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To: [Benton County Talks Trash](#); [Sam Imperati](#)
Subject: Pitera Notes Coffin Butte Tour 9/24/22
Date: Thursday, September 29, 2022 7:21:51 PM
Attachments: [Pitera Coffin Butte Tour Notes 092422.docx](#)
[Pitera CB Tour Stops Figure 092422.docx](#)
[Coffin Butte 2005 DEQ Record Fig 2-2.pdf](#)
[1974 chemeketa region solid waste management program technical report volume ii 54 annotated.pdf](#)

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Please accept these notes and comments on the Coffin Butte Landfill Tour on 24 September 2022. The time taken by County and Republic Services staffs is most appreciated and was very helpful.

The notes consist of two sections. Section I Observation Notes reflects information gathered during the tour. This information should be useful in developing a sense of current conditions at the site. Section II Uses of Information reflects follow-up questions or topics triggered by information from the site tour.

I hope this material is of use to the Workgroup.

Sincerely,
Ed Pitera

Pitera Notes Coffin Butte Tour 9/24/22

Many thanks to Republic Services Inc. and Benton County for arranging the tour. It was helpful.

The notes below are organized in two sections. Section I Observations is intended to be to convey what I observed and heard on the tour. It is geared to be included in the “Common Understands” under the outline headings (give citation) as facts. Section II Uses of Information points to questions triggered by the tour and possible ways to address them.

Section I Observation Notes (Refer to Site Drawing)

At Walnut Facility and Bus Ride to CB:

1. Leachate: Lots of public comments. Treatment not on site. CB relies on Albany/Corvallis treatment works to dispose of leachate. Discharges from both are to Willamette River.
2. Leachate collection system, some liquid collected from secondary collection network.
3. Liner system since 1990's
4. Double liner used – not required by Feds (RSI rep unsure on this).
5. Samples of High-Density Polyethylene liner material and examples of heat bonded HDPE seams were pasted about as was a sample of an engineered clay layer.
6. Physical display model of landfill cross section (I suggest a photo of this RSI model be in the Workgroup report. The display represented various engineering controls to control leachate.
7. Power Backup to maintain gas collection (Gas buildup in landfill / explosion concern).
8. Onsite power plant.
9. No reserve generator backup on site.
10. Landfill gases are burned in Caterpillar Engines to generate power which eventually flow to BPA (Bonneville Power Authority) grid.
11. 3rd Party Co-Op runs power plant
12. Tillamook rendering plants send waste to CB (Cow carcasses included). No other place to go (RSI).
13. Area (Benton County) good at recycling organics (>100 tpy) go to Pacific Regional Composting
14. Industrial users of CB go through RSI screening and acceptance approval process (info used for screening not mentioned)
15. Hauling amounts/data/% recycled info: Referred to DEQ website and plans. Recovery Rate for Benton County is ca. 39%, for Marion County (43/44%).
16. DEQ tracks Municipal Solid Waste disposal and Recyclables. Info on Industrial Wastes also should be available. Disconnect in numbers between RSI and DEQ mentioned by tour participant. Need DEQ (Brian Fuller) and RSI (Sean and Russ) to resolve disconnects?
17. Benton County is given a preferred dump rate for non-industrial refuse because it is a “Host” county.

Entrance to Coffin Butte Landfill

1. Landfill clearly visible raising very high above highway 99W. Uncovered landfill plastic directly in line of sight.
2. Engineered wetlands at NE corner of 99W and Coffin Butte Road. Appears to be in wet condition. Unclear if this is the 40 acres of dedicated wetlands. DEQ records (2005)(called Figure 2-2 and attached) indicate a Leachate Pond was located on the east side of the site. Where is its approximate location on a current site map?
3. Landfill runoff basin at NE corner of Coffin Butte Road and entrance road to landfill. No liquid apparent just disturbed soil with little/no vegetation.

