SEMI-ANNUAL VRP PROGRESS REPORT

(12 MONTH)

DIAMOND CRYSTAL DULUTH, LLC
DULUTH, GA
HSI SITE NO. 10844

JUNE 2016

PREPARED FOR:

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PG Certification

"I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et.seq.). I am a professional engineer/professional geologist who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors/Georgia State Board of Registration for Professional Geologists and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances.

Furthermore, to document my direct oversight of the Voluntary Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division.

The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Mark Taylor, P.G. #1766
Principal

Date: 7 June 2016

1.0 INTRODUCTION

The Voluntary Investigation and Remediation Plan (VIRP) application for the Diamond Crystal Duluth, LLC (Diamond Crystal Duluth) facility, located at 3245 North Berkeley Lake Road in Duluth, Gwinnett County, Georgia (HSI Site No. 10844), was submitted to the Georgia Environmental Protection Division (EPD) on May 11, 2015. The VIRP was approved by the EPD in a letter dated June 8, 2015.

An initial Progress Report was submitted in December 2015 summarizing activities completed during the first six months in the Voluntary Remediation Program (VRP). This Progress Report provides a summary of activities conducted from December 2015 through May 2016, the second six month period (first 12 months) in the VRP.

2.0 SUMMARY OF SITE ACTIVITIES

As described in the VIRP application, certain activities are scheduled to be completed within the second six month period (first 12 months) after entry to the VRP. These activities include:

- The Risk Reduction Standards (RRS) for applicable exposure pathways will be reviewed for HSI Site No. 10844 and RRS will be proposed for the Diamond Crystal Duluth site;
- Update on subsurface conditions on adjacent property;
- Report on progress with site paving and controls; and,
- Update the Conceptual Site Model (CSM) and Corrective Action Plan (CAP), if necessary.

A summary of the activities conducted from December 2015 through May 2016 are described in the following sections.

2.1 Risk Reduction Standards

This section provides a summary of RRS for the facility, calculated according to the Hazardous Site Response Act (HSRA), Chapter 391-3-19-.07(9). The facility is an active manufacturing facility with multiple work shifts, surrounded by industrial, commercial or undeveloped real estate. The HSRA regulation provides for the development of both "generic" and "facility-specific" RRS Types 1 through 5, for soil and groundwater at residential (Types 1 and 2) and/or non-residential (Types 3, 4, and 5) sites. Arsenic is the HSRA regulated substance for HSI Site No. 10844, including the Diamond Crystal Duluth facility.

The direct exposure pathway calculations for the "generic" non-residential (Type 3) RRS utilize exposure assumptions provided in the Rules of Georgia Department of Natural Resources EPD, Chapter 391-3-19: Hazardous Site Response, Appendix III, Table 3. Calculation of Type 4 non-residential (site-specific) RRS values was considered appropriate for this facility.

2.1.1 Potential Receptors

Potential receptors were identified for the facility based on an evaluation of the potentially complete exposure pathways as well as EPD correspondence related to HSI Site No. 10844. For the facility, potential receptors include an everyday

industrial worker, maintenance worker/groundskeeper, construction worker, and an adolescent trespasser.

The industrial worker receptor is considered for this facility as a conservative scenario. Industrial activities at the facility occur primarily inside the building. This worker is assumed to spend at least 6 of the 8 hours during a work shift inside the building, with no exposure to the soil.

The maintenance worker/groundskeeper receptor is considered for this facility as a conservative scenario. This worker is assumed to spend between 2 and 4 hours a day on the property for lawn care and landscape maintenance where they might be exposed to surface soil. The property has limited unpaved surface area; therefore, this scenario is conservative for estimating risk.

The construction worker receptor is considered for this facility as a conservative scenario. This worker is assumed to spend approximately 8 hours on the property for a hypothetical temporary construction project where they might be exposed to surface and subsurface soil.

The adolescent trespasser receptor is considered for this facility as a conservative scenario. Residential dwellings are not located directly adjacent to the property. The area is highly industrialized, with residences located outdoors within a one mile radius of the facility. The location of the facility limits the potential trespassing receptor to an adolescent or adult trespasser. Security fencing and multiple work shifts further limit the likelihood for exposure. As such, an adolescent trespasser scenario is anticipated as the most applicable potentially complete exposure pathway for the facility. The trespasser is assumed to spend approximately 2 hours outdoors but within the property where they might be exposed to surface soil. The property has limited unpaved surface area and is regularly staffed and patrolled; therefore, this scenario is conservative for estimating risk.

2.1.2 Development of RRS for Soils

Tables A-1 through A-5 in **Appendix A** present and summarize the Type 4 non-residential RRS calculations for arsenic completed for the four receptor scenarios evaluated. Type 4 non-residential RRS is a site-specific RRS.

