

ATTACHMENT 13
SPLP CALCULATIONS



State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
*Division of Enforcement, Technical and Financial Support
Bureau of Environmental Evaluation and Risk Assessment
P.O. Box 420, Mail Code 401-05W
Trenton, NJ 08625-0420
Phone: (609) 633-7413
Fax: (609) 633-1454*

BOB MARTIN
Commissioner

MEMORANDUM

TO: *David Doyle, Office of the Assistant Commissioner*

FROM: *Diane Groth, Research Scientist, BEERA/ETRA*

SUBJECT: *Hudson County Chrome Site 63: Alternative Soil Remediation Standard for Vanadium
PI# G000008691*

DATE: *May 11, 2017*

As requested, ETRA has evaluated an Alternative or New Soil Remediation Standard (ARS) Application Form (dated April 21, 2017) submitted to the Department for the above Hudson County Chrome Site 63 at 1 Burma Road, Jersey City, New Jersey. An alternative ingestion-dermal residential soil standard for vanadium that required Departmental pre-approval was requested for the above property. The concentration of vanadium detected onsite ranged up to 87.6 mg/kg, which exceeds the current vanadium residential soil standard (78 mg/kg). The submittal requested that an ARS for vanadium is appropriate based on toxicity information found in EPA's *Integrated Risk Information System (IRIS)* and recorded in EPA's *Regional Screening Level (RSL) Tables (May 2016)*. The submittal was reviewed and an ARS for vanadium of 390 mg/kg for residential use is approved on a site-specific basis using DEP standard exposure assumptions.

If you have questions on the above, please contact Diane Groth at (609) 984-9782.

C: Kevin Schick, BEERA

Leavey, Crystal L.

From: Amin, Prabal <Prabal.Amin@WestonSolutions.com>
Sent: Tuesday, May 16, 2017 5:32 PM
To: Leavey, Crystal L.
Cc: David Doyle (David.Doyle@dep.nj.gov)
Subject: RE: PPG Site 63 - Alternative Remediation Standard Application Form

Crystal,

Weston evaluated the ARS application package for nickel and informed the NJDEP that it is acceptable and in accordance with NJDEP guidance. We understand that Dave Doyle will be reaching out to you shortly regarding the vanadium.

Thanks.

Prabal

Prabal N. Amin, P.E., LSRP
Weston Solutions, Inc.
205 Campus Drive
Edison, NJ 08837

prabal.amin@westonsolutions.com

Office: 732-417-5857

Cell: 609-240-5289

Fax: 732-417-5801

From: Leavey, Crystal L. [mailto:crystal.leavey@cbi.com]
Sent: Monday, May 15, 2017 4:57 PM
To: Amin, Prabal <Prabal.Amin@WestonSolutions.com>
Cc: David Doyle (David.Doyle@dep.nj.gov) <David.Doyle@dep.nj.gov>
Subject: PPG Site 63 - Alternative Remediation Standard Application Form

Prabal,

Following up on the request I had this afternoon on the call regarding the ARS approvals for Site 63, Dave called me a little while ago. He asked that I forward the ARS package for nickel to you for input. The attached has both vanadium and nickel.

Dave can fill you in tomorrow on what we're trying to achieve, since SPLP ARS don't require Department pre-approvals for use. I'll call you in the morning as a reminder.

Thanks,

Crystal



Crystal L. Leavey, LSRP
Project Manager II
Capital Services
Facilities & Plant Services
Tel: +1 609 588 6154
Cell: +1 609 680 4982
Fax: +1 609 588 6300
crystal.leavey@cbi.com

CB&I
200 Horizon Center Blvd.
Trenton, NJ 08691
USA
www.CBI.com



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NJDEP SPLP Spreadsheet, V3.1, November 2013

Case name/area of concern: Hudson County Chrome Site 63
 Case number: G000008691
 Sampling date: 10/4/2013

