

- no tires (illegal), medical waste (legal, but want nothing of it), or listed hazardous waste - like paint. Tires are a potential home for insects and a fire hazard.
- no ash from Brooks burner - Liner system isn't at a high enough DEQ level for that.
    - ash is disposed of in Woodburn, OR.
- no radioactive waste
    - diapers from babies undergoing radiation treatment
    - animal carcasses and waste after undergoing radiation treatment

Radioactive waste is taken to special “box” to cool before removal from site. OSU/State handles disposal.

Other HAZMAT goes to only HAZMAT dump in state, in Arlington, OR up on Columbia river (what is with our habit of putting nasty stuff a stone’s throw from the Columbia? First Hanford, now this place). Average cost of 55gal barrel of HAZMAT to Arlington is $2,500-3,500.

Working quarry on site - they get their cover dirt from the quarry discards on site.

Quarry is ocean bottom (pillow) basalt tectonically moved to Willamette Valley (accretion wedge). Lots of marine terrace sediment as well (junk - suitable for landfill cover).

Rock ground up practically to order - railroad roadbed major use.

$1/ton goes to landfill.

Hole created by quarry will be a new cell of landfill eventually - have 100 feet further down to quarry out.

Hole stair-stepped at every 40 feet, will be sloped out with dirt prior to lining.

Methane Collection System:

Methane extraction wells on top of pile at 100 foot intervals.

Well depth 40 feet.

New method: Also have methane extraction from interior base of pile - just put a little vacuum on it, it will flow out that way too.

Very dirty methane, must clean it out (waste back to the landfill).

Sold to local power company to supply over 2k homes with electricity.

Computerized monitoring system (Gentech?) tells them how dirty gas is coming out of wells, as well as flow rate.

New methane well - 90 days before methane starts coming in, 120/160 days before the well is fully operational. Depends on how much moisture is in the air.

They put leachate back through the pile to enhance decomposition and increase methane production.

2 forms of income from Methane - first from selling it, then they get a tax credit for recovering it as well.

Leachate Collection System - Guide: Bruce Benson, Landfill Technician

25% of garbage load is wet

Collection system makes drinkable H_2O

System first of kind in world

Combination of Direct and Reverse Osmosis

“The Bubble” - a 4 mil gal surge pond where the leachate is mixed. Bubble itself is 20 mil polyethylene plastic, has collapsed twice - once when power stopped to fan keeping 2 psi under bubble, once due to weight of snow accumulation. Bubble keeps rain out of leachate - approx. 40,000 gal/inch rain over >1 acre pond.

I believe it’s pretreated with Lime prior to osmosis.

40,000 gallons a day pass through the treatment plant.

95-98% recovery rate clean water.

38,000 gallons (at least) leave as 100 TDS (100ppm) drinking water - state requirement for municipal drinking water is 500 TDS. Water is actually too clean and they have to aerate it before pouring it down a fir tree covered hillside, where it flows into a wildlife waterfowl refuge. Tested 3 times before it hits the county ditch and leaves the landfill property.

4 osmosis lines - 90% salt brine is the osmotic agent. Run through pipes where brine and leachate are separated by secret membrane developed by company in Corvallis.
Water in leachate goes through membrane in an attempt to dilute salt brine. At least part if not all goes through again as the water component of the salt brine. What is left on the leachate side is concentrate.

Membranes replaced every 2 years - still testing that.

Salt Brine after osmosis passes into reverse osmosis system, probably similar to ROWPU system US Army hauls anywhere they need drinking water, produces extremely clean H2O - as noted, strips too much minerals and free oxygen out of water.
Water "disposed" of because it's not cost effective to ship it anywhere.

Concentrate - up to 2,000 gallons a day. Turned into a solid and dumped back into landfill: 300 gal concentrate + 1700 lbs portland cement + 6800 lbs fly ash (free from Smurfit lumber mill in Newberg) = 7 yards of solid concrete concentrate "rock" - dumped in landfill by cement mixer, cures to solid inside of 24 hours.

Cost of plant left unsaid - built because it's very likely that municipal wastewater treatment plants won't take leachate much longer, due to the "pour it into the river in an emergency" clause in their operating licenses. Plant is about the only part of the operation which doesn't make money, however they do get tax credits for running it.

Will possibly recover part of their investment in licensing the design for other landfills nationwide.

Plant was built with 30% over-capacity (I like their thinking) and with expansion of landfill will be running at capacity fairly soon.

12 mil Plastic covering landfill keeps rain out of leachate, approx. 3.5 million gallons of water per inch of rain kept out. Watching leachate flow figures, they can determine when the plastic has a hole - 12 gal/min hole currently in plastic, unable to find.

Only problems they've had with groundwater testing has come from bird waste washing off plastic cap.

Monitoring:

63-64 monitoring wells located around the facility - no leachate wells (collection system takes care of that).

Each well sampled every 3 months. System uses paired wells - one shallow (30 feet) one deep (40 or more deeper).

Water table about 15 feet below surface at fence line, outside fence line in lower area, water table effectively at surface.

Every six months, DEQ comes out and does a "split sample" with VLI, each sends their sample off to respective labs, both had better match.

Chain of custody maintained over samples, just like evidence in criminal case. Bigtime CYA stuff.

Bruce estimated lab fees at between $5-6,000 a month for water testing, ~$1,500 of that for groundwater testing.

Odds and ends

- sediment ponds are located in the wildlife refuge, which has added at least 6 new “wetlands” thanks to the landfill’s water production

- large fire last year - largest on record in Oregon.
  - 2 weeks to put out
  - Buried the active flames to extinguish them, then had to dig out all the hot stuff.
  - Fire started at 6pm (quitting time), was under control by 4-5am.
  - Used 1.5 mil/gal water, which turned straight into leachate.

- Authorized to shoot seagulls, but they avoid this. Instead fire off cannons and starter pistols to get “scouts” to leave, main pack never settles in.

- no rats - too hard to get in, Bruce had only seen 3 in 6 years there, probably came in on garbage trucks.

Old Camp Adair “cell.”

- Dates back to 1940’s when area was active Army base.
- Plan to dig out and transplant to lined cell in 2 years.
- Will start taking bore samples of trash next year, hope to determine composition / decomposition, as well as age.