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Director

Terry E. Branstad
Governor

Kim Reynolds
Lt. Governor

January 6, 2012

Residents of Ankeny, Iowa

RE: Health Consultation
Des Moines (Ex) Ordnance Site Landfill and Lagoon Complex
Prairie Trail Development Site

Dear Ankeny, Iowa Resident:

This letter has been prepared as a consultation to evaluate human health impacts that will remain in a commercial and residential area within Ankeny, Iowa known as the Prairie Trail Development Site. The Iowa Department of Public Health's priority is to ensure the Ankeny community has the best information possible to safeguard its health. That information is included in the following paragraphs.

Background and Statement of Issues

The Prairie Trail Development Area is located in the southern portion of Ankeny, Iowa. This development area is located in an area that was formally occupied by the Des Moines Ordnance Plant. The Des Moines Ordnance Plant was constructed for the production and testing of small arms munitions for use during World War II. The Landfill and Lagoon Complex was utilized for disposal of wastes from the ordnance plant and also from various entities that utilized the site property until 1991. The United States Environmental Protection Agency (EPA) is overseeing the cleanup of the Landfill and Lagoon Complex. A portion of the remainder of the site property had been used for burning of scrap explosives, the storage and disposal of chemicals, a disposal pond, testing of products, and various munitions manufacturing activities. The Iowa Department of Natural Resources (IDNR) is overseeing the cleanup of this remaining portion of the site property.

The Iowa Department of Public Health has been contacted by residents within the Prairie Trail Development Area and by individuals that have an interest in relocating to the Prairie Trail Development Area. These residents are concerned with any environmental contamination that will be left after site remedial activities are completed. These residents want to know if any remaining environmental contamination will adversely impact their health or the health of their families.

Discussion – Contaminants of Concern

Landfill and Lagoon Complex

Within the Landfill and Lagoon Complex the EPA determined that arsenic, chromium (III and VI), copper, and lead were identified as contaminants of concern in soil and groundwater (1). In order to address these contaminants of concern within the Landfill and Lagoon Complex EPA selected a site cleanup action that included excavation and disposal of contaminated soil, structures, and debris in the former Domestic and Industrial Wastewater Treatment Areas; and construction of a landfill cover system and implementation of institutional controls in the former Landfill and Lagoon Complex areas (1). In addition, the EPA required sampling and monitoring of water within groundwater monitoring wells installed around the boundary of the landfill cover.

Remaining Portions of the Site

Within the remaining portions of the site a variety of contaminants of concern exist. Soil at the location of the some of the former operational and disposal areas within the site contain elevated heavy metals (lead and arsenic), poly aromatic hydrocarbons or PAHs, pesticides, and asbestos containing materials at a few locations (2). The groundwater in the remaining portions of the site has been monitored through the installation of temporary groundwater monitoring wells. The result of the groundwater monitoring has shown that the level of potential contaminants within the groundwater is below the statewide standards of the IDNR. The clean-up and remediation of the areas of soil contamination being overseen by the IDNR is being accomplished by the excavation and proper disposal of any contaminated soil.

Discussion – Remediation and Cleanup

As stated before, the remediation and cleanup of the site now known as the Prairie Trail Development area is being overseen by the EPA and the IDNR. The goal of each of these agencies is to remove or eliminate the exposure to elevated site contaminants. The following is a discussing of the remediation and cleanup of the site being overseen by these agencies and an evaluation by the Iowa Department of Public Health of their protectiveness of public health.

Remediation and Cleanup of Lagoon and Landfill Complex (1, 2)

The first step in the remediation and cleanup of the Lagoon and Landfill Complex was the removal of the surface water within the lagoons. The domestic wastewater lagoons and the industrial wastewater lagoons were dewatered and this water was discharged directly to the City of Ankeny sewer system in accordance with city approval. Sediment from within the domestic wastewater lagoon was excavated and disposed within the on-site landfill, and sediment from within the industrial wastewater lagoon and other soil contamination areas found to be above the site action levels set by EPA was excavated and disposed within the Metro Park East Landfill (the local regulated municipal landfill). Asbestos containing material and other debris were also removed from the Lagoon and Landfill Complex and disposed within the Metro Park East Landfill.

Visual observation was used to confirm the effectiveness of the removal of sediments from within the domestic wastewater lagoons. Confirmatory soil sampling and laboratory analysis was used to confirm the effectiveness of the removal of all of the contaminated sediments from within the industrial wastewater lagoon and within other areas of soil contamination. After the excavation of contaminated soils within the industrial wastewater lagoon, soil samples were collected from surface of the excavation and sent to the laboratory to determine if the soils left within the excavation were below the cleanup standards that EPA had established for the site.