Contaminant: Nickel (total)
 CAS No: 7440-02-0
 Water solubility (mg/L): NA
 Aqueous reporting limit (µg/L): 4.00E+00
 Soil reporting limit (mg/kg): 4.00E+00
 Health-based GWQC (µg/L): 1.00E+02
 DAF (20, or site-specific if approved): 20
 Leachate Criterion (µg/L): 2.00E+03
 Henry's law constant (dimensionless): 0.00E+00

NOTE:

USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples
 Do not enter samples with soil concentrations at or below the reporting limit
 When leachate concentration is non-detect, enter the aqueous reporting limit
 Enter site-specific dilution-attenuation factor (DAF) if desired

Data entry cells (do not skip rows)
 Optional data entry
 Calculated or locked cells
 Indicates that Alternative Remediation Standard needs to be recalculated

| Sample ID | Soil sample weight (kg) | Leachate Volume (L) | Total Soil Concentration (mg/kg) | SPLP Leachate Concentration (µg/L) | Final pH of Leachate (except VOCs) | Optional data | | Kd (L/kg) | % Contaminant in Leachate | Field leachate concentration (µg/L) | Pass or fail? |
|-----------------|-------------------------|---------------------|----------------------------------|------------------------------------|------------------------------------|---------------------|-----------|-----------|---------------------------|-------------------------------------|---------------|
| | | | | | | Sampling Depth (ft) | Soil Type | | | | |
| B013R 0.0'-0.5' | 0.0811 | 2.008 | 205 | 10 | 7.87 | | | 20475.2 | 0.12 | 10.01 | PASS |
| C013R 0.0'-0.5' | 0.081 | 2 | 162 | 10 | 8.13 | | | 16175.3 | 0.15 | 10.02 | PASS |
| C005R 2.5'-3.0' | 0.0748 | 2.004 | 193 | 17.8 | 10.67 | | | 10815.9 | 0.25 | 17.84 | PASS |

SPLP RESULTS for

OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 205 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
 EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value

Kd ratio = 1.89, AVERAGING Kds OK
 Kd USED FOR CALCULATING STANDARD = 15822.15 L/kg
 result before rounding = 31644.6095 mg/kg
 REMEDIATION STANDARD = 200 mg/kg (controlled by maximum soil concentration)

OPTION 3: Remediation standard using linear regression

Number of points = 3
 Soil concentration midrange = 183.5
 Number of points above midrange = 2
 Enough points above midrange? YES
 R-Square high enough? NO
 Leachate criterion within range of leachate concentrations? NO
 OPTION 3 NOT VALID

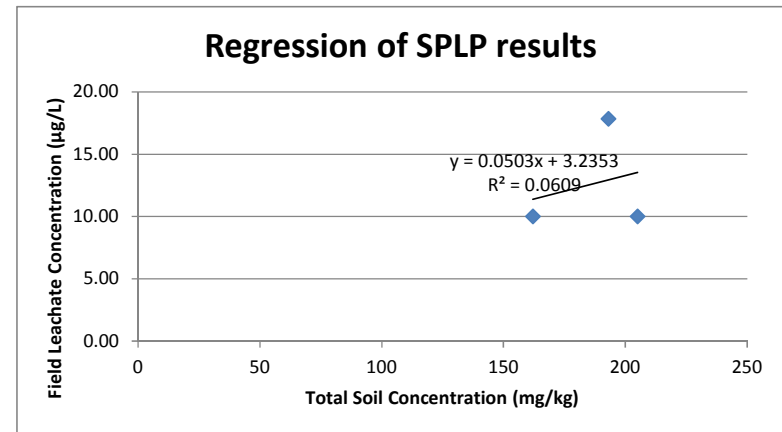


Table 1
Soil Leachate Procedure Analytical Summary Table
Site 63-65, Jersey City, NJ