Stop 1 Public Recycling Area (Stayed in Bus)

1. Recycling expanded. Materials staged out to air/rain: vehicle tires, whitegoods, bulk yard wastes for compost (yard waste material staged for movement to PRC to avoid too many cars at PRC. Materials staged at CB in cargo containers: TV's, electronics, bulk metal recycling,).
2. Lots of methane generated from yard waste recycling.
3. Waste stream volume received at CB tracked at scale – source county identified by vehicle driver.
4. New OR State Legislation on recycling likely to come into force in 2025.
5. Pacific Regional Recycling has no drop off. Drop off is in CB.
6. Benton County has been offered more recycling services than any other county in OR.
7. Observation: Unclear how storm water is captured and directed.

Stop 2 Flat area covered in dirt (Bus stopped at top covered level of landfill. Got out of Bus and walked closer to edge where trash dropped over into area for bulldozer to spread it.)

1. Placement of waste (MSW) is done in a ~1 acre working area termed “open” or “working face”.
2. Rock face of Coffin Butte exposed on north side of working area. Multiple benches evident in rock face. Seemed to be some arcing of benches from west - center – east. Benches reportedly used for stopping rock falls. Not intended to direct storm water.
3. Landfill customers with self-tipping trailers allowed to unload near working face area.
4. Trailer trucks from transfer stations allowed to directly dump into working area.
5. “Tipping ramps” available for some vehicles.
6. Birds: flocks and flocks swirling around and down to “working face”
7. Coventa operation in Marion County provides cover material to CB.
8. Landfill gas is a vacuum system to Power Plant. Do not want to pull air into landfill. Want to keep waste anerobic (to generate the most methane) and with non-flammable atmosphere.
9. Well heads of vertical landfill gas recovery wells evident in area. Horizontal gas collection system used in area bus / vehicles have access to.
10. RSI expanded gas recovery system at cost of ~\$1MM.
11. Hours of operation 5:00a.m to 5:00pm with public allowed access at 8:00a.m
12. Run area lighting in winter to illuminate dumping/spreading operations.

13. Compacting vehicle used to increase density of layer. Compacting vehicle weight is ~120,000 pounds.
14. General noise level was high due to diesel powered equipment especially nearer the open face of the dump.
15. Top level of dump: Permeable to rainwater unless covered. Not covered in dry summer
16. Groundwater monitoring wells: Some in tree line above working face.
17. Gas well system at CB: Composed of vertical and horizontal wells. Only horizontal wells used during (waste placement) operations. Three gas wells per acre used at CB. Typical at other landfills is 1 gas well per acre. (System designed by a firm in Sisters, OR.
18. Leachate volumes? Not addressed at this point.
19. Garbage fires: RSI explained how fires could start in a truck load and the approaches used to control the situation and put out the fires (compact load more, close top hatch of truck to smother fire, and dump load if necessary).
20. Garbage trucks cost ~\$300,000 each.
21. We were on Landfill Cell 6. Cells are constructed in sub phases i.e. 6a, 6b, etc. It was unclear which sub phase we viewed/were in.
22. During travel to stop 3, plastic trash seen on top of last layer uncovered. Plastic is from PRC operation. Potential source of “forever chemicals” (sometimes termed perfluoroalkyl and polyfluoroalkyl substances (PFAS))

Stop 3 Road above and to south of Knife River quarry operations (Got out of Bus)

Viewed north face of quarry and substantial portion of quarry bottom. South face not visible. No access to quarry area (different company from RSI, safety concerns)

1. The Knife Ridge facility did not appear to be operating this day.
2. North face of quarry: Horizontal rock benches at 40-foot vertical intervals (typical mining practice).
3. Strata exposed on north face. A tour participant observed that studies of the exposed rock would offer insights into what the landfill rests on and abuts. A RSI representative indicated no studies have been done to characterize geology other than those needed to mine material i.e. area not used as data for mapping nature of underground rock.
4. Final floor of quarry planned to be two more benches (i.e. 80 foot) down.
5. Quarry excavation to be completed in 8 to 10 years.
6. Observation spot is on road. Road on rock wall separating quarry from closed landfill to south.
7. Old Landfill to south closed in 1990's (1992-1994?) by capping it with impermeable barrier and placing soils on top. Now a grass covered field. Old Landfill does not have an impermeable liner under the placed trash. (Note: DEQ records imply 1977 closure)
8. Camp Adair military landfill / burn pits (active early to mid 1940's) located on west/northwest side of rock knob at western end of Knife River operations. Material removed for disposal in CB several years ago at cost of about \$5million.
9. Knife River has its own NPDES permit. (National Pollutant Discharge Elimination System (Clean Water Act))