For all Type 4 non-residential RRS calculations, a relative bioavailability (RBA) value for arsenic of 60 percent was used. This is consistent with current United States Environmental Protection Agency (US EPA) guidance and EPD

recommendations. The US EPA document *Recommendations for Default Value of Relative Bioavailability of Arsenic in Soil* (December 2012) summarizes the findings of bioavailability studies showing bioavailability of arsenic in soil is typically less than the RBA of water soluble forms of arsenic and that a RBA of 60 percent is recommended as a default value. This is supported by the study data set showing values for arsenic RBA exceeding 60 percent are relatively uncommon (*i.e.*, <5 percent of the RBA estimates exceed 60 percent) and use of higher RBA values will result in an overestimation of risk. The EPD cites this same US EPA document and finds the RBA of 60 percent to be applicable to HSI Site No. 10844 (EPD, 2015).

The non-residential Type 4 RRS was evaluated for an industrial worker who is employed at the facility. Exposure to soil for this receptor scenario is limited to surface soil less than 2 feet in depth. Exposure time for this worker is limited to approximately 2 hours per work day to be outdoors but within the property for activities such as breaks and walking to and from their vehicle. To account for this daily exposure duration, the RRS calculation was adjusted from the default 8 hour daily exposure time to a scenario-specific value of 2 hours. Consistent with EPD recommendations (EPD, 2015), a conversion factor was used in the calculation in lieu of adjusting the inhalation and soil ingestion rates This scenario assumes an exposure frequency of 250 days per year for 25 years (US EPA assumptions). See **Table A-1** for calculation details.

Type 4 non-residential RRS was developed for a maintenance worker/ groundskeeper scenario. This worker is assumed to provide up to 4 hours a day of routine lawn care maintenance services such as mowing, light landscaping and general maintenance duties within the facility. This receptor is potentially exposed to surface soil less than 2 feet in depth. Mowing activities at the facility are currently limited to select portions not paved for parking or other use. Similar to the industrial worker scenario described above, to account for this daily exposure duration the RRS calculation was adjusted to a scenario-specific value of 4 hours using a conversion factor. This scenario assumes an exposure frequency of 52 days per year (1 day/week) for 15 years. See **Table A-2** for calculation details.

Type 4 non-residential RRS was developed for a construction worker scenario. This scenario is for a hypothetical future worker providing construction services at the facility for a limited period of time (assumed to be 1 year). This receptor is potentially exposed to all soil on-site (surface soil less than 2 feet in depth and

subsurface soil greater than 2 feet in depth). The RRS calculation assumes an 8 hour exposure to the soil outdoors (US EPA assumption) and is not adjusted for proper personal protection equipment (PPE) which is typically required for construction activities. This scenario assumes an exposure frequency of 120 days per year for 1 year. See **Table A-3** for calculation details.

Type 4 non-residential RRS was developed for a hypothetical adolescent trespasser spending up to 2 hours at the site in a given day. This receptor is potentially exposed to surface soil less than 2 feet in depth. Similar to the industrial and maintenance worker scenarios described above, to account for this daily exposure duration the RRS calculation was adjusted to a scenario-specific value of 2 hours using a conversion factor. This scenario assumes an exposure frequency of 52 days per year (1 day/week) for 10 years. The RRS variables and assumptions used in the adolescent trespasser scenario are consistent with EPD recommendations (EPD, 2015), including a body weight of 45 kilograms and a soil ingestion rate of 100 milligrams per day. See **Table A-4** for calculation details.

2.1.3 Development of RRS for Groundwater

A groundwater assessment is planned for the facility to identify whether arsenic present in soil at the property presents a risk to groundwater. No development of RRS for the protection of groundwater will be completed at this time, pending results of the groundwater assessment.

2.1.4 Proposed RRS for Soil

The Type 4 non-residential (site-specific) RRS for arsenic developed for all receptors evaluated are summarized in **Table A-5**. The lowest applicable RRS values were selected for use at the property for non-residential use.

The evaluation for the industrial worker resulted in a site-specific RRS of 762 milligrams per kilogram (mg/kg) and is considered protective for this receptor. This scenario is conservative and was adjusted for the time workers spend inside of the building (the majority of the shift) which limits direct oral and inhalation exposure routes from soils.

The maintenance worker/groundskeeper resulted in a site-specific RRS of 3,053 mg/kg, which is considered protective for this receptor.

Exposure to subsurface soil (greater than 2 feet) is limited to construction workers; the site-specific RRS for the construction worker of 322 mg/kg is considered protective for this receptor.

The adolescent trespasser scenario resulted in a site-specific RRS of 1,532 mg/kg. The property has limited unpaved surface area and is regularly staffed and patrolled; therefore, this scenario is conservative for estimating risk and the RRS is considered protective for this receptor scenario.