| Sample Location: | | RDC | Non-RES | SCC (Cr) | IGW | B005R | B011R | F010R | F010R - DUP | B013R | C005R | C013R | |
|---------------------------|-------|-------|---------|----------|-------|-------------------|-----------------|-----------------|-------------|-----------------|-----------------|-----------------|-----------|
| Sample Depth (ft bgs): | | | | | | 1.3'-1.8' | 0.5'-1.0' | 0.0'-0.5' | 0.0'-0.5' | 0.0'-0.5' | 0.0'-0.5' | 2.5'-3.0' | 0.0'-0.5' |
| Client Sample ID: | | | | | | B005R 1.3'-1.8' | B011R 0.5'-1.0' | F010R 0.0'-0.5' | DUP | B013R 0.0'-0.5' | C005R 2.5'-3.0' | C013R 0.0'-0.5' | |
| Lab Sample ID: | | | | | | JB49550-5 | JB49550-4 | JB49550-3 | JB49550-7 | JB49550-1 | JB49550-6 | JB49550-2 | |
| Date Sampled: | | | | | | 10/4/2013 | 10/4/2013 | 10/4/2013 | 10/4/2013 | 10/4/2013 | 10/4/2013 | 10/4/2013 | |
| Matrix: | | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | | | |
| Metals Analysis | | | | | | | | | | | | | |
| Antimony | mg/kg | 31 | 450 | N/A | 6 | 10.2 ^a | <2.4 | <2.3 | 2.2 | - | - | - | |
| Nickel | mg/kg | 1,600 | 23,000 | N/A | 205** | - | - | - | - | 205 | 193 | 162 | |
| General Chemistry | | | | | | | | | | | | | |
| pH, SPLP Leachate | su | --- | --- | --- | --- | 10.07 | 8.24 | 8.61 | 8.61 | 7.87 | 10.67 | 8.13 | |
| Volume, SPLP Leachate | l | --- | --- | --- | --- | 2 | 2.002 | 2 | 2.01 | 2.008 | 2.004 | 2 | |
| Weight, SPLP Leachate | kg | --- | --- | --- | --- | 0.1 | 0.1001 | 0.1 | 0.1005 | 0.1004 | 0.1002 | 0.1 | |
| Dry Weight, SPLP Leachate | kg | --- | --- | --- | --- | 0.0813 | 0.0862 | 0.0912 | 0.0929 | 0.0811 | 0.0748 | 0.081 | |
| Solids, Percent | % | --- | --- | --- | --- | 81.3 | 86.1 | 91.2 | 92.4 | 80.8 | 74.7 | 81 | |
| SPLP Analysis | | | | | | | | | | | | | |
| Antimony | ug/L | --- | --- | --- | --- | <50 | <50 | <50 | <50 | - | - | - | |
| Nickel | ug/L | --- | --- | --- | --- | - | - | - | - | <10 | 17.8 | <10 | |

Footnotes:

^a Elevated detection limit due to dilution required for high interfering element.



**New Jersey Department of Environmental Protection
Site Remediation Program**

**ALTERNATIVE OR NEW REMEDIATION STANDARD
AND/OR SCREENING LEVEL APPLICATION FORM**

Date Stamp
(For Department use only)

NOTE: This form shall be completed for all contaminants for which a direct contact exposure pathway alternative or new remediation standard, alternative impact to ground water soil remediation standard, alternative vapor intrusion screening level, ecological risk-based remediation goal, and/or ecological risk management decision goal is being implemented and/or requested for a site or area of concern. The form shall be used regardless of whether Department pre-approval is required.

SECTION A. SITE NAME AND LOCATION

Site Name: Hudson County Chrome Site 63

List all AKAs: _____

Street Address: 1 Burma Road

Municipality: Jersey City (Township, Borough or City)

County: Hudson Zip Code: _____

Program Interest (PI) Number(s): G000008691

Case Tracking Number(s): _____

SECTION B. REMEDIATION STANDARD NOTIFICATION SPREADSHEET

Complete and attach the Remediation Standard Notification Spreadsheet which can be found at: <http://www.nj.gov/dep/srp/srra/forms/>. This form will not be processed by the NJDEP if the spreadsheet is not attached.