Stop 4 Stop on Landfill Road above and across from leachate basin and power plant and former Leachate Treatment Plant (Stayed in Bus)

1. Little triangular pond with water presented (greenish color) observable next to former Leachate Treatment Plant.
2. Two Leachate Storage Basins: Basins are lined with floating roofs. One can hold about 4 million gallons of leachate, the other about 3.5 million gallons.
3. Leachate Treatment Plant was difficult to operate and taken out of use many years ago. Leachate now taken to Albany or Corvallis wastewater plants for treatment.
4. New RSI programs: a) Pick-up of litter on roads approaching landfill with help from Benton County work crew program. b) Accepting at no cost stuff from homeowners that trash illegally dumped on their property. c) Litter control initiative: Education of drivers on need to cover their loads and charging \$10 more per load for uncovered loads.

Stop 5 Power Plant

1. Power generation started in 1985.CPI (Owner of Plant). Separate business entity from waste disposal/quarrying firms.
2. CPI in co-op with Portland General Electric? (Unclear on this)
3. Plant has own operating permits including DEQ permits.
4. Ownership changes at fence line. (Beginning of road to plant)
5. CPI Site Power Manager mentioned CB is "Model" Bioreactor due to precipitation. Cited a Paper/Report by Casey.
6. Five Caterpillar internal combustions engines used to combust landfill gas. Original three engine system produced power at 25% efficiency. Next two installed in 2007 at 42% efficiency.
7. Combustion efficiency is 99%.
8. Use ~2000 cfm of landfill gas for electric power generation, 1200 to 1300 cfm is flared.
9. Two flare units on site. Units were operating during visit. Flare flames were essentially completely transparent except for orange colored fringe at top of combustion zone.
10. Power plant at full capacity hence need for flaring.
11. Do not store landfill gas. If not flowing to engines, gas is flared.
12. Capital investments in power generation: \$2.5 million in 1995 (3 engines), \$5.5 million in 2007 (2 more engines); \$7.7 million expansion under consideration.
13. If landfill does not expand, what is impact on power generation?
14. Number of employees at power plant: Appeared to be 5 to 10 people associated with operations.
15. Cost of power generated at CB costs about \$60 per megawatt.
16. About 5.660 megawatts generated per hour.
17. Quantity of gas generated by landfill is a little less in Spring and a little more in Fall.
18. Methane gas agreement is with RSI.
19. CPI monitors and adjusts operation of wells.
20. CPI targets drawing 48-54 volume percent methane gas from landfill wells.
21. Gas to flare runs about same as gas to compressor.
22. Gas to compressor pressurized to 3.5 psig for use in Caterpillar engines.

23. Gas from landfill is about enough for 4000 homes. Typical home annual electricity use is 10,800 kilowatt hours.
24. RSI: a) Investing in hybrid powered garbage trucks; b) has one hybrid powered dozer at CB; c) Boise, ID operation is totally electric.
25. Materials Recovery Facility (MRF): a) Three large MRFs in Portland Area; two smaller facilities also in Oregon; b) There is a minimum volume needed to make an MRF economic; c) One Portland MRF has AI capability.
26. CB is a model bioreactor (maximizes methane generation). It was included in paper/survey of bioreactor technology authored by "Casey" (mentioned by CPI power plant manager). Converting a landfill to a bioreactor is good in dry climates i.e. areas where trash is insufficiently wet to promote landfill trash degradation and gas generation.
27. Equipment noise levels exterior to the building were low enough to not hinder normal voice level communications.