The proposed Type 4 non-residential RRS for arsenic in soil at the Diamond Crystal Duluth site will be used to further assess the need for potential corrective action and to develop the site Corrective Action Plan (CAP).

2.2 Neighboring Property Conditions

2.2.1 OSC Norcross, LLC

Site assessment activities were completed at the OSC Norcross, LLC (OSC) property located at 4075 Blue Ridge Industrial Parkway, Norcross, Georgia. The property is located south of the Diamond Crystal Duluth facility. OSC conducted the assessment in response to a Release Notification Call-In letter received from the EPD dated April 23, 2014. A Phase II Environmental Site Assessment (ESA) was completed on the OSC property in October 2015 and a memorandum summarizing the assessment and findings was submitted to the EPD on December 11, 2015.

The ESA included the advancement of six soil borings by means of hand auger along the northern portion of the OSC property. This area of the property is directly adjacent to the south side of the Diamond Crystal Duluth facility. Borings were advanced from the ground surface to 5 feet below ground surface (bgs) using a 3 ¼ inch-diameter stainless steel hand auger. Samples were collected between depth intervals of 0.5 – 2 feet bgs (representative of surface soils) and 4 – 5 feet bgs (representative of subsurface soils). A total of eleven soil samples, in addition to two duplicates, were collected from the six borings. The samples were submitted to an analytical testing laboratory for analysis of total arsenic by US EPA Method 6020A.

Based on the soil sampling and analytical testing completed for arsenic at the OSC property, no arsenic concentrations exceeding the HSRA Notification Concentration limit of 41 mg/kg were identified in any of the 13 soil samples collected and a notifiable condition at this property does not exist. OSC received

a letter from the Georgia EPD dated February 1, 2016 indicating the property will not be scored for listing on the Hazardous Site Inventory.

2.3 Preliminary Paving and Site Controls Plan

A preliminary site paving and controls plan is continuing to be developed for the Diamond Crystal Duluth site. An updated conceptual figure outlining the areas being considered for paving/capping controls is included in **Appendix B**.

During the second six month period (first 12 months) in the VRP, Diamond Crystal Duluth prepared two additional areas for paving; one located northeast of the facility building, and one northwest of the facility building. The work completed included capping these areas with concrete. These areas are shown on the included figure in **Appendix B**.

The preliminary site paving and controls plan will continue to be evaluated as Diamond Crystal Duluth progresses through the VRP and identifies areas requiring corrective action based on applicable exposure pathways/receptors and site RRS values.

2.4 Conceptual Site Model

No adjustments to the Conceptual Site Model (CSM) are required at this time.

2.5 Corrective Action Plan

No adjustments to the proposed Corrective Action Plan (CAP) are required at this time.

3.0 RESPONSE TO 6-MONTH VRP PROGRESS REPORT COMMENTS

The Diamond Crystal Duluth 6-Month Semi-Annual VRP Progress Report was submitted to the EPD in December 2015. On March 18, 2016 the EPD provided a letter with comments relating to the December 2015 Semi-Annual VRP Progress Report. This section provides responses to the EPD's comments (shown in italicized text, followed by responses).

1) *Section 3.0 of the Report indicates Diamond Crystal does not intend to collect any groundwater data from its property. This information is required for the EPD to make a determination that the geologic conditions at the property are definitively similar to the neighboring properties and in order for Diamond Crystal to eventually certify compliance with applicable risk reduction standards for groundwater.*

   In the comment letter relating to the application, EPD reduced the requirements for groundwater monitoring locations to only two onsite locations, recognizing prior work done at neighboring sites could be utilized, provided Diamond Crystal incorporated data from these neighboring groundwater monitoring wells along with the onsite wells to construct a groundwater potentiometric map for the site. If you choose not to use the neighboring groundwater monitoring wells, then install a minimum of three onsite groundwater monitoring locations in order to provide the information required by EPD.

To confirm that geologic conditions at the Diamond Crystal Duluth site are similar to existing neighboring sites, a minimum of two groundwater monitoring wells will be installed onsite. Groundwater data obtained from the Diamond Crystal Duluth site will be used in conjunction with data collected from monitoring wells on neighboring property(s) in constructing a groundwater potentiometric map. This work is scheduled to be completed within the next six months and the assessment findings will be included in the (18 Month) VRP Progress Report due in December 2016.

2) *The Report indicates that a Preliminary Paving and Site Controls Plan has been completed, and listed Appendix E as containing this Plan. However, only a "conceptual figure outlining the areas being considered for paving/capping" is included in Appendix E.*

The preliminary paving and site controls plan provided in **Appendix B** is a conceptual figure meant to outline areas on the property under current consideration for paving and capping. It is premature to identify areas requiring corrective action since site RRS values have yet to be reviewed/approved in conjunction with the EPD. The preliminary paving and site controls plan will continue to be evaluated as Diamond Crystal Duluth

progresses through the VRP and identifies areas requiring corrective action based on applicable exposure pathways/receptors and site RRS values.