SECTION C. PURPOSE FOR SUBMISSION

Pre-Approval Required:

- Ingestion/Dermal Alternative Soil Remediation Standard
- Inhalation Alternative Soil Remediation Standard
(New Toxicity Data, New Modeling, etc.)
- Development of New Remediation Standard
- Ecological Risk Based Remediation Goal
- Ecological Risk Management Decision Goal

No Pre-Approval Required:

- Inhalation Alternative Soil Remediation Standard
(Calculation Spreadsheet)
- Impact to Groundwater Alternative Soil Remediation Standard
- Vapor Intrusion Alternative Screening Level
- Development of New Vapor Intrusion Screening Level

SECTION D. PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: PPG

Representative First Name: Mark Representative Last Name: Terril

Title: Corporate Director, Environmental Affairs

Phone Number: (724) 325-5060 Ext: _____ Fax: _____

Mailing Address: 440 College Park Drive

City/Town: Monroeville State: PA Zip Code: 15164

Email Address: terril@ppg.com

This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature: *Mark E Terril* Date: April 21, 2017

Name/Title: Mark E. Terril/Corporate Director No changes to contact information since last submittal

SECTION E. LICENSED SITE REMEDIATION PROFESSIONAL INFORMATION AND STATEMENT

LSRP ID Number: _____
First Name: _____ Last Name: _____
Phone Number: _____ Ext: _____ Fax: _____
Mailing Address: _____
City/Town: _____ State: _____ Zip Code: _____
Email Address: _____

This statement shall be signed by the LSRP who is submitting this notification in accordance with N.J.S.A. 58:10C-14, and N.J.S.A. 58:10B-1.3b(1) and (2).

I certify that I am a Licensed Site Remediation Professional authorized pursuant to N.J.S.A. 58:10C to conduct business in New Jersey. As the Licensed Site Remediation Professional of record for this remediation, I:

[SELECT ONE OR BOTH OF THE FOLLOWING AS APPLICABLE]:

- directly oversaw and supervised all of the referenced remediation, and/or*
- personally reviewed and accepted all of the referenced remediation presented herein.*

I believe that the information contained herein, and including all attached documents, is true, accurate and complete.

It is my independent professional judgment and opinion that the remediation conducted at this site, as reflected in this submission to the Department, conforms to, and is consistent with, the remediation requirements in N.J.S.A. 58:10C-14.

My conduct and decisions in this matter were made upon the exercise of reasonable care and diligence, and by applying the knowledge and skill ordinarily exercised by licensed site remediation professionals practicing in good standing, in accordance with N.J.S.A. 58:10C-16, in the State of New Jersey at the time I performed these professional services.

I am aware pursuant to N.J.S.A. 58:10C-17 that for purposely, knowingly or recklessly submitting false statement, representation or certification in any document or information submitted to the board or Department, etc., that there are significant civil, administrative and criminal penalties, including license revocation or suspension, fines and being punished by imprisonment for conviction of a crime of the third degree.

LSRP Signature: _____ Date: _____
LSRP Name/Title: _____
Company Name: _____

Completed forms should be sent to:

Bureau of Case Assignment & Initial Notice
Site Remediation Program
NJ Department of Environmental Protection
401-05H
PO Box 420
Trenton, NJ 08625-0420