The next step in the remediation and cleanup of the Lagoon and Landfill Complex was to construct a cover system for the landfill. The purpose of the landfill cover system constructed within the Lagoon and Landfill Complex is to contain all waste material that was previously disposed in the landfill and the sediment from the domestic wastewater lagoon that was placed in the landfill, and to remove the potential for future exposure to these materials. The landfill cover system consists of a general fill sub-grade to level the surface of the landfill area, a geo-composite gas pressure relief layer, a two-foot compacted clay liner (CCL), a geo-membrane liner, a geo-composite drainage layer, a two-foot vegetative soil layer, and a six-inch topsoil layer. The landfill cover system is required to be maintained and inspected annually as part of the approved Operations and Maintenance Plan (3).

The Operations and Maintenance Plan also requires the groundwater in the vicinity of the Lagoon and Landfill Complex is planned to be sampled and analyzed through monitoring wells installed around the perimeter of the landfill to monitor potential migration of the contaminants of concerns from the landfill. In addition, an environmental covenant has been prepared and filed with the Polk County, Iowa Records office that prevents the installation of water wells at the site except for the purpose of environmental investigation and monitoring. The environmental covenant also restricts the use of the landfill area to a park, a recreational area, or a green space.

Status of the Remediation and Cleanup of Lagoon and Landfill Complex (4)

The remediation and cleanup of the Lagoon and Landfill Complex has been completed except for the continuation of sampling and monitoring of the groundwater wells installed around the perimeter of the landfill. The surface water within the lagoons was pumped out and disposed within the City of Ankeny wastewater system. All asbestos containing material and other debris within the site has been disposed at the Metro Park East Landfill. The sediment within both lagoons has been removed. The contaminated sediment within the industrial wastewater lagoon has been disposed at the Metro Park East Landfill. The sediment within the domestic wastewater lagoon has been placed within the on-site landfill. And the cover system for the on-site landfill has been completed. At the present time the Landfill and Lagoon Complex is on the State of Iowa Registry of Hazardous Waste or Hazardous Substance Disposal Sites and requires the City of Ankeny to get IDNR approval to change the Landfill and Lagoon Complex to a park. As of the preparation of this consultation the City has not made this request.

Remediation of Remaining Portions of the Site (2)

The remediation of the remaining portion of the site is being overseen by the IDNR. At the present time this remaining area has been broken down into areas that correspond to former operational areas and

disposal areas associated with the former Des Moines Ordnance Plant. These areas are known as: Scrap Burial Area A, Burn Area A, Tracer/Igniter Manufacturing Area, Primer Manufacturing Storage Area, Chemical Storage Area, Lime Sludge Drying Beds, Powder Canning Area, Demolition Debris Disposal Area, Outfall Sewer Line, Northeast Area EM 31 Survey, and Central Magazine Loop. For each of these areas the first step was an assessment to determine the extent of environmental contamination within the soil and groundwater. After the assessment was completed a determination was made regarding removal or treatment of contaminated soil and whether the groundwater contamination needed to be addressed. The following table has been prepared that provides a summary of assessment and remediation completed in each of these former operational or disposal areas. The table also includes the status of the work completed at each of the former operational or disposal areas at the time this consultation was prepared.

Table 1 – Assessment and Remedial Work within Remaining Site Areas (1)

Operational Area	Assessment and Remedial Work	Status
Scrap Burial Area A	Soil samples and groundwater samples collected. Some soil samples had lead contamination above statewide standards. Soil that exceeded IDNR statewide soil standards removed from site. Soil rendered non-hazardous before removal and disposal at local landfill.	Soil remediation is “in process” Upper layer of soil has been removed down to layer of concrete and scrap metal. Groundwater samples collected were below statewide standards. IDNR gave a no further action status to the groundwater investigation on August 22, 2008.
Burn Area A	Soil samples and groundwater samples collected. Some soil samples had lead and antimony contamination above statewide standards. Soil that exceeded IDNR statewide soil standards removed from site. Soil rendered non-hazardous before removal and disposal at local landfill.	All contaminated soil removed from area. Soil samples collected to confirm all contaminated soil above statewide standards was removed. Groundwater samples collected were below statewide standards. IDNR gave a no further action status to this area on August 15, 2007
Tracer/Igniter Manufacturing Area	Soil samples and groundwater samples collected. Some soil samples had poly aromatic hydrocarbon contamination above statewide standards. Soil that exceeded IDNR statewide standards removed from site and disposed at local landfill.	All contaminated soil removed from area. Soil samples collected to confirm all contaminated soil above statewide standards was removed. Groundwater samples collected were below statewide standards. IDNR gave a no further action status to this area on October 17, 2008.