4.0 SITE ACTIVITIES PLANNED FOR NEXT 6 MONTHS

The following activities will be conducted in the next 6 months and summarized in the (18 Month) Semi-Annual VRP Progress Report to be submitted in December 2016:

- Evaluate overland run-off route and the potential for offsite impacts to surface water/sediment as a result of surface erosion of impacted soils;
- Complete a site groundwater assessment;
- Report on progress with site paving and controls;
- Update on subsurface conditions on adjacent property; and,
- Update the CSM and CAP, if necessary.

5.0 SUMMARY

All activities related to the VIRP implementation to be completed within the second six month period (first 12 months) after entry to the VRP have been completed. A revised milestone schedule is provided in **Table 1**, below.

Table 1.0 Revised Milestone Schedule

Timeline	Date	Activity	Status
-	June 8, 2015	VIRP Application Approved	Complete
Within 45 days of VRP entry	July 21, 2015	Filing of Affidavit with clerk of Superior Court of Gwinnett County pursuant to O.C.G.A. §44-2-20	Complete
Within 30 days of filing affidavit	August 10, 2015	Submittal of copy of receipt of recorded Affidavit to EPD	Complete
Due within first 6 months	December 2015	Provide results of additional horizontal delineation of arsenic in surface soil	Complete
		Update on subsurface conditions on adjacent County Property	
		Submittal of Soil Management Plan	
		Submittal of preliminary paving and site controls plan	
Due within first 12 Months	June 2016	Review RRS for applicable exposure pathways and proposed RRS for the Diamond Crystal Duluth site	Complete
		Report on progress with site paving and controls plan	
		Update on subsurface conditions on adjacent property	
		Adjustments to CSM and CAP, if necessary	
Due within first 18 Months	December 2016	Evaluate overland run-off route and the potential for offsite impacts to surface water/sediment as a result of surface erosion of impacted soils	Pending
		Complete a site groundwater assessment	
		Report on progress with site paving and controls plan	
		Update on subsurface conditions on adjacent property	
		Adjustments to CSM and CAP, if necessary	

Table 1.0 Revised Milestone Schedule (cont.)

Timeline	Date	Activity	Status
Due within first 24 Months	June 2017	Report on progress with site paving and controls	
		Update on subsurface conditions on adjacent properties	
		Adjustments to CSM and CAP, if necessary	
Due within first 30 Months	December 2017	Report on progress with site paving and controls	
		Update on subsurface conditions on adjacent properties	
		Adjustments to CSM and CAP, if necessary	
Due within first 60 Months	June 2020	Report on progress with site paving and controls	
		Submit the final Compliance Status Report certifying completion of the CAP	

6.0 MONTHLY INVOICE SUMMARY

The VRP requires that the professional engineer/geologist specified in the VIRP application oversee the implementation of the VIRP in accordance with the provisions, purposes, standards and policies of the Georgia Voluntary Remediation Program Act. During the period from December 2015 through May 2016, SynTerra staff invoiced 94.5 hours on this project. A monthly summary of hours invoiced and a description of services provided is shown in **Table 2**, below.

Table 2.0 Summary of Monthly Hours Invoiced

Month	Hours Billed	Description of Activities
December 2015	41	Surface soil summary memo (cont.) Soil Management Plan (cont.) Review groundwater assessments from other properties included in HSI Site No. 10844 (cont.) Preliminary paving and site controls plan (cont.) Compiled 6 Month VRP Progress Report
January 2016	1.5	RRS review
February 2016	0.5	2016 planning
March 2016	2.5	Reviewed EPD correspondence RRS review and calculations
April 2016	10	Review progress reports and assessments from other properties included in HSI Site No. 10844 and adjacent to Diamond Crystal Duluth RRS review and calculations (cont.) Compiled 12 Month VRP Progress Report
May 2016	39	Review progress reports and assessments from other properties included in HSI Site No. 10844 and adjacent to Diamond Crystal Duluth (cont.) RRS review and calculations (cont.) Preliminary paving and site controls plan Compiled 12 Month VRP Progress Report (cont.)

7.0 REFERENCES

CDM Smith. 2015. Voluntary Remediation Program (VRP) 1st Semi-Annual Progress Report for HSI Site Number 10844, North Berkeley Lake Road Site, Gwinnett County Fire Station No. 19. March 17, 2015, <Technical Memorandum for the Relative Bioavailability (RBA) "Risk Reduction Standards (RRS)" dated March 17, 2015>

Georgia EPD. 2014. Release Notification Call-In, Ryerson Corporation, Tax Parcel ID#:R6267 025, North Berkeley Lake Road Site, HSI #10844, 4075 Blue Ridge Industrial Parkway, Duluth, Gwinnett County, GA. April 23, 2014.

