REMEDIAL ACTION REPORT

Non-Residential Chromate Chemical Production Waste Site
Former Baldwin Oil Facility, Hudson County Chrome Site 63
1 Burma Road
Jersey City, New Jersey

Program Interest Number: G000008691

Prepared for:
PPG
Pittsburgh, Pennsylvania

Prepared by:
CB&I Environmental and Infrastructure, Inc.
200 Horizon Center
Trenton, New Jersey 08691

Report/Project No. 151136

June 2017

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LIST OF ACRONYMS

AAC	Acceptable Air Concentration
ACO	Administrative Consent Order
AECOM	AECOM Environmental, Inc.
AMP	Air Monitoring Plan
ANS	ANS Consultants, Inc.
AOC	Areas of Concern
AST	Aboveground Storage Tanks
AWT	AWT Environmental Services, Inc.
bgs	below ground surface
CB&I	CB&I Environmental and Infrastructure, Inc.
CCIA	Cumberland County Improvement Authority
CID	Case Inventory Document
CCPW	Chromate Chemical Production Waste
CEA	Classification Exception Area
CEP	Clean Earth Philadelphia
CMAA	Construction Manager as Agent
COPEC	Contaminants of Potential Environmental Concern
COPR	Chromite Ore Processing Residue
CrSCC	Chromium Soil Cleanup Criteria
CCIA	Cumberland County Improvement Authority
EE	Ecological Evaluation
Emilcott	Emilcott Associates, Inc.
Entact	Entact Environmental Services
EPH	Extractable Petroleum Hydrocarbons
ESC	Ecological Screening Criteria
ESNR	Environmentally Sensitive Natural Resources
GPR	Ground Penetrating Radar
GWQS	Ground Water Quality Standard
HASP	Health and Safety Plan
HCC	Hudson County Chrome
HDPE	High Density Polyethylene
HEP SCS	Hudson-Essex-Passaic County Soil Conservation Service
IDW	Investigation Derived Waste
IGW SSL	Impact to Groundwater Soil Screening Level
IRAR	Interim Remedial Action Report
IRM	Interim Remedial Measures
JCSA	Jersey City Sewerage Authority
JCMUA	Jersey City Municipal Utilities Authority
JCO	Judicial Consent Order
LLRW	Low Level Radioactive Waste
mg/kg	milligram per kilogram
NFA	No Further Action
NRC	Nuclear Regulatory Commission
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NJTA	New Jersey Turnpike Authority
NRDC, SRS	Non Residential Direct Contact Soil Remediation Standard
OSHA	Occupation Safety and Health Administration
PADEP	Pennsylvania Department of Environmental Protection
PAHs	polycyclic aromatic hydrocarbons

PAMP	Project Air Monitoring Plan
PI	Program Interest
PID	photoionization detector
PM-10	Particulate Matter less than 10 micrometers in size
PPG	PPG
PPE	Personal Protective Equipment
PSE&G	Public Service Electric and Gas Company
PVC	Polyvinyl Chloride
PVSC	Passaic Valley Sewage Commission
RA	Remedial Action
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan
RDC SRS	Residential Direct Contact Soil Remediation Standard
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
ROW	Right-of-Way
SCC	Soil Cleanup Criteria
Spectra	Spectra Energy Transmission Services
SPLP	Synthetic Precipitation Leaching Procedure
SRP	Site Remediation Program
SPPP	Storm Water Pollution Prevention Plan
SVOC	Semi-Volatile Organic Compounds
TCLP	Toxicity Characteristic Leaching Procedure
Tetra Tech	Tetra Tech, Inc.
Texas Eastern	Texas Eastern Transmission, LP
TPH	Total Petroleum Hydrocarbon
TPI Environmental	TPI Environmental, Inc.
µg/L	Microgram per Liter
µR/hour	MicroRoentgen per hour
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
Weston Solutions	Weston Solutions, Inc.
WTS	Waste Technology Services, Inc.

CASE INVENTORY DOCUMENT (CID)

Case Name: Hudson County Chrome Site 63
PI #: G000008691

IMPORTANT: *1) Do not delete or copy and paste across multiple columns because it can disrupt hidden equations.*
2) If pasting from a Word document, use the Paste option: ***Match Destination Formatting***
3) If the text turns ***red*** *you have exceeded the character limit for that column*