Table 1 – Assessment and Remedial Work within Remaining Site Areas (Cont.)

Operational Area	Assessment and Remedial Work	Status
Primer Manufacturing Storage Area	Soil samples and groundwater samples collected. Some soil samples had poly aromatic hydrocarbon contamination above statewide standards. Soil that exceeded IDNR statewide standards removed from site and disposed at local landfill.	All contaminated soil removed from area. Soil samples collected to confirm all contaminated soil above statewide standards was removed. Groundwater samples collected were below statewide standards. IDNR gave a no further action status to this area on January 27, 2009.
Chemical Storage Area	Soil samples and groundwater samples collected. Some soil samples had poly aromatic hydrocarbon contamination above statewide standards. Soil that exceeded IDNR statewide standards removed from site and disposed at local landfill.	All contaminated soil removed from area. Soil samples collected to confirm all contaminated soil above statewide standards was removed. Groundwater samples collected were below statewide standards. IDNR gave a no further action status to this area on January 16, 2009.
Lime Sludge Drying Beds	Soil samples and groundwater samples collected. Soil and groundwater samples collected were below statewide standards.	IDNR gave a no further action status to this area on May 31, 2007.
Powder Canning Area	Soil samples and groundwater samples collected. Some soil samples had poly aromatic hydrocarbon contamination above statewide standards. Soil that exceeded IDNR statewide standards removed from site and disposed at local landfill.	All contaminated soil removed from area. Soil samples collected to confirm all contaminated soil above statewide standards was removed. Groundwater samples collected were below statewide standards. IDNR gave a no further action status to this area on December 8, 2008.

Table 1 – Assessment and Remedial Work within Remaining Site Areas (Cont.)

Operational Area	Assessment and Remedial Work	Status
Demolition Debris Disposal Area	Soil and groundwater samples collected. Asbestos containing material found within soil samples. This material was removed and disposed at local landfill.	Soil samples collected to confirm all soil with asbestos containing material was removed. IDNR gave a no further action status to this area on August 14, 2008.
Outfall Sewer Line	Soil samples and groundwater samples collected. Soil and groundwater samples collected were below statewide standards.	IDNR gave a no further action status to this area on February 5, 2008.
Northeast Area EM 31	An electro-magnetic survey was completed in this area. No anomalies were noted that would indicate disposal of bulky waste in this area.	IDNR gave a no further action status to this area on February 5, 2008.
Central Magazine Loop	An electro-magnetic survey was completed in this area. Two anomalies were noted that would indicate disposal of bulky waste in this area. Trenches were excavated and showed no disposal of bulky waste, only changes in soil type.	IDNR gave a no further action status to this area on August 22, 2008.

At the time of the preparation of this health consultation, remediation and cleanup has been completed, and IDNR has given a “no further action” status for the following areas: Scrap Burial Area A (groundwater only), Burn Area A, Tracer/Igniter Manufacturing Area, Primer Manufacturing Storage Area, Chemical Storage Area, Lime Sludge Drying Beds, Powder Canning Area, Demolition and Debris Disposal Area, Outfall Sewer Line, Northeast Area EM 31, Central Magazine Loop.

Discussion – Health Implications from Exposure to Contaminants after Remediation and Cleanup

As previously mentioned, the main concern that residents currently living in or planning to live in the Prairie Trail Development Area have is whether any remaining environmental contamination will adversely impact their health or the health of their families. This concern can be answered by determining if there will be any human exposure to the remaining environmental contamination that will

exist after remediation and cleanup is completed. If there is any exposure to the remaining environmental contamination that exists, then an evaluation must be made to determine the health significance of this exposure.

Exposure to Contaminants in Landfill and Lagoon Complex after Remediation

There are two areas within the Landfill and Lagoon Complex where previous environmental contamination has been remediated. These two areas are the former domestic wastewater lagoon and the former landfill area which has now been covered with an engineered cap. Surface water and sediment has been removed from within the former domestic wastewater lagoon and no environmental contamination currently exists in this area. Since a cap that consist of a two-foot compacted clay liner, a geo-membrane liner, a two-foot vegetative soil layer, and a six-inch topsoil layer has been installed over the former landfill area, all direct exposure to environmental contamination in this area has been eliminated. As long as the integrity of this cap is maintained, direct exposure to contaminants within the landfill is not a possibility.