New Jersey Department of Environmental Protection
Site Remediation Program

Instructions

Clear Form

REMEDATION STANDARD NOTIFICATION SPREADSHEET

Site Name: Hudson County Chrome Site 63

Program Interest Number: G000008691

ALTERNATIVE STANDARDS OR SCREENING LEVELS REQUESTED/IMPLEMENTED

| Chemical Name | CAS | Concentration Range on Site (include units) | ARS / Screening Level | Scenario | Type of Standard | Default Remediation Standard / Screening level (include units) | Proposed Remediation Standard / Screening level (include units) |
|---------------|-----------|---|-----------------------------------|-------------|------------------|--|---|
| Nickel | 7440-02-0 | 7.8 - 96.3 mg/kg | Impact to Ground Water – SPLP | NA | Alternative | 48 mg/kg | 205 mg/kg |
| Vanadium | 7440-62-2 | 8 - 87.6 mg/kg | Ingestion-Dermal Exposure Pathway | Residential | Alternative | 78 mkg/kg | 390 mg/kg |
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MEMORANDUM

To: Crystal L. Leavey, LSRP
From: Marshall E. King, PE, LSRP
Subject: Alternative Remediation Standard for Nickel and Vanadium
Project: PPG, Site 63/65, 1 Burma Road, Jersey City, Hudson County, New Jersey
PI G000008691
Report Date: March 10, 2017

Site Background

The Site was identified as a Non-Residential Hudson County Chrome (HCC) site by the New Jersey Department of Environmental Protection (NJDEP) and is designated as HCC Site 63 in the July 19, 1990 Administrative Consent Order (ACO) between the NJDEP and PPG. The majority of the Site is currently used for temporary parking of tractor trailers, but had formerly been occupied by a light industrial building that was razed as part of earlier remedial efforts in 1998-1999. Soil investigations completed between 1987 and 2013 documented the presence of chromate chemical production waste (CCPW) or CCPW-impacted materials and analytical exceedances of the NJDEP's Soil Remediation Standards (SRS) and/or the Chromium Soil Cleanup Criteria (CrSCC). The recommended Remedial Action (RA) for soils at the Site included the excavation and removal of visible CCPW and soils with concentrations of Hexavalent Chromium and Total Chromium above the CrSCC and Antimony, Nickel, Thallium, and Vanadium above the SRS or default IGW SSLs.

Site-Specific Impact to Groundwater Soil Remediation Standard (IGWSRS) for Nickel

A site-specific IGWSRS was calculated for nickel using the Synthetic Precipitation Leaching Procedure (SPLP) methodology and the NJDEP's SPLP Spreadsheet (V3.1, November 2013). Three soil samples were collected from the Site on October 4, 2013 and submitted for total nickel analysis and SPLP nickel analysis.

Based on the NJDEP's guidance, the Default Leachate Criterion for Class II Ground Water for nickel is 2,000 micrograms per liter (ug/l). Option 1 of the NJDEP's guidance allows for the determination of a site-specific IGWSRS from a direct comparison of field leachate concentrations against the Default Leachate Criterion. The results of the total and SPLP nickel analyses were entered into the NJDEP SPLP Spreadsheet for the calculation of field leachate concentrations. Calculated field leachate concentrations were observed to be below the Default Leachate Criterion of 2,000 ug/l and ranged from 10 ug/l to 17.8 ug/l. Option 1 allows the highest total contaminant concentration to be used as the site-specific IGWSRS. The highest total nickel concentration was observed in sample B013R 0.0'-0.5'. As a result, the site-specific IGWSRS for nickel is 205 milligrams per kilogram (mg/kg).

Soil samples used for the calculation of a site-specific IGWSRS for nickel, including B013R 0.0'-0.5', were removed during soil excavation activities. Following the completion of RA activities for soil, nickel concentrations remaining on the site range from 7.8 mg/kg to 96.3 mg/kg.

Ingestion/Dermal Alternative Soil Remediation Standard for Vanadium

In correspondence dated July 15, 2016, the NJDEP indicated that a change in the Technical Regulations for Site Remediation (N.J.A.C. 7:26E) that required analysis for metals using the Target Analyte List (TAL) rather than Priority Pollutant (PP) metals, has resulted in the NJDEP receiving a larger data set for vanadium than in the past. Background soil studies conducted in NJ have typically shown vanadium concentrations of 25 mg/kg, and the NJDEP has indicated that recent data sets are indicating a wide range of naturally elevated vanadium with no use or discharges of vanadium at sites within the Site Remediation Program.