Case Inventory Document Version 1.4 02/23/17

AOC ID	AOC Type	AOC Description	Confirmed Contamination	AOC Status	Status Date	Incident #	DEP AOC Number	Contaminated Media	Contaminants of Concern	Additional Contaminants of Concern	Additional Contaminants of Concern	Applicable Remediation Standard	Exposure Route	Additional Exposure Route	RA Type	Additional RA Type	Additional RA Type	Was an Order of Magnitude Evaluation Conducted?	Activity
AOC 1a to 1u	Storage tank and appurtenance - Above ground storage tank	Three 500-gallon, two 175-gal, nine 12,000-gallon, and 7 "Large" former ASTs	Yes	PA/SI	3/10/2017			Soil	EPH + PAHs	VO		Remediation Standards	Ingestion/Dermal	Ground Water				No	**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. RI - Subsequent waste classification sampling conducted by CB&I in 2013 revealed elevated petroleum hydrocarbons and chlorinated VO contamination. RA - Surficial impacted soil excavated as part of RA for AOC-9. Post-excavation soils not collected/analyzed for petroleum, PAH, or VO constituents.
AOC 2	Storage tank and appurtenance - Rail car	Former Railroad Spur	Undetermined	PA/SI	3/10/2017							Remediation Standards	Ingestion/Dermal	Ground Water				No	**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. RA - Surficial impacted soil excavated as part of RA for AOC-9. Post-excavation soils not collected/analyzed for PAHs, PCBs, and non-CCPW related TAL metals.
AOC 3a	Drainage system and area - Drainage swale and culvert	Western Drainage Ditch	Undetermined	PA/SI	3/10/2017														**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011.
AOC 3b	Drainage system and area - Drainage swale and culvert	Eastern Drainage Ditch	Yes	RAR	3/10/2017			Soil	Metals										PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. April 2014 - May 2015: Excavation of the remainder of the CCPW-related contamination at the site was completed (see AOC 9). This AOC is encompassed by the larger AOC-9.
AOC 4	Drainage system and area - Storm sewer collection system	Catch Basin	Undetermined	RAR	3/10/2017														**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. April 2014 - May 2015: Excavation of the remainder of the CCPW-related contamination at the site was completed (see AOC 9). This AOC is encompassed by the larger AOC-9.
AOC 5	Discharge and disposal area - Historic fill material area/other fill area	Historic Fill	Yes	SI	3/10/2017			Soil	Metals + PAHs			Remediation Standards	Ingestion/Dermal	Ground Water					**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. RI - Subsequent waste classification sampling conducted by CB&I in 2013 revealed elevated metals and PAH contamination. RA - Surficial impacted soil excavated as part of RA for AOC-9. Post-excavation soil samples not collected/analyzed for historic fill related contaminants
AOC 6a to 6b	Other areas of concern - Hazardous substance storage or handling area	Former Interior Hazardous Material Storage Areas and Unidentified Drum	Undetermined	PA/SI	3/10/2017														**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011.
AOC 7a to 7b	Other areas of concern - Discolored area or spill area	Staining in southern and southeastern portions of site	Undetermined	PA/SI	3/10/2017														**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011.
AOC 8	Storage tank and appurtenance - Loading and unloading area	Former Loading Area	Undetermined	PA/SI	3/10/2017														PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. April 2014 - May 2015: Excavation of the remainder of the CCPW-related contamination at the site was completed (see AOC 9). This AOC is encompassed by the larger AOC-9.
AOC 9	Discharge and disposal area - Historic fill material area/other fill area	Soils contaminated with Chromate Chemical Production Waste	Yes	RAR	3/10/2017			Soil	Metals										1987: NJDEP collected soil samples and identified elevated chromium. Interim RA - September 1998 - August 1999: Onsite building demolished, chrome-impacted soils within foundation footprint hauled away. Soil sampling to collect preliminary information for planning the remediation activities. 20 soil borings advanced and 109 analytical samples were collected. Former building footprint covered with IRM consisting of PVC liner and gravel. 2011: Cursory site investigation completed by TRC Environmental with oversight by Tetratech that included the advancement of 9 soil borings, installation/sampling of four temporary well points, and sampling of monitoring wells installed by others. A total of 34 soil samples and 8 groundwater samples were collected. RI 2011: TetraTech advanced 62 soil borings and collected 328 soil samples for analysis. 2012: Additional RI work performed by CB&I. Scope included 7 soil borings and collection and analysis of 36 samples. August/September 2013: Design Boring Investigation as extension of RAWP was performed by CB&I and included 64 soil borings and collection and analysis of 370 soil samples. April to August 2013: Soil excavation began for a natural gas pipeline within the western boundary of the Site by Spectra Energy. Approximately 3,400 tons of soil was transported offsite for disposal. On July 26, 2013, a truckload of the stockpiled soil triggered disposal facility portal monitor radiation detection alarm. The source of the radioactive material was determined to be thorium series radionuclides (Thorium-232 and daughters) located in low level radioactive waste slag. Slag material identified drummed separately for disposal. April 2014 - May 2015: Excavation of the remainder of the CCPW-related contamination at the site was completed including continual monitoring for radioactive material. ±24,360 tons of non-hazardous fill material removed for disposal. ±7,353 tons of hazardous fill material removed for disposal. Soil samples collected indicate that CCPW-impacted soil and fill materials have been removed from the Site. Issuance of a NFA equivalent is appropriate at this time.
AOC 10	Environmental media - Media Ground water	Groundwater contaminated from contact with Chromate Chemical Production Waste	Yes	RI	3/10/2017			Ground Water	Metals										February 2013: Groundwater RIR submitted. 2016: MW-101, MW-102, MW-103 installed in April. Wells sampled in June and July. Groundwater samples were analyzed for hexavalent chromium, total chromium and CCPW-related metals. Vanadium present in MW-101 and MW-103 in excess of the GWQS (70 ug/l). The remaining targeted contaminants were not reported at concentrations in excess of the MDL and/or respective GWQS during either sampling event.
AOC 11	Other areas of concern - Other discharge area	Dumping	No	RAR	3/10/2017			None											**AOC associated with Baldwin Oils & Commodities Company (SRP PI G000002333)** PA/SI - Initial cursory site investigation activities completed by TRC Environmental in 2011. RA - Surficial impacted soil excavated as part of RA for AOC-9. Post-excavation soil samples not collected/analyzed to demonstrate absence of non-CCPW related contamination.

COVER/CERTIFICATION FORM

New Jersey Department of Environmental Protection
Site Remediation Program

COVER/CERTIFICATION FORM

(Submit with Remedial Phase Report, Receptor Evaluation, and CEA Forms)

Date Stamp
(For Department use only)

SECTION A. SITE INFORMATION

Site Name: Hudson County Chrome Site 63

AKAs: Baldwin Oils

Street Address: 1 Burma Road

Municipality: Jersey City (*Township, Borough or City*)

County: Hudson Zip Code: 07035

Program Interest (PI) Number(s): G000008691

Case Tracking Number(s) for this submission:

Date Remediation Initiated Pursuant to N.J.A.C. 7:26C-2: 04/04/2013

State Plane Coordinates for a central location at the site: Easting: 680427.1 Northing: 612405.9

List current Municipal Block and Lot Numbers of the Site:

Block # 21503	Lot #(s) 11	Block # 2154	Lot #(s) 13
Block # 2154	Lot #(s) 18B	Block # 1497	Lot #(s) 3R
Block #	Lot #(s)	Block #	Lot #(s)
Block #	Lot #(s)	Block #	Lot #(s)

SECTION B. SUBMISSION STATUS

1. Indicate how the Electronic Data Deliverable (EDD) for this submission is being provided to the NJDEP:
   - ☒ Via Email at srpedd@dep.state.nj.us (attach NJDEP confirmation email); or
   - ☐ CD (attach to this submission)
   - ☐ Not Applicable – No EDD
2. Complete the following Submission and Permit Status Table:

Remedial Phase Documents	N/A	Included in this Submission	Previously Submitted	Date of Submission	Date of Revised Submission	Date of Previous NJDEP Approval	Date of Document Withdrawal
Preliminary Assessment Report	☒	☐	☐				
Site Investigation Report*	☐	☐	☒	01/11/2000			
Remedial Investigation Report	☐	☐	☒	04/01/2013	08/13/2014	04/11/2013	
Remedial Action Work Plan	☐	☐	☒	06/26/2013	08/01/2013	07/10/2013	
Remedial Action Report	☐	☒	☐	06/28/2017			
Response Action Outcome	☐	☐	☐				
Other Submissions							
Alternative Soil Remediation Standard and/or Screening level Application Form	☐	☐	☒	04/21/2017		05/11/2017	
Case Inventory Document		☒					
Classification Exception Area / Well Restriction Area (CEA/WRA)	☒	☐	☐				
Discharge to Ground Water Permit by Rule Authorization Request	☒	☐	☐				

* Draft Interim Remedial Action Report by IT Corporation dated January 11, 2000 detailing interim remedial measures and soil sampling.

IEC Engineered System Response Action Report	☒	☐	☐				
Immediate Environmental Concern Report	☒	☐	☐				
LNAPL Interim Remedial Measure Report	☒	☐	☐				
Public Notification	☐	☐	☒	08/26/2015			
Receptor Evaluation	☐	☒	☐				
Technical Impracticability Determination	☒	☐	☐				
Vapor Concern Mitigation Report	☒	☐	☐				
Permit Application – list:	☐						
		☐	☐				
		☐	☐				
		☐	☐				
		☐	☐				
Radionuclide Remedial Action Report	☒	☐	☐				
Radionuclide Remedial Action Workplan	☒	☐	☐				
Radionuclide Remedial Investigation Report	☒	☐	☐				
Radionuclide Remedial Investigation Workplan	☒	☐	☐				

SECTION C. SITE USE

Current Site Use: (*check all that apply*)

- ☐ Industrial
- ☐ Residential
- ☐ Commercial
- ☐ School or child care
- ☐ Agricultural
- ☐ Park or recreational use
- ☐ Vacant
- ☐ Government
- ☒ Other: Parking Lot, Underground Pipeline

Intended Future Site Use, if known: (*check all that apply*)

- ☐ Industrial
- ☐ Residential
- ☐ Commercial
- ☐ School or child care
- ☐ Park or recreational use
- ☐ Vacant
- ☐ Government
- ☐ Future site use unknown
- ☒ Other: Parking Lot, Underground Pipeline

SECTION D. CASE TYPE: (*check all that apply*)

- ☒ Administrative Consent Order (ACO)
- ☐ Brownfield Development Area (BDA)
- ☐ Child Care Facility
- ☒ Chrome Site (Chromate chemical production waste)
- ☐ Coal Gas
- ☐ Due Diligence with RAO
- ☐ Hazardous Discharge Remediation Fund (HDSRF) Grant/Loan
- ☐ ISRA
- ☐ Landfill (SRP subject only)
- ☐ Regulated Underground Storage Tank (UST)
- ☐ Remediation Agreement (RA)/Remediation Certification
- ☐ School Development Authority (SDA)
- ☐ School facility
- ☐ Spill Act Defense – Government Entity
- ☐ Spill Act Discharge
- ☐ UST Grant/Loan
- ☐ Other: _____

Federal Case (*check all that apply*)

☐ RCRA GPRA 2020 ☐ CERCLA/NPL ☐ USDOD ☐ USDOE

1. Is the party conducting remediation a government entity? ..... ☐ Yes ☒ No

If "Yes," check one: ☐ Federal ☐ State ☐ Municipal ☐ County

SECTION E. PUBLIC FUNDS

Did the remediation utilize public funds? ..... ☐ Yes ☒ No

If "Yes," check applicable:

- ☐ UST Grant
- ☐ HDSRF Grant
- ☐ Spill Fund
- ☐ UST Loan
- ☐ HDSRF Loan
- ☐ Schools Development Authority
- ☐ Brownfield Reimbursement Program
- ☐ Landfill Reimbursement Program
- ☐ Environmental Infrastructure Trust

SECTION F. 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: (412) 434-2078 Ext: Fax:

Mailing Address: One PPG Place

City/Town: Pittsburgh State: PA Zip Code: 15272

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: June 26, 2017

Name/Title: Mark E. Terril/Corporate Director

For CEA Submissions:

☐ Check this box if the person above is also the property owner of the site or their representative. If this person is not the site property owner, please ensure the site property owner's name and address is in the first line of the table in Section E.2 of the Classification Exception Area / Well Restriction Area (CEA/WRA) Fact Sheet Form.

SECTION G. 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

REMEDIAL ACTION REPORT FORM

New Jersey Department of Environmental Protection
Site Remediation Program

REMEDIAL ACTION REPORT FORM

Date Stamp
(For Department use only)

SECTION A. SITE

Site Name: Hudson County Chrome Site 63

Program Interest (PI) Number(s): G000008691

Case Tracking Number(s) for this submission: _____

This form must be attached to the Cover/Certification Form

SECTION B. SCOPE OF REMEDIAL ACTION REPORT

1. Does the RAR address:
   - ☒ Area(s) of Concern (AOCs) Only
   - ☐ Entire Site (Based on a completed and submitted Preliminary Assessment/Site Investigation)
2. Total number of contaminated AOCs associated with the case: 5
3. Total number of contaminated AOCs addressed in this submission: 3
4. Are there any outstanding contaminated AOCs associated with the case where the remedial action has NOT been performed? ☒ Yes ☐ No
5. Does this RAR address a discharge/release from a federally regulated UST? ☐ Yes ☒ No

When answering the remaining questions on this form consider only the AOCs addressed in this submission.