There may be some possibility for environmental contaminants within the landfill to seep into the groundwater in the vicinity of the landfill, which is why there will be continuing monitoring of the groundwater through monitoring wells installed around the perimeter of the landfill. But, exposure to this groundwater has been eliminated since all homes and businesses within the Prairie Trail Development Area have been and will be supplied with public water from the City of Ankeny. There have been some concerns expressed about the leaching of contaminants in the groundwater into water lines that might be installed near the Landfill and Lagoon Complex. But the contaminants of concern within the Landfill and Lagoon Complex, heavy metals (arsenic, chromium (III and VI), copper, and lead), are not known to leach into water lines as might happen with petroleum-based hydrocarbons or other organic solvents.

Sediment within the industrial wastewater lagoon and within other soil contamination areas that are part of the Lagoon and Landfill Complex was removed if the level of contamination was above action levels set by EPA. Soil contamination that is below the action levels set by EPA has been allowed to remain on site, therefore, some level of exposure to soil contamination to the levels below the EPA action levels remain. A review of the EPA action levels for soil cleanup utilized in the Landfill and Lagoon Complex can be made to determine if they are protective of public health. The following table is a list of the action levels for soil contamination that were utilized by EPA in the Landfill and Lagoon Complex.

Table 2 – Landfill and Lagoon Complex EPA Action Levels

Contaminant of Concern	EPA Action Level (mg/kg) (3)	Comparison Value (mg/kg) (5)
Arsenic	17	20
Chromium III	97,000	80,000
Chromium VI	210	50
Copper	14,000	500
Lead	400	400

Table 2 also includes comparison values that are utilized by the Agency for Toxic Substances and Disease Registry. Comparison values (or environmental guidelines) are measures of substance concentrations that are set well below levels that are known to cause, or anticipated to result in, adverse health effects. The Agency of Toxic Substances and Disease Registry (ATSDR) has determined and published a set of comparison values for substances that may be found in air, water, and soil. From Table 2 it can be seen that the comparison values for arsenic, chromium III, and lead are very close or are equivalent to the EPA Action Levels. The EPA Action Levels for chromium VI and copper are significantly higher than their associated comparison values. A closer look at the development of the EPA Action Levels for chromium VI and for copper can be made to determine if they are protective of public health.

Development of EPA Action Levels

The method that EPA uses to develop their Action Levels is very similar to the method that ATSDR uses to develop their comparison values. Action levels and comparison values are based upon toxicological studies that have observed health impacts to either test animals or humans (mostly in studies from workplace exposure). This toxicological information obtained from these studies is then extrapolated to make estimates of levels of exposure that will not adversely impact human health.

In order to develop the EPA Action Levels shown in Table 2 assumptions are made in terms of the types of exposure that will be experienced by people that will potentially be exposed to the Landfill and Lagoon Site. The EPA is assuming that since the former Landfill and Lagoon Complex will be developed as a recreational area, the human exposures will not be as intense as everyday exposures in a residential setting. As a result, the EPA Action Levels for chromium VI and copper are a bit less restrictive than the comparison values for these chemicals of concern since comparison values are developed assuming everyday exposures in a residential setting. It is the opinion of the Iowa Department of Public Health that the EPA Action Levels for the Landfill and Lagoon Complex site are protective of public health provided that the future use of the Landfill and Lagoon Complex is maintained as a recreational area.

Exposure to Contaminants in Remaining Prairie Trail Development Area after Remediation

There are eleven areas within the remaining portions of the Prairie Trail Development Area where previous environmental contamination has been remediated. This includes the following operational areas: Scrap Burial Area A, Burn Area A, Tracer/Igniter Manufacturing Area, Primer Manufacturing Storage Area, Chemical Storage Area, Lime Sludge Drying Beds, Powder Canning Area, Demolition Debris Disposal Area, Outfall Sewer Line, Northeast Area EM 31, Central Magazine Loop. In all these areas both groundwater and surface soils were investigated to determine any levels of environmental contamination that may provide a risk to human health.

In all cases the level of contamination found within the groundwater was below the IDNR statewide standards and at levels that are known to not adversely impact human health. If levels of contamination within the soils were found to be above the statewide standards of the IDNR, these soils were excavated and removed from the site. Soil contamination that is below the statewide standards set by the IDNR has been allowed to remain on site, therefore, some level of exposure to soil contamination to the levels

below IDNR statewide standards remain. A review of the IDNR statewide standards for soil cleanup utilized in the Prairie Trail Development Area can be made to determine if they are protective of public health.