Georgia EPD. 2015. Comment Letter on 1st Semi-Annual Progress Report, Gwinnett County Fire Station No. 19, North Berkley Lake Road Site, HSI Site No. 10844, Tax Parcel ID #6-267-028, 3275 North Berkeley Lake Road, Duluth, Gwinnett County, GA. May 1, 2015.

Georgia EPD. 2016. Response to Release Notification Call-In Letter, OSC Norcross / Ryerson, 4075 Blue Ridge Industrial Parkway, Norcross, Gwinnett County. February 1, 2016.

Georgia EPD. 2016. Comments: Semi-Annual VRP Progress Report, Diamond Crystal Duluth Property, North Berkeley Lake Road Site, Duluth, Gwinnett County, HSI # 10844. March 18, 2016.

Georgia EPD. 2016. Comparison of Existing Risk Reduction Standards. https://epd.georgia.gov/comparison-existing-contamination-risk-reduction-standards-391-3-19-07. Accessed May 2016.

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APPENDIX A

RISK REDUCTION STANDARD CALCULATIONS

Table A-1
Type 4 Risk Reduction Standard Calculation - Industrial Worker
Diamond Crystal Duluth, LLC
Duluth, Georgia

Constituent	Target Risk (TR)	Inhalation Slope Factor (Sfi)[1] (mg/kg-day)	Inhalation Unit Risk (IUR)[1] (ug/m^3)	Oral Slope Factor (Sfo)[1] (mg/kg-day)	Oral Slope Factor (Sfo)[1] Adjusted for RBA[6] (mg/kg-day)	Csoil-carc (mg/kg)	Target Hazard (THI)	Oral Reference Dose (RFD$_o$)[1] (mg/kg-day)	Oral Reference Dose (RFD$_o$)[1] Adjusted for RBA[6] (mg/kg-day)	Reference Concentration (RFC$_i$)	Reference Dose Inhalation (RFD$_i$)[1] (mg/kg-day)	Csoil-NC (mg/kg)
Arsenic	1.00E-05	1.50E+01	4.30E-03	1.50E+00	9.00E-01	762	1	3.00E-04	5.00E-04	1.50E-05	4.29E-06	12,142

Variable	Value	Units	Source
C_{soil} – Concentration in soil	calculated RRS	mg/kg	
THI – Target Hazard Index	1	unitless	HSRA Rules[1]
TR– Target Excess Risk	1.00E-05	unitless	HSRA Rules[1]
BW – Body Weight	70	kg	EPA 2011[2]
ED – Exposure Duration	25	years	EPA 2002[3]
AT – Averaging Time (noncarcinogenic)	9125	days	HSRA Rules[1]
AT – Averaging Time (carcinogenic)	25550	days	HSRA Rules[1]
EF – Exposure Frequency	250	days/year	EPA 2002[3]
ET- Exposure Time Conversion Factor (2 hours/24 hours)	0.0833	unitless	Professional Judgment / EPD[5]
IRs – Ingestion rate of soil	50	mg/day	EPA 2002[3]
IRa – Ingestion rate of air	20	m^3/day	HSRA Rules[1]
RfDi – Inhalation reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
RfDo – Oral reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
IUR – Inhalation unit risk	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFi – Inhalation cancer slope factor	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFo – Oral cancer slope factor	chemical-specific	(mg/kg-day)$^{-1}$	USEPA RSL 2016[4]
PEF – Particulate Emission Factor	4.63E+09	m^3/kg	HSRA Rules[1]

Carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(TR)(BW)(AT)}{(ET)(EF)(ED)[(SFo)(10\text{-}6\ kg/mg)(IRs) + (SFi)(IRa)(1/PEF)]}$$

Non-carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(THI)(BW)(AT)}{(ET)(EF)(ED)[(1/RfDo)(10\text{-}6\ kg/mg)(IRs) + (1/RfDi)(IRa)(1/PEF)]}$$

Prepared by: HHS
Checked by: RLP

Notes:

[1] = Information derived from Hazardous Site Response Act Rules (391-3-19-.07).

[2] = Exposure Factors Handbook, U.S. Environmental Protection Agency (2011).

[3] = Information derived from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002).

[4] = Information derived from Regional Screening Levels May (EPA 2016).

[5] = An exposure time (hours) is acccounted by use of a conversion factor based on professional judgment and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

[6] = The oral slope factor and oral reference dose are adjusted for relative bioavailability (RBA) of arsenic in soil (60 percent) based on *Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil* (USEPA, 2012) and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

Exposure duration default of 25 years likely results in an overestimate potential risk based on employee retention at the facility.

= Yellow shading indicates selected site-specific RRS which is the more stringent of the calculated site-specific carcinogenic and noncarcinogenic RRS.