SECTION C. GENERAL

1. Does this submission include Remedial Action Permit Application(s) that require Site Remediation Program approval? ☐ Yes ☒ No
2. Was a remediation initiated after May 6, 2010, for new construction / change in the use of the site proposed for the purpose of residential use, use as a licensed child care center or use as a school? ☐ Yes ☒ No
   If "Yes," was an unrestricted use or a presumptive remedy implemented? ☐ Yes ☐ No
3. Was an alternative remedy approved by the NJDEP? ☐ Yes ☒ No
   If "Yes," provide the date of the approval: _____
4. Has the remediation varied from the Technical Rules? ☐ Yes ☒ No
   If "Yes." provide the citation(s) from which the remediation has varied and the page(s) in the attached document where the rationale for the variance is provided.
   N.J.A.C. 7:26E- _____ Page _____
   N.J.A.C. 7:26E- _____ Page _____
   N.J.A.C. 7:26E- _____ Page _____
5. Were the laboratory Reporting Limits below applicable remediation standards/screening levels criteria required for the contaminants of concern for the AOCs addressed in this submission? ☒ Yes ☐ No
6. Have past NJDEP-documented deficiencies been addressed in this submission? ☒ Yes ☐ No ☐ N/A
7. Did the remediation deviate from that proposed in the Remedial Action Workplan? ☐ Yes ☒ No
   If "Yes," specify the section/page(s) in the report where the deviation(s) are discussed:
   _____
8. Did the remedial action render the property unusable for future redevelopment or for recreational use (N.J.A.C. 7:26C-6.4(b)? ☐ Yes ☒ No

SECTION D. SITE CONDITIONS

1. At any time, was there any radiological contamination detected at the AOCs addressed in this submission? ☒ Yes ☐ No
2. At any time, did any of the AOCs addressed in this submission contain Ordnance and Explosives/ Unexploded Ordnance (OE/UXO)? ☐ Yes ☒ No
3. Did the remedial action involve containment of free product? ☐ Yes ☒ No
4. Has dioxin been detected at levels above NJDEP's interim direct contact soil screening level of 50 ppt dioxin TEQ (TCDD Toxicity Equivalence Quotient) in any AOCs addressed in this submission? ☐ Yes ☒ No
5. Have any of the following contaminants *ever* been detected in sediment above the ecological screening levels at the AOCs addressed in this submission? ☐ Yes ☒ No

   If "Yes," check all that apply:

   ☐ Arsenic ☐ Dioxin ☐ Mercury ☐ PCBs ☐ Pesticides
6. Is remediation complete in all affected media at the AOCs addressed in this submission? ☐ Yes ☒ No
7. Did contaminants from the AOCs addressed in this submission discharge to surface water? ☐ Yes ☒ No
8. Did contaminants from the AOCs addressed in this submission discharge to an Environmentally Sensitive Natural Resource (ESNR)? ☐ Yes ☒ No
9. Are any of the following conditions currently present for the AOCs addressed in this submission? *(check all that apply):*

Groundwater:

- ☒ Contaminated ground water in the overburden aquifer
- ☐ Contaminated ground water in a confined aquifer
- ☐ Contaminated ground water in the bedrock aquifer
- ☐ Contaminated ground water in multiple aquifer units
- ☐ Multiple distinct ground water plumes
- ☐ Contaminated ground water migrating off-site
- ☐ Natural background ground water contamination
- ☐ Contaminated ground water discharging to surface water or Environmentally Sensitive Natural Resource (ESNR)
- ☐ Residual or free product
- ☐ Radionuclides

Soil:

- ☐ On-site discharge(s) impacting soil off-site
- ☐ Chromate Chemical Production Waste/COPR
- ☐ Munitions and explosives of concern
- ☐ Contaminated soil in the saturated zone
- ☐ Historic pesticide impacts to soil
- ☐ Residual or free product
- ☐ Radionuclides
- ☒ Historic Fill
- ☐ Natural background only above Impact to Ground Water Cleanup Criteria
- ☐ Natural background above Direct Contact Remediation Standards
- ☐ Soil contamination in an ESNR

SECTION E. APPLICABLE REMEDIATION STANDARDS

1. Were Default Remediation Standards used for all contaminants? ☐ Yes ☒ No

   If "Yes," check all that apply:

   ☐ Direct Contact
   ☐ Impact to Ground Water Soil Screening Levels
   ☐ Ecological Screening Levels
2. Has compliance averaging been utilized to determine compliance with the Soil Remediation Standards? ☒ Yes ☐ No

   If "Yes," check all that apply:

	Compliance Averaging Method Utilized			
Pathway	Arithmetic Mean	95 Percent UCL	Spatially Weighted Average	75 Percent/ 10X Procedure
☒ Ingestion-Dermal Pathway	☐	☒	☐	☐
☒ Inhalation Pathway	☐	☒	☐	☐
☒ Impact to Ground Water Pathway	☐	☒	☐	☐

3. Has a compliance option been utilized to determine compliance with the Impact to Ground Water Pathway? (If "Yes," check all that apply) ☒ Yes ☐ No

   ☐ Immobile Compounds
   ☒ Data evaluation for metals and semi-volatiles
   ☐ Data evaluation for volatile organics derived from discharges of petroleum mixtures