In all the former operational areas soil was sampled and analyzed for metals and poly aromatic hydrocarbons. The following table is a list of the IDNR statewide standards for the soil contaminants detected in the operational areas. This table also includes the associated comparison values utilized by ATSDR.

Table 3 – Prairie Trail Development Area IDNR Statewide Standards

Contaminant of Concern	IDNR Statewide Standard (mg/kg) (6)	Comparison Value (mg/kg) (5)
Antimony	31	20
Arsenic	17	20
Cadmium	70	5
Chromium	210	NA
Copper	NA	500
Lead	400	400
Mercury	23	NA
Selenium	390	300
Silver	370	300
Strontium	47,000	30,000
Thallium	5.5	NA
Vanadium	490	200
Benzo(a)anthracene	3.1	NA
Benzo(a)pyrene	0.31	0.1
Benzo(b)fluoranthene	3.1	NA
Benzo(k)fluoranthene	31	NA
Dibenzo(a,h)anthracene	0.31	NA
Ideno(1,2,3-cd)pyrene	3.1	NA
Nitrobenzene	31	30

From Table 2 it can be seen that the comparison values for most of the contaminants of concern are very close or are equivalent to the IDNR statewide standards. The IDNR statewide standards for cadmium, vanadium, and benzo(a)pyrene are more than twice level of the associated comparison values. A closer look at the development of the IDNR statewide standards for cadmium, vanadium, and benzo(a)pyrene can be made to determine if they are protective of public health.

Development of IDNR Statewide Standards

The method that IDNR used to develop their statewide standards is very similar to the method that ATSDR uses to develop their comparison values. But, there are slight differences that lead to differing

values. The development of the IDNR statewide standards for cadmium and vanadium assume combined exposure to children and adults, while the comparison values shown in Table 3 for these chemicals only apply to exposure to children. Benzo(a)pyrene is classified as a probable human carcinogen, and as a result both the IDNR statewide standard and the comparison values consider a risk to developing cancer from exposure to benzo(a)pyrene. The IDNR statewide standard for benzo(a)pyrene assumes a slightly higher cancer risk than the comparison value for benzo(a)pyrene, but it is still within the generally acceptable risk of cancer considered by federal environmental agencies. The IDPH concludes that the IDNR statewide standards are protective of public health.

Conclusions

The Iowa Department of Public Health has reviewed the cleanup and remediation of the Landfill and Lagoon Complex and the remaining areas of the Prairie Trail Development Area located in the southern portion of Ankeny, Iowa. The cleanup and remediation of these areas is being overseen by the U.S. Environmental Protection Agency and the Iowa Department of Natural Resources. A review was made of the completeness of the remediation and cleanup and the health implications of any remaining contamination left on site within these areas. The Iowa Department of Public Health concludes that exposure to any remaining site contaminants after cleanup and remediation has been completed to the approval of both the U.S. Environmental Protection Agency and the Iowa Department of Natural Resources will not harm the health of people living or working within the Prairie Trail Development Area.

References

1. Scope of Work Des Moines (Ex) Ordnance Plant Site, CERCLIS ID Number IA8210890028, MWH, September 2008.
2. Iowa Department of Natural Resources' Electronic files for Prairie Trail Development Area, IDNR web link: <https://programs.iowadnr.gov/contaminatedsites/pages/processManagement.aspx?siteID=116&subSiteID=82> .
3. Operation and Maintenance Plan Des Moines (Ex) Ordnance Plant Site, CERCLIS ID Number IA8210890028, MWH, February 2010
4. Construction Completion Report Des Moines (Ex) Ordnance Plant Site, CERCLIS ID Number IA8210890028, MWH, February 2010.
5. Agency for Toxic Substances and Disease Registry, Sequoia Database, February 2011
6. Iowa Department of Natural Resources, Statewide Standards for Contaminants in Soil and Groundwater, IDNR web link: <https://programs.iowadnr.gov/riskcalc/pages/standards.aspx>

If you have any questions regarding the information in this letter please contact me at (515) 281-8707 or by email at stuart.schmitz@idph.iowa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "S.C. Schmitz". The signature is fluid and cursive, with the first name "S.C." being more distinct than the last name "Schmitz".

Stuart C. Schmitz, M.S., P.E.
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Hazardous Waste Site Health Assessment Program