Table A-2
Type 4 Risk Reduction Standard Calculation - Maintenance Worker
Diamond Crystal Duluth, LLC
Duluth, Georgia

Constituent	Target Risk (TR)	Inhalation Slope Factor (Sfi)[1] (mg/kg-day)	Inhalation Unit Risk (IUR)[1] (ug/m^3)	Oral Slope Factor (Sfo)[1] (mg/kg-day)	Oral Slope Factor (Sfo)[1] Adjusted for RBA[6] (mg/kg-day)	Csoil-carc (mg/kg)	Target Hazard (THI)	Oral Reference Dose (RFD_o)[1] (mg/kg-day)	Oral Reference Dose (RFD_o)[1] Adjusted for RBA[6] (mg/kg-day)	Reference Concentration (RFC_i)	Reference Dose Inhalation (RFD_i)[1] (mg/kg-day)	Csoil-NC (mg/kg)
Arsenic	1.00E-05	1.50E+01	4.30E-03	1.50E+00	9.00E-01	3,053	1	3.00E-04	5.00E-04	1.50E-05	4.29E-06	29,187

Variable	Value	Units	Source
C_{soil} – Concentration in soil	calculated RRS	mg/kg	
THI – Target Hazard Index	1	unitless	HSRA Rules[1]
TR– Target Excess Risk	1.00E-05	unitless	HSRA Rules[1]
BW – Body Weight	70	kg	EPA 2011[2]
ED – Exposure Duration	15	years	Professional Judgment
AT – Averaging Time (noncarcinogenic)	5475	days	HSRA Rules[1]
AT – Averaging Time (carcinogenic)	25550	days	HSRA Rules[1]
EF – Exposure Frequency	52	days/year	Professional Judgment
ET- Exposure Time Conversion Factor (4 hours/24 hours)	0.167	unitless	Professional Judgment / EPD[5]
IRs – Ingestion rate of soil	50	mg/day	EPA 2002[3]
IRa – Ingestion rate of air	20	m^3/day	HSRA Rules[1]
RfDi – Inhalation reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
RfDo – Oral reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
IUR – Inhalation unit risk	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFi – Inhalation cancer slope factor	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFo – Oral cancer slope factor	chemical-specific	(mg/kg-day)$^{-1}$	USEPA RSL 2016[4]
PEF – Particulate Emission Factor	4.63E+09	m^3/kg	HSRA Rules[1]

Carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(TR)(BW)(AT)}{(EF)(ED)[(SFo)(10\text{-}6\ kg/mg)(IRs) + (SFi)(IRa)(1/PEF)]}$$

Non-carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(THI)(BW)(AT)}{(EF)(ED)[(1/RfDo)(10\text{-}6\ kg/mg)(IRs) + (1/RfDi)(IRa)(1/PEF)]}$$

Prepared by: HHS
Checked by: RLP

Notes:

[1] = Information derived from Hazardous Site Response Act Rules (391-3-19-.07).

[2] = Exposure Factors Handbook, U.S. Environmental Protection Agency (2011).

[3] = Information derived from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002).

[4] = Information derived from Regional Screening Levels May (EPA 2016).

[5] = An exposure time (hours) is acccounted by use of a conversion factor based on professional judgment and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

[6] = The oral slope factor and oral reference dose are adjusted for relative bioavailability (RBA) of arsenic in soil (60 percent) based on *Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil* (USEPA, 2012) and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

Exposure duration of 15 years considered at the high end (conservative) range for this type of activity. Exposure time of 4 hours is an overestimate based on communications with site management.

= Yellow shading indicates selected site-specific RRS which is the more stringent of the calculated site-specific carcinogenic and noncarcinogenic RRS.

Table A-3
Type 4 Risk Reduction Standard Calculation - Construction Worker
Diamond Crystal Duluth, LLC
Duluth, Georgia

Constituent	Target Risk (TR)	Inhalation Slope Factor (Sfi)[1] (mg/kg-day)	Inhalation Unit Risk (IUR)[1] (ug/m^3)	Oral Slope Factor (Sfo)[1] (mg/kg-day)	Oral Slope Factor (Sfo)[1] Adjusted for RBA[5] (mg/kg-day)	Csoil-carc (mg/kg)	Target Hazard (THI)	Oral Reference Dose (RFD$_o$)[1] (mg/kg-day)	Oral Reference Dose (RFD$_o$)[1] Adjusted for RBA[5] (mg/kg-day)	Reference Concentration (RFC$_i$)	Reference Dose Inhalation (RFD$_i$)[1] (mg/kg-day)	Csoil-NC (mg/kg)
Arsenic	1.00E-05	1.50E+01	4.30E-03	1.50E+00	9.00E-01	502	1	3.00E-04	5.00E-04	1.50E-05	4.29E-06	322