Section II Uses of Information

The conversations about and observations of the physical layout of the facility were extremely helpful in better visualizing and understanding the situation at CB. As examples, the following situations/communication topics cropped up during the tour.

1. Leachate Management: This topic was raised several times by several people at various points in the tour suggesting it is a hot button for some members of the community in their understanding of the safety and desirability of hosting CB. A typical tactful RSI response seemed to be that "...leachate is transported to a city wastewater treatment facility then discharged to the Willamette River. Treatment of leachate is governed by the operating permit of the receiving wastewater facility." i.e., it is not an RSI responsibility. It is an OK answer. But it does not address the potential impact/burden on the host community of having to manage leachate. One way to think of the situations is: Do the materials left over from treating leachate in our city treatment system which discharges to the Willamette River and presumably disposes of sewage sludge on land pose human health and environmental risks that are acceptable to Benton County residents? It is well recognized that landfill leachate can contain toxic materials¹. I do not know if and to what levels the city municipal facilities can treat CB leachate. It is probably best to test the Workgroup's level of interest in exploring the leachate processing/consequences topic before spending much time on it.
2. Current Landfill Liner Integrity: It was mentioned that small amounts of leachate are collected from the secondary leachate collection system (the one below the primary collection system). It would be good to quantify the amount and put the volume in perspective e.g., total gallons collected, gallons per acre of liner, fraction of total

¹ Landfill Leachate Released to Wastewater Treatment Plants and other Environmental Pathways Contains a Mixture of Contaminants including Pharmaceuticals (<https://www.usgs.gov/programs/environmental-health-program/science/landfill-leachate-released-wastewater-treatment>)

leachate collected from secondary liner system, etc. and compare that to some objective standards or waste industry norms to put the environmental risks posed by CB in perspective.

3. Old Landfill Impacts: What is being done to ensure the Old Landfill is not a continuing environmental problem (see page 32² attached). How are closure costs for the Old Landfill addressed in current operating budgets and financial assurance instruments?
4. Interactions With Rock Mining: Have seeps been observed in the rock formations between the current landfill and the Knife River operation? Between the Old Landfill and the Knife River operation? Do/did these seeps contain landfill leachate constituents? Does/did testing of the quarry pond or site discharge contain landfill leachate constituents?
5. Landfill Gas Management. Clarifications requested: is all the landfill gas collected piped to the power plant? How much gas vents from the landfill?
6. Emissions directly to the atmosphere: Have estimates been made? What do they include as sources e.g. open face of landfill, fuel for dozer like equipment use on site, emissions from garbage trucks on site?
7. Power Generation/Use: Clarifications of the net amount of energy generated and overall environmental emissions would be helpful. Examples: What are the constituents of the landfill gas and at what concentration? What fraction of the landfill gas received is used in the power production engines? What fraction is flared? Is supplemental natural gas or other fuel used to assist flare operations/efficiency? What are the environmental emissions from the power plant site (including the flair)? What fraction of the electric power generated is used onsite? Clarify what the impact of CB not being able to maintain its recent rate of yearly increased trash inflow on power generation. Hypothetically, what would be the impact on power generation if CB operations were limited to accepting materials from only Benton County? Please include the impact on CPI customers, corporate financial condition, etc.

ATTACHMENTS:

- Coffin Butte 092422 Tour Stops 1-5 (figure)
- DEQ 2005 Locality of Facility Figure 2-2 (figure)
- Page 32,
chemeketa_region_solid_waste_management_program_technical_report_volume_ii
(figure)