4. Was an interim standard used for a contaminant where a standard does not exist? ☐ Yes ☒ No
5. Were Alternate Remediation Standards used for the Ingestion/Dermal Pathway? ☒ Yes ☐ No
6. Were Alternate Remediation Standards used for the Inhalation Pathway? ☐ Yes ☒ No
7. Were Site Specific Standards used for the Impact to Ground Water Pathway? ☒ Yes ☐ No
   If "Yes," check all that apply:

   ☐ Soil-Water Partitioning Equation ☒ SPLP ☐ Sesoil ☐ Sesoil/AT123D
   ☐ DAF Modification

8. Were Site Specific Ecological Remediation Goals used? ☐ Yes ☒ No
9. What is the ground water classification for this site as per N.J.A.C. 7:9C? (check all that apply)

   ☐ Class I-A ☒ Class II-A
   ☐ Class I-PL Pinelands Protection Area ☐ Class III-A
   ☐ Class I-PL Pinelands Preservation Area ☐ Class III-B

SECTION F. ALTERNATIVE AND CLEAN FILL USE

1. Was alternative fill used? ☐ Yes ☒ No
2. Was clean fill used? ☒ Yes ☐ No
3. Was material sent off-site for use as alternative and/or clean fill? ☐ Yes ☒ No
   If "Yes," specify the section/page in the RAR where it states the SRP site receiving this alternative and/or clean fill: _____
4. Was material sent off-site for use as alternative and/or clean fill at a non-SRP site? ☐ Yes ☒ No
   If "Yes," specify the section/page in the RAR where it states the non-SRP site receiving this alternative and/or clean fill: _____
5. Was alternative fill used in excess of the amount required for the remedial action? ☐ Yes ☒ No
   If "Yes," was the NJDEP's preapproval obtained pursuant to N.J.A.C. 7:26E-5.2(b)3? ☐ Yes ☐ No

SECTION G. REMEDIAL ACTION REPORT INFORMATION

Soils

1. Did the remedy include a remedial action for soils? ☒ Yes ☐ No
   If "No," skip to **Ground Water**
2. Is a restricted use required? ☐ Yes ☒ No
   If "Yes," indicate the type of restriction being implemented. _____
3. If applicable, has consent from all involved property owners been obtained (i.e., for institutional or engineering controls)? ☐ Yes ☐ No
4. Was an engineering control required? ☐ Yes ☒ No
   If "Yes," indicate the receptor(s) each engineering control is intended to protect. *(check all that apply)*

   ☐ Human ☐ Ecological ☐ Offsite Impacts

Ground Water

5. Did the remedy include a remedial action for ground water? ☐ Yes ☒ No
   If "No," skip to **Ecological**
6. Is a restricted use required for ground water? ☐ Yes ☐ No

7. Is a revised CEA required? ☐ Yes ☐ No

8. Do any contaminant levels in ground water currently exceed the vapor intrusion ground water trigger? ☐ Yes ☐ No

Ecological

9. Did the remedy include a remedial action for Environmentally Sensitive Natural Resources (ESNRs)? ☐ Yes ☒ No
   If "No," skip to **Indoor Air**

10. Was post-remedial sampling performed to determine whether contaminant levels currently meet ecological screening levels or ecological remediation goals? ☐ Yes ☐ No

11. Did the remedial action require filling of State open waters or wetlands? ☐ Yes ☐ No

12. Have ecological risk-based remediation goals been developed? ☐ Yes ☐ No
    If "Yes," have the ecological risk-based remediation goals been approved by NJDEP? ☐ Yes ☐ No

13. Have Risk Management Decision (RMD) goals been developed? ☐ Yes ☐ No
    If "Yes," have the RMD goals been approved by NJDEP? ☐ Yes ☐ No

Indoor Air

14. Have any vapor intrusion engineering controls/mitigation systems been installed in order to mitigate a vapor condition in a structure? ☐ Yes ☒ No
    If "Yes," check each type of engineering control that was implemented:
    - ☐ Subsurface Depressurization System
    - ☐ Subsurface Ventilation System
    - ☐ Soil Vapor Extraction System
    - ☐ HVAC Positive Pressure
    - ☐ Other (specify): _____

SECTION H. LABORATORY DATA

1. Were all data submitted in the appropriate full and/or reduced formats according to the deliverables defined in N.J.A.C. 7:26E-2? ☒ Yes ☐ No

2. Do all data submitted meet the quality assurance/quality control (QA/QC) requirements incorporated by reference in N.J.A.C. 7:26E-2 for:
   sampling ☒ Yes ☐ No
   analysis ☒ Yes ☐ No

3. How was it determined that the data complied with the QA/QC requirements?
   - ☒ Laboratory non-conformance summary/narrative
   - ☒ Laboratory correspondence
   - ☐ LSRP review
   - ☐ Independent contractor review
   - ☒ Other: Data underwent full validation by CB&I.

4. Has any data been qualified and used? ☒ Yes ☐ No

5. Has any data been rejected and used? ☐ Yes ☒ No

6. Provide the page number for the "Reliability of Data" section of the report: 6-5

RECEPTOR EVALUATION FORM

New Jersey Department of Environmental Protection
Site Remediation Program

RECEPTOR EVALUATION (RE) FORM

Date Stamp
(For Department use only)

SECTION A. SITE

Site Name: Hudson County Chrome Site 63

Program Interest (PI) Number(s): G000008691

Case Tracking Number(s) for this submission: _____

This form must be attached to the Cover/Certification Form
if not submitted through a Remedial Phase Online Service

Indicate the type of submission:

☐ Initial RE Submission

☒ Updated RE Submission

Indicate the reason for submission of an updated RE form

☐ Submission of an Immediate Environmental Concern (IEC) source control report;
☐ Submission of a Remedial Investigation Report;
☒ Submission of a Remedial Action Report;

Check if included in updated RE

☐ The known concentration or extent of contamination in any medium has increased;
☐ A new AOC has been identified;
☐ A new receptor is identified;
☐ A new exposure pathway has been identified.

