DETAILED ACTION PLAN
NELSON LAGOON LANDFILL
WASTE EROSION ASSESSMENT & REVIEW (WEAR)
MAY 2015

The **Nelson Lagoon Landfill** is on a narrow sand spit that separates the Nelson Lagoon (water body) from the Bering Sea. The landfill is located at latitude 55.997119 and longitude -161.229392 and was inspected for the Waste Erosion Assessment and Review (WEAR) project on August 13, 2013.

The Nelson Lagoon Village Council owns and operates this permitted landfill. A part-time operator is employed by the Village Council to work in the landfill 1 hour per day for 6 days per week. Residents self-haul waste to the landfill as there is no collection program. The site is accessible by vehicle on a maintained sand road. The site is largely unfenced and accessible to the public.

Imagery Dated 2012. WEAR Map at http://dec.alaska.gov/eh/sw/wear.html

Community* – NELSON LAGOON – Located on the northern coast of the Alaska Peninsula on a narrow sand spit that separates the lagoon from the Bering Sea. It is 580 miles southwest of Anchorage. The culture is focused on commercial fishing and subsistence activities.

CONTAMINANT RISK

The Nelson Lagoon landfill has been in operation since 1988 and is approximately a half mile west of the community. It is located on a sand spit between the Bering Sea and Nelson Lagoon (water body), and is considered a medium-sized site, measuring 2.4 acres. The landfill accepts municipal solid waste (MSW), sewage sludge, and construction and demolition (C&D) debris. A large volume of waste items have been segregated and stored in a separate cell in the landfill including empty propane tanks, lead-acid batteries, old fuel tanks, fishing nets and buoys, and scrap metals. A Tok Burn Unit is used to burn waste near the entrance to the landfill, and the ash is emptied from the unit and buried in an adjacent trench.

Rural communities generate smaller volumes of MSW than larger urban communities; however, these smaller landfills pose significant risks if not designed or operated appropriately. MSW may include household hazardous waste (HHW) from cleaners, automotive maintenance, batteries, paints, etc., that if not managed appropriately can be a concern. Contaminants associated with HHW may include solvents and heavy metals, such as lead, which are known to cause health effects. This site contains construction and demolition (C&D) debris that is a concern due to the possible presence of asbestos-containing materials. Asbestos was widely used in construction materials prior to the 1980s and remains in many rural communities in their older structures. Asbestos is known to cause lung cancer, but does not pose a health risk if it remains contained and is not released to the environment. Asbestos released to water due to erosion is less of a health concern; however, asbestos fibers released to the air pose a more significant risk to human health and the environment. Once asbestos fibers are released they are difficult to clean up, which can result in both short term and long term impacts.

There were no signs of stressed vegetation. The landfill is 80 feet from a subsistence area and a critical habitat area for the Steller's eider.

Tok Burn Unit and Trench (ADEC 2013)

Batteries, Drums, and Propane Tanks (ADEC 2013)

C&D Waste (ADEC 2013)

Burned Waste (ADEC 2013)

C&D Waste (ADEC 2013)

Buoys (ADEC 2013)

EROSION RISK

The Nelson Lagoon landfill is susceptible to erosion on both the Bering Sea and Nelson Lagoon sides of the sand spit. The US Army Corps of Engineers 2009 study, *Alaska Baseline Erosion Assessment* (BEA), lists an estimated erosion rate for this area of 5 feet per year. During the 2013 site inspection, the landfill was approximately 80 feet from the Bering Sea. According to the BEA, factors causing and contributing to erosion at the site include high tides and storm surges. There is a constant prevailing wind of 20 to 25 miles per hour, which combined with wave action also contributes to erosion. The soil structure is primarily sand which is more susceptible to erosion than larger-grained soil types like gravel.

This site is estimated to be impacted by erosion within 16 years, or around 2029.

Lagoon Shoreline (ADEC 2013)

Bering Sea Shoreline (ADEC 2013)

Distance to Lagoon (ADEC 2013)

Low Elevation Bering Sea (ADEC 2013)

Distance to Lagoon (ADEC 2013)

Lagoon Shoreline (ADEC 2013)

MITIGATION

As of 2013, there were no erosion mitigation measures in place for this site on the Bering Sea or Nelson Lagoon sides. However geotube containment structures were installed as a test project within the community in 2005.

Mitigation Options

A. **No Action** – If no action is taken to control erosion, the shoreline will continue to erode closer to the landfill, eventually impacting the site in approximately 2029. The landfill has the potential to release MSW-related contaminants into the Bering Sea that could affect human health, subsistence areas, and the critical habitat area for Steller's eider.

B. **Remove Landfill** – Removing the landfill would mitigate the contaminant risk for this site. This would involve digging up all of the waste at the site and moving it to another location. This action would require significant planning and funding as the landfill is located on a sand spit and would need to be moved to the mainland. Some of the steps involved would be: determine the location of all the buried waste, identify and permit a new landfill location, and obtain funding to remove and relocate the waste. An interim action could be recycling of some wastes, such as metals, propane tanks, and lead-acid batteries. These items are already segregated at the landfill and also have a value as recyclable materials. Recycling these items could generate revenue and would reduce both the amount of waste that could potentially erode and that would have to be removed at a future date.

C. **Erosion Mitigation** – Wave action due to high tides, storm surges, and wind is the primary cause of erosion for this site. The Department of Commerce, Community, and Economic Development's Division of Community and Regional Affairs handbook, *Understanding and Evaluating Erosion Problems,* suggests the best methods for protecting against erosion by wave action are: breakwaters, revetments, vegetation, beach fill, or relocation. The full list of suggested methods is provided in Table 2 of the document which is available online at http://commerce.state.ak.us/dnn/dcra/PlanningLandManagement.aspx.

SUMMARY

This active, permitted landfill is located a half mile west of the community. Both the community and the landfill are on a narrow sand spit that is susceptible to erosion from both Nelson Lagoon and the Bering Sea. The site includes contaminants associated with MSW, burning MSW, HHW, sewage sludge, and construction and demolition debris. The landfill is located near subsistence areas and a critical habitat area for the Steller's eider. With an erosion rate of 5 feet per year for this area, the site is estimated to be impacted by 2029.

RECOMMENDATIONS

Relocation of the landfill is not recommended at this time as the landfill provides key infrastructure. Moving the landfill further away from the community would make the site impractical for transportation of waste.

Removal of wastes such as metals, propane tanks, and lead-acid batteries for recycling or off-site disposal is recommended to reduce impacts from the landfill eroding. These wastes are not buried in the landfill and could more easily wash away in a large erosion event or storm surge. An effort should be made to minimize waste disposed of in the landfill.

The community should monitor and record erosion rates yearly as these rates can change based on storm events. Research into appropriate mitigation measures is recommended. The effectiveness of the geotube containment structures within the community should be evaluated as a possible mitigation option for this site.

Imagery Dated 2004. WEAR Map at http://dec.alaska.gov/eh/sw/wear.html

*Community Database Online, Division of Community and Regional Affairs, Department of Commerce, Community and Economic Development

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