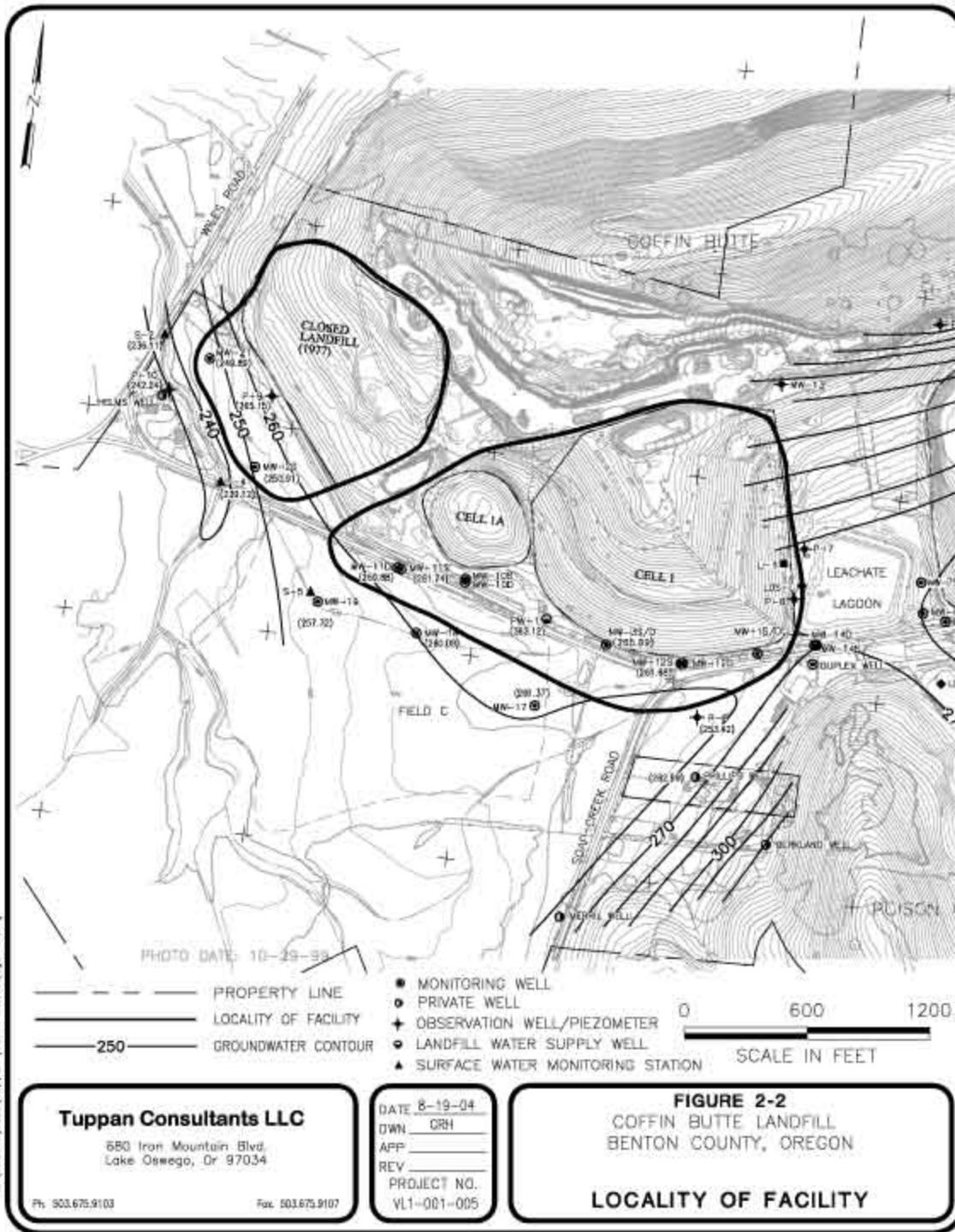
²https://www.co.benton.or.us/sites/default/files/fileattachments/community_development/page/8136/1974_chemeketa_region_solid_waste_management_program_technical_report_volume_ii.pdf