SECTION B. ON SITE AND SURROUNDING PROPERTY USE

1. Identify any sensitive populations/uses that are currently on-site or surrounding property usage within 200 feet of the site boundary (check all that apply):

	On-site	Off-site
None of the following	☒	☒
Residences or residential property	☐	☐
Public or Private Schools grades K-12	☐	☐
Child care centers	☐	☐
Public parks, playgrounds or other recreation areas	☐	☐
Other sensitive population use(s) Explain _____	☐	☐

If any of the above applies, attach a list of addresses, facility names, type of use, and a map depicting each location relative to the site.

2. Current site uses (check all that apply):

☐ Industrial ☐ Residential ☐ Commercial ☐ Agricultural
☐ School or child care ☐ Government ☐ Park or recreational use
☐ Vacant ☒ Other: Parking lot and Underground Pipeline

3. Planned future site uses and off-site use within 200 ft of site boundary (check all that apply):

☒ Industrial ☐ Residential ☒ Commercial ☐ Agricultural
☐ School or child care ☒ Government ☐ Park or recreational use
☐ Vacant ☒ Other: Parking lot and Underground Pipeline

Provide a map depicting the location of the proposed changes in land use.

SECTION C. DESCRIPTION OF CONTAMINATION

1. Identify if any of the following exist at the site (check all that apply):
   - ☐ Free product [N.J.A.C. 7:26E-1.8] identified is ☐ LNAPL* or ☐ DNAPL**. Date identified: _____
   - ☐ Residual product [N.J.A.C. 7:26E-1.8]
   - ☒ Other high concentration source materials not identified above (e.g., buried drums, containers, unsecured friable asbestos)

     Explain: Chromate Chemical Production Waste (CCPW)

   * LNAPL – measured thickness of .01 feet or more

   **DNAPL – See US EPA DNAPL Overview

2. Soil Migration Pathway

   Has soil contamination been delineated to the applicable Direct Contact Soil Remediation Standard? ..... ☒ Yes ☐ No

   Are all soils either below the applicable Direct Contact Criteria or under an institutional control (i.e. deed notice)? ..... ☒ Yes ☐ No

3. If this evaluation is submitted with a technical document that includes contaminant summary information, proceed to Section D. Otherwise attach a brief summary of all currently available data and information to be included in the site investigation or remedial investigation report.

SECTION D. GROUND WATER USE

1. Has the requirement for ground water sampling been triggered? ..... ☒ Yes ☐ No ☐ Unknown
   If "No," proceed to Section F. If "Unknown," explain:

2. Is Ground water contaminated above the Ground Water Remediation Standards [N.J.A.C.7:9C]? ..... ☒ Yes ☐ No ☐ Unknown

   Or ☐ Awaiting laboratory data with the expected due date: _____

   If "Yes," provide the date that the laboratory data was available and confirmed contamination above the Ground Water Remediation Standards. Date: 06/30/2016

   If "Unknown," explain: _____

   If "No," or awaiting laboratory data proceed to Section F.

3. Has ground water contamination been delineated to the applicable Remediation Standard? ..... ☐ Yes ☒ No
4. Has a well search been completed? ..... ☒ Yes ☐ No

   Date of most recent or updated well search: 03/02/2016

   Identify if any of the following conditions exist based on the well search [N.J.A.C.7:26E-1.14(a)] (check all that apply):
   - ☐ Potable wells located within 500 feet from the downgradient edge of the currently known extent of contamination.
   - ☐ Potable well located 250 feet upgradient or 500 feet side gradient of the currently known extent of contamination.
   - ☐ Ground water contamination is located within a Tier 1 wellhead protection area (WHPA).

5. Is a completed Well Search Spreadsheet or historical well search table attached and has an electronic copy of the spreadsheet been submitted to srpgis_wrs@dep.state.nj.us. ..... ☐ Yes ☒ No

   If "No," explain: No wells were identified within half-mile of subject property.

6. Are any private potable or irrigation wells located within ½ mile of the currently known extent of contamination? ..... ☐ Yes ☒ No

   If "Yes," was a door to door survey completed? ..... ☐ Yes ☐ No

   If survey was not completed explain: _____

7. Has sampling been conducted of ☐ potable well(s) and /or ☐ non-potable use well(s)? ..... ☐ Yes ☒ No

   If "No," provide justification then proceed to Section E.

8 Has contamination been identified in potable well(s) above Ground Water Remediation Standards that is not suspected to be from the site? (If "Yes," provide justification) ..... ☐ Yes ☒ No

_____

9 Has contamination been identified in potable well(s) that is above the Ground Water Remediation Standards or Federal Drinking Water Standards? ..... ☐ Yes ☒ No

Provide date laboratory data was received: _____

Or ☐ awaiting laboratory data with the expected due date: _____

If "Yes" for potable well contamination **not attributable to background**, follow the IEC Guidance Document at http://www.nj.gov/dep/srp/guidance/index.html#iec for required actions and answer the following:

Has an engineered system response action been completed on all receptors? ..... ☐ Yes ☐ No

Provide a brief narrative description:

Date completed: _____ NJDEP Case Manager: _____

10. Were Non-potable use well(s) sampled and results were above Class II Ground Water Remediation Standards? ..... ☐ Yes ☒ No

Provide date laboratory data was received: _____

Or ☐ awaiting laboratory data with the expected due date: _____

11. Has the ground water use evaluation been completed? ..... ☒ Yes ☐ No

SECTION E. VAPOR INTRUSION (VI)

1. Contaminants present in ground water exceed the Vapor Intrusion Ground Water Screening Levels that trigger a VI evaluation. (see NJDEP Vapor Intrusion Technical Guidance). ... ☐ Yes ☐ No ☒ Unknown *

Or ☐ Awaiting laboratory data and the expected due date: _____

Provide the date that the laboratory data was available and confirmed contamination above the Vapor Intrusion Trigger Levels. Date: _____

2. Other existing conditions that trigger a VI evaluation. (see NJDEP Vapor Intrusion Technical Guidance)

☐ Wet basement or sump containing free product or ground water containing volatile organics
☐ Methane generating conditions causing oxygen deficient or explosion concern
☐ Other human or safety concern from the VI pathway (i.e. elemental mercury, unsaturated contamination, elevated soil gas or indoor vapor (explain):

If you answered "No," or awaiting laboratory data to Question 1., *and* did not check any boxes in Question 2, proceed to Section F, "Ecological Receptors", otherwise complete the rest of this section.