Prior to RA activities, vanadium concentrations in soil ranged from non-detect to 718 mg/kg. Following the completion of RA activities for soil, vanadium concentrations remaining on the site range from 8 mg/kg to 87.6 mg/kg.

The USEPA has developed Regional Soil Screening Level of 390 mg/kg for residential exposure for vanadium and compounds (<https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-november-2015>) as listed in the Generic Tables (May 2016 - <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016>) with a target cancer risk (TR) of 1E-06 and a target hazard quotients (THQ) of 1.0. PPG proposes to use 390 mg/kg as the Ingestion Alternative Soil Remediation Standard for vanadium for this site.

NJDEP SPLP Spreadsheet, V3.1, November 2013

| | |
|----------------------------|------------------------------|
| Case name/area of concern: | Hudson County Chrome Site 63 |
| Case number: | G000008691 |
| Sampling date: | 10/4/2013 |

| | |
|---|----------------|
| Contaminant: | Nickel (total) |
| CAS No: | 7440-02-0 |
| Water solubility (mg/L): | NA |
| Aqueous reporting limit (µg/L): | 4.00E+00 |
| Soil reporting limit (mg/kg): | 4.00E+00 |
| Health-based GWQC (µg/L): | 1.00E+02 |
| DAF (20, or site-specific if approved): | 20 |
| Leachate Criterion (µg/L): | 2.00E+03 |
| Henry's law constant (dimensionless): | 0.00E+00 |

NOTE:
USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples
Do not enter samples with soil concentrations at or below the reporting limit
When leachate concentration is non-detect, enter the aqueous reporting limit
Enter site-specific dilution-attenuation factor (DAF) if desired

| |
|--|
| Data entry cells (do not skip rows) |
| Optional data entry |
| Calculated or locked cells |
| Indicates that Alternative Remediation Standard needs to be recalculated |

| Sample ID | Soil sample weight (kg) | Leachate Volume (L) | Total Soil Concentration (mg/kg) | SPLP Leachate Concentration (µg/L) | Final pH of Leachate (except VOCs) | Optional data | | | | Kd (L/kg) | % Contaminant in Leachate | Field leachate concentration (µg/L) | Pass or fail? |
|-----------------|-------------------------|---------------------|----------------------------------|------------------------------------|------------------------------------|---------------------|-----------|------------------------|--------------------|-----------|---------------------------|-------------------------------------|---------------|
| | | | | | | Sampling Depth (ft) | Soil Type | Organic Carbon (mg/kg) | Organic Carbon (%) | | | | |
| B013R 0.0'-0.5' | 0.0811 | 2.008 | 205 | 10 | 7.87 | | | | | 20475.2 | 0.12 | 10.01 | PASS |
| C013R 0.0'-0.5' | 0.081 | 2 | 162 | 10 | 8.13 | | | | | 16175.3 | 0.15 | 10.02 | PASS |
| C005R 2.5'-3.0' | 0.0748 | 2.004 | 193 | 17.8 | 10.67 | | | | | 10815.9 | 0.25 | 17.84 | PASS |

SPLP RESULTS for

OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 205 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
 EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value

Kd ratio = 1.89, AVERAGING Kds OK
 Kd USED FOR CALCULATING STANDARD = 15822.15 L/kg
 result before rounding = 31644.6095 mg/kg
REMEDIATION STANDARD = 200 mg/kg (controlled by maximum soil concentration)

OPTION 3: Remediation standard using linear regression

Number of points = 3
 Soil concentration midrange = 183.5
 Number of points above midrange = 2
 Enough points above midrange? YES
 R-Square high enough? NO
 Leachate criterion within range of leachate concentrations? NO
 OPTION 3 NOT VALID