Coffin Butte 092422 Tour Stops 1 - 5



Decommissioned
Leachate Plant and
Discharge Pond

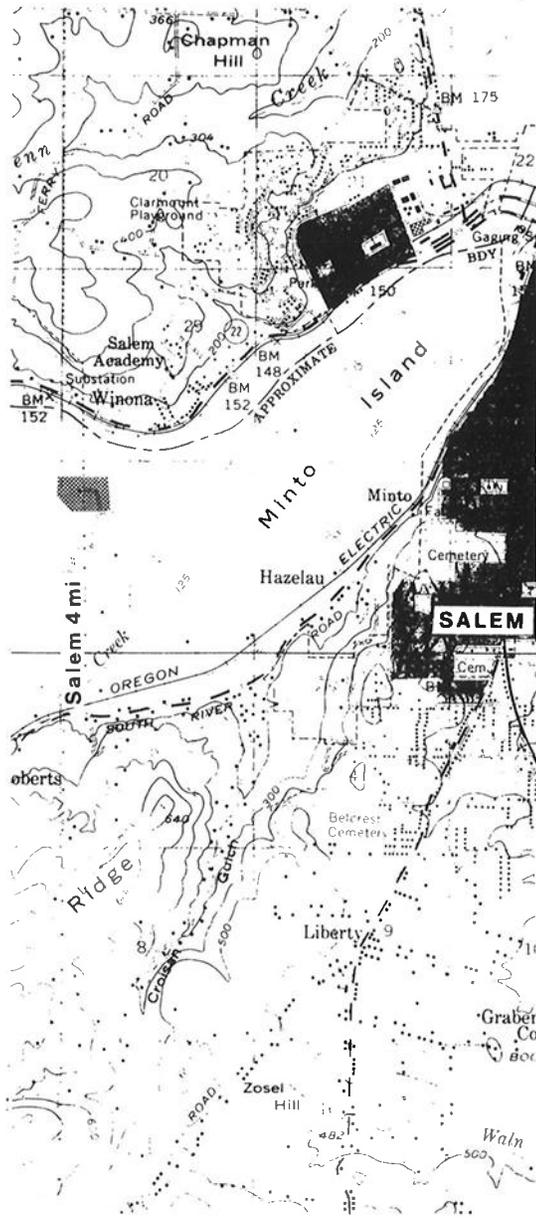
Leachate Ponds 4MM gal and
3.5MM gal HDPE? Lined with
"Floating" Covers



August 19, 2004
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ECSI Site ID: 832.
 Locality of the Facility
 Picture date 11/2/2005

FIGURE III-3
Brown's Island Site



Coffin Butte Site: The existing Coffin Butte site (Benton County) contains a total of 84 acres of which approximately 60 acres are usable. The site is located approximately eight miles north of Corvallis and 1¼ miles west of 99W on County Road 45-01 near the old Camp Adair. The entire landfill operation is privately owned and operated.

The site presently receives a total of approximately 40,000 tons annually of residential, commercial, and industrial wastes from Corvallis and a portion of Benton County. An estimated 2,400 T/YR of waste are directly hauled by the general public. An estimated 75 to 100 private vehicles use the site on an average day.

Recycling practices are reducing landfill needs to a limited extent. Cardboard is separated in Corvallis and baled for resale by the area's franchised collector. White goods are presently stockpiled at the site and periodically delivered to scrap dealers for processing. Landfilling of the remaining solid waste is done by the ramp method. Ultimate uses of filled areas are restricted primarily to agricultural grazing because of the steepness of slopes. Due to the steepness of the fill area, covering is difficult in wet weather and drainage into the buried refuse is hard to control.

The existing site is well above the floodplain of nearby Soap Creek. Inter-

ference from surface water and groundwater are significant occurrences as evidenced by seeps and springs which occur above and below the fill during extreme wet seasons. Limited recharge of groundwater occurs from drainage off Coffin Butte and other surrounding hills due to a sharp interface of overburden and basalt outcroppings at the base of the hills. A leachate and drainage control system has been partially constructed to alleviate these conditions.

Future use of the site as a regional landfill with a larger service area is not feasible due to limited size and physical features. Recently, an adjoining parcel containing 100 acres of relatively flat land was approved by Benton County for use as a regional sanitary landfill. This area was evaluated in site feasibility studies previously published as interim reports.(3)