Variable	Value	Units	Source
C_{soil} – Concentration in soil	calculated RRS	mg/kg	
THI – Target Hazard Index	1	unitless	HSRA Rules[1]
TR– Target Excess Risk	1.00E-05	unitless	HSRA Rules[1]
BW – Body Weight	70	kg	EPA 2011[2]
ED – Exposure Duration	1	years	EPA 2002[3]
AT – Averaging Time (noncarcinogenic)	365	days	HSRA Rules[1]
AT – Averaging Time (carcinogenic)	25550	days	HSRA Rules[1]
EF – Exposure Frequency	120	days/year	Professional Judgement
IRs – Ingestion rate of soil	330	mg/day	EPA 2002[3]
IRa – Ingestion rate of air	20	m^3/day	HSRA Rules[1]
RfDi – Inhalation reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
RfDo – Oral reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
IUR – Inhalation unit risk	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFi – Inhalation cancer slope factor	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFo – Oral cancer slope factor	chemical-specific	(mg/kg-day)$^{-1}$	USEPA RSL 2016[4]
PEF – Particulate Emission Factor	4.63E+09	m^3/kg	HSRA Rules[1]

Carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(TR)(BW)(AT)}{(EF)(ED)[(SFo)(10\text{-}6\ kg/mg)(IRs) + (SFi)(IRa)(1/PEF)]}$$

Non-carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(THI)(BW)(AT)}{(EF)(ED)[(1/RfDo)(10\text{-}6\ kg/mg)(IRs) + (1/RfDi)(IRa)(1/PEF)]}$$

Prepared by: HHS
Checked by: RLP

Notes:

[1] = Information derived from Hazardous Site Response Act Rules (391-3-19-.07).

[2] = Exposure Factors Handbook, U.S. Environmental Protection Agency (2011).

[3] = Information derived from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002).

[4] = Information derived from Regional Screening Levels May (EPA 2016).

[5] = The oral slope factor and oral reference dose are adjusted for relative bioavailability (RBA) of arsenic in soil (60 percent) based on *Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil* (USEPA, 2012) and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

= Yellow shading indicates selected site-specific RRS which is the more stringent of the calculated site-specific carcinogenic and noncarcinogenic RRS.

Table A-4
Type 4 Risk Reduction Standard Calculation - Adolescent Trespasser
Diamond Crystal Duluth, LLC
Duluth, Georgia

Constituent	Target Risk (TR)	Inhalation Slope Factor (Sfi)[1] (mg/kg-day)	Inhalation Unit Risk (IUR)[1] (ug/m^3)	Oral Slope Factor (Sfo)[1] (mg/kg-day)	Oral Slope Factor (Sfo)[1] Adjusted for RBA[6] (mg/kg-day)	Csoil-carc (mg/kg)	Target Hazard (THI)	Oral Reference Dose (RFD$_o$)[1] (mg/kg-day)	Oral Reference Dose (RFD$_o$)[1] Adjusted for RBA[6] (mg/kg-day)	Reference Concentration (RFC$_i$)	Reference Dose Inhalation (RFD$_i$)[1] (mg/kg-day)	Csoil-NC (mg/kg)
Arsenic	1.00E-05	1.50E+01	4.30E-03	1.50E+00	9.00E-01	1,532	1	3.00E-04	5.00E-04	1.50E-05	4.29E-06	9,806

Variable	Value	Units	Source
C_{soil} – Concentration in soil	calculated RRS	mg/kg	
THI – Target Hazard Index	1	unitless	HSRA Rules[1]
TR– Target Excess Risk	1.00E-05	unitless	HSRA Rules[1]
BW – Body Weight	45	kg	EPA 2011[2]
ED – Exposure Duration	10	years	EPA 2011[2]
AT – Averaging Time (noncarcinogenic)	3650	days	HSRA Rules[1]
AT – Averaging Time (carcinogenic)	25550	days	HSRA Rules[1]
EF – Exposure Frequency	100	days/year	Professional Judgment / EPD[5]
ET - Exposure Time (2 hours/24 hours)	0.083333333	UNITLESS	Professional Judgment / EPD[5]
IRs – Ingestion rate of soil	100	mg/day	Professional Judgment / EPD[5]
IRa – Ingestion rate of air	20	m^3/day	HSRA Rules[1]
RfDi – Inhalation reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
RfDo – Oral reference dose	chemical-specific	mg/kg-day	USEPA RSL 2016[4]
IUR – Inhalation unit risk	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFi – Inhalation cancer slope factor	chemical-specific	(ug/m^3)$^{-1}$	USEPA RSL 2016[4]
SFo – Oral cancer slope factor	chemical-specific	(mg/kg-day)$^{-1}$	USEPA RSL 2016[4]
PEF – Particulate Emission Factor	4.63E+09	m^3/kg	HSRA Rules[1]

Carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(TR)(BW)(AT)}{(EF)(ED)[(SFo)(10\text{-}6\ kg/mg)(IRs) + (SFi)(IRa)(1/PEF)]}$$

Non-carcinogenic RRS Equation

$$C\ (mg/kg) = \frac{(THI)(BW)(AT)}{(EF)(ED)[(1/RfDo)(10\text{-}6\ kg/mg)(IRs) + (1/RfDi)(IRa)(1/PEF)]}$$

Prepared by: HHS
Checked by: RLP

Notes:

[1] = Information derived from Hazardous Site Response Act Rules (391-3-19-.07).