3. Has ground water contamination been delineated to the applicable Ground Water Vapor Screening Level? ..... ☐ Yes ☐ No

4. Was a site specific screening level, modeling or other alternative approach employed for the VI pathway? ..... ☐ Yes ☐ No

5. Identify and locate on a scaled map any buildings/sensitive populations that exist within the following distances from ground water contamination with concentrations above the Vapor Intrusion Ground Water Screening Levels or specific threats (check all that apply):

☐ 30 feet of petroleum free product or dissolved petroleum hydrocarbon contamination in ground water
☐ 100 feet of any non-petroleum free product or any non-petroleum dissolved volatile organic ground water contamination
☐ No buildings exist within the specified distances

6. The vapor intrusion pathway is a concern at or adjacent to the site (if "No," attach justification) ..... ☐ Yes ☐ No

* Contaminants of concern for which PPG is responsible do not pose a vapor intrusion risk.

7. Has soil gas sampling of the building(s) been conducted? ☐ Yes ☐ No ☐ N/A
   If "No," or "N/A," proceed to #12

8. Has indoor air sampling been conducted at the identified building(s)? ☐ Yes ☐ No
   If "No," proceed to #12

9 Has indoor air contamination been identified but not suspected to be from the site?
   (if "Yes," attach justification) ☐ Yes ☐ No

10. Indoor air results were above the NJDEP's Rapid Action Levels. ☐ Yes ☐ No

   Provide the date that the laboratory data was available. Date: _____

   Or ☐ Awaiting laboratory data with the expected due date: _____

   If "Yes" to #10 above, follow the IEC Guidance Document at
   http://www.nj.gov/dep/srp/guidance/index.html#iec **for required actions.**

   The IEC engineering system response for control was implemented for all
   identified structures ☐ Yes ☐ No

   Date: _____ NJDEP Case Manager: _____

11. Indoor air sampling was conducted and results were above the NJDEP's Indoor Air Screening
   Levels but at or below the Rapid Action Levels ☐ Yes ☐ No

   Provide the date that the laboratory data was available. Date: _____

   Or ☐ Awaiting laboratory data with the expected due date: _____

   If "Yes" to #11 above, answer the following:

   Has the Vapor Concern (VC) Response Action Form notifying the NJDEP of the exceedances
   been submitted? ☐ Yes ☐ No

   Date: _____

   Has a plan to mitigate and monitor the exposure been submitted? ☐ Yes ☐ No

   Date: _____

   Has the Mitigation Response Action Report been submitted? ☐ Yes ☐ No

   Date: _____

12. Has the vapor intrusion investigation been completed? ☐ Yes ☐ No
   If "No", is the vapor intrusion investigation stepping out as part of the site
   investigation or remedial investigation. (If "No," attach justification) ☐ Yes ☐ No

SECTION F. ECOLOGICAL RECEPTORS

1. Has an Ecological Evaluation (EE) has been conducted? [N.J.A.C. 7:26E-1.16] ☒ Yes ☐ No
   Date conducted: 03/07/2016

2. Do the results of an EE trigger a remedial investigation of ecological receptors? [N.J.A.C. 7:26E-4.8] ☐ Yes ☒ No

3. Has a remedial investigation of ecological receptors been conducted? ☐ Yes ☒ No
   Date conducted: _____

4. Provide the following information for any surface water body on or within 200 feet of the site:

Surface Water Body Name	Stream Classification	Antidegradation Designation	Trout Production	Trout Maintenance
			☐	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐

5. Does the site contain any features regulated by the Land Use Regulation Program (LURP)? (e.g. wetlands, flood hazard area, tidelands, etc.). ..... ☐ Yes ☒ No

   If "Yes," identify the type(s) of features: _____

6. Have any formal LURP jurisdiction letters or approvals been issued for the site? ..... ☐ Yes ☒ No

   If "Yes," what is the LURP Program Interest (PI) number(s) for the site? _____

7. Have any applications for formal LURP jurisdiction letters or approvals been submitted the NJDEP?..... ☐ Yes ☒ No

   If "Yes," what is the LURP Program Interest (PI) number(s) for the site? _____

8. Is free product or residual product located within 100 feet from an ecological receptor?..... ☐ Yes ☒ No

9. Does available data indicate an impact on Ecological receptor(s), Surface water, or Sediment?..... ☐ Yes ☒ No

   If "Yes,"

   a) Check all that apply:

      ☐ Ecological receptor(s) ☐ Surface water ☐ Sediment

   b) Submit with this evaluation either a technical document that includes contaminant summary information, or a description of the type of contamination, a schedule, and a description of all actions to be taken to mitigate exposure.

Completed forms should be sent to the municipal clerk, designate health department, and:

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

CB&I Environmental & Infrastructure, Inc.
200 Horizon Center
Trenton, NJ 08691
Tel: +1 609.584.8900
Fax: +1 609.588.6300
www.CBI.com

Ecological Evaluation Report

Site 63, 1 Burma Road, Jersey City, NJ

As the entire site consisted of historic fill and was fully developed, no ecological sensitive natural resource (ENSR) receptors have been identified on the subject property. The site is surrounded on three sides by roads or asphalt paved driveways. On the northern boundary there is a thin strip of forested land that abuts a New Jersey Turnpike Authority (NJTA) exit ramp. As all shallow chromate chemical production waste (CCPW)-impacted soil has been removed from the site and replaced with clean fill from a NJ-licensed quarry, no CCPW-related contaminants of potential ecological concern (CPECs) are present that could pose an potential impact to any adjacent ecological receptors. As no CPECs are present, there are no contaminant migration pathways (CMPs) present at or off site. As such, no further ecological evaluation is required.