[2] = Exposure Factors Handbook, U.S. Environmental Protection Agency (2011).

[3] = Information derived from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002).

[4] = Information derived from Regional Screening Levels May (EPA 2016).

[5] = An exposure time (hours) is acccounted by use of a conversion factor based on professional judgment and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

[6] = The oral slope factor and oral reference dose are adjusted for relative bioavailability (RBA) of arsenic in soil (60 percent) based on *Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil* (USEPA, 2012) and EPD recommendations in a May 1, 2015 comment letter regarding the Gwinnett County Fire Station No. 19, HSI Site No. 10844.

= Yellow shading indicates selected site-specific RRS which is the more stringent of the calculated site-specific carcinogenic and noncarcinogenic RRS.

Table A-5
Summary of Proposed RRS Values for Arsenic in Soil by Receptor Scenario
Diamond Crystal Duluth, LLC
Duluth, Georgia

Potential Receptor	Site-Specific RRS[1] (mg/kg)	Basis
Industrial Worker	762	Type 4 calculated[2]
Maintenance Worker	3,053	Type 4 calculated[2]
Construction Worker	322	Type 4 calculated[2]
Adolescent Trespasser	1,532	Type 4 calculated[2]

Prepared by: HHS
Checked by: RLP

Notes:

[1] = Site-specific RRS is the more stringent of the calculated site-specific carcinogenic and noncarcinogenic RRS (as determined in Tables A-1 through A4).

[2] = Type 4 refers to a non-residential site-specific exposure scenario using site-specific assumptions.

APPENDIX B

PRELIMINARY PAVING AND SITE CONTROLS PLAN

PARCEL 6267-028
GWINNETT COUNTY

Landscape area capped with concrete (provides additional parking)

N 59°05'30"E 566.06'

GRAVEL

ASPHALT

ENTER

SLUDGE TANK

PRETREATMENT

TRASH COMPACTOR

SHIPPING & RECEIVING

LIFT STATION

PROPANE STORAGE

Landscape area capped with concrete

Landscape area capped with concrete (provides additional parking)

NORTH BERKELEY ROAD, 100' R/W

S 30°18'48"E 365.97'

EMPLOYEE PARKING

ASPHALT

ENTER

ST

N 30°27'45"W 362.34'

GRAVEL

DIAMOND CRYSTAL BRANDS
DULUTH PLANT

1 STORY BRICK BUILDING
85,320 SQUARE FOOT
HEIGHT 25'

PARCEL 6267-050
DIAMOND CRYSTAL BRANDS

ST

METAL STORAGE

COMPRESSOR AREA

TRANSFORMER

ASPHALT

CONTAINMENT WALL

CONTAINMENT WALL

ENTER

ST

S 59°27'45"W 565.09'

PARCEL 6267-025
OSC NORCROSS LLC

PARCEL 6267-031
SUZANNA'S KITCHEN

PARCEL 6267-026
GWINNETT REGIONAL DISTRIBUTION CENTER

LEGEND

PARCEL 6267-028
GWINNETT COUNTY

GWINNETT COUNTY TAX PARCEL NUMBER
PROPERTY OWNER NAME

AREA BEING CONSIDERED FOR ADDITIONAL PAVING OR CAPPING

-Map is referenced to Georgia State Plane Coordinate System NAD83
-Tax Parcel Numbers and Property Owner Name downloaded from Gwinnett County GIS website
-SPCC Site Plan (Sheet No. N10101) furnished to SynTerra by Diamond Crystal Brands

GRAPHIC SCALE
25 0 25 50
IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. COLEMAN DATE: 12/09/2014
PROJECT MANAGER: M. MUDGE
LAYOUT: FIG 2 (SITE LAYOUT)

11/25/2015 10:37 AM P:\Hormel .918\05.Diamond Crystal Brands\03.VRP Application\Soil Management Plan\DIAMOND BRAND SOIL MANAGEMENT PLAN.dwg

FIGURE 1
SITE PAVING AND CONTROLS PLAN
DIAMOND CRYSTAL DULUTH
3245 NORTH BERKELY LAKE ROAD
DULUTH, GEORGIA