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

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

REMEDIATION STANDARD NOTIFICATION SPREADSHEET

Instructions | Clear Form

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

CB&I Environmental & Infrastructure, Inc.
200 Horizon Center
Trenton, NJ 08691
Tel: +1 609.584.8900
Fax: +1 609.588.6300
www.CBI.com

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

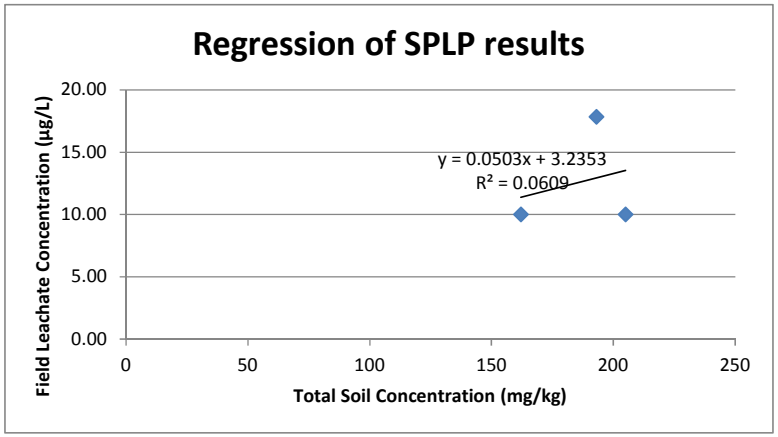
OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

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



Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; F = See FAQ; J = New Jersey; O = EPA Office of Water; E = see user guide Section 2.3.5; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide)

Toxicity and Chemical-specific Information												Contaminant		Screening Levels										Protection of Ground Water SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volatile	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
7.0E-03	X			3.0E-05	X					1	0.1		Trichloroaniline, 2,4,6-	634-93-5	1.9E+00	n	2.5E+01	n					4.0E-01	n		3.6E-03	n	
				8.0E-04	X			V		1			Trichlorobenzene, 1,2,3-	87-61-6	6.3E+01	n	9.3E+02	n					7.0E+00	n				
2.9E-02	P			1.0E-02	I	2.0E-03	P	V		1		4.0E+02	Trichlorobenzene, 1,2,4-	120-82-1	2.4E+01	c**	1.1E+02	c**	2.1E+00	n	8.8E+00	n	1.2E+00	c**	7.0E+01	3.4E-03	c**	2.0E-01
				2.0E+00	I	5.0E+00	I	V		1		6.4E+02	Trichloroethane, 1,1,1-	71-55-6	8.1E+03	ns	3.6E+04	ns	5.2E+03	n	2.2E+04	n	8.0E+03	n	2.0E+02	2.8E+00	n	7.0E-02
5.7E-02	I	1.6E-05	I	4.0E-03	I	2.0E-04	X	V		1		2.2E+03	Trichloroethane, 1,1,2-	79-00-5	1.1E+00	c**	5.0E+00	c**	1.8E-01	c**	7.7E-01	c**	2.8E-01	c**	5.0E+00	8.9E-05	c**	1.6E-03
4.6E-02	I	4.1E-06	I	5.0E-04	I	2.0E-03	I	V	M	1		6.9E+02	Trichloroethylene	79-01-6	9.4E-01	c**	6.0E+00	c**	4.8E-01	c**	3.0E+00	c**	4.9E-01	c**	5.0E+00	1.8E-04	c**	1.8E-03
				3.0E-01	I			V		1		1.2E+03	Trichlorofluoromethane	75-69-4	2.3E+04	ns	3.5E+05	nms					5.2E+03	n		3.3E+00	n	
				1.0E-01	I					1	0.1		Trichlorophenol, 2,4,5-	95-95-4	6.3E+03	n	8.2E+04	n					1.2E+03	n		4.0E+00	n	
1.1E-02	I	3.1E-06	I	1.0E-03	P					1	0.1		Trichlorophenol, 2,4,6-	88-06-2	4.9E+01	c**	2.1E+02	c**	9.1E-01	c	4.0E+00	c	4.1E+00	c**		4.0E-03	c**	
				1.0E-02	I					1	0.1		Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	6.3E+02	n	8.2E+03	n					1.6E+02	n		6.8E-02	n	
				8.0E-03	I					1	0.1		Trichlorophenoxypropionic acid, -2,4,5	93-72-1	5.1E+02	n	6.6E+03	n					1.1E+02	n	5.0E+01	6.1E-02	n	2.8E-02
				5.0E-03	I			V		1		1.3E+03	Trichloropropane, 1,1,2-	598-77-6	3.9E+02	n	5.8E+03	ns					8.8E+01	n		3.5E-02	n	
3.0E+01	I			4.0E-03	I	3.0E-04	I	V	M	1		1.4E+03	Trichloropropane, 1,2,3-	96-18-4	5.1E-03	c	1.1E-01	c	3.1E-01	n	1.3E+00	n	7.5E-04	c		3.2E-07	c	
				3.0E-03	X	3.0E-04	P	V		1		3.1E+02	Trichloropropene, 1,2,3-	96-19-5	7.3E-01	n	3.1E+00	n	3.1E-01	n	1.3E+00	n	6.2E-01	n		3.1E-04	n	
				2.0E-02	A					1	0.1		Tricresyl Phosphate (TCP)	1330-78-5	1.3E+03	n	1.6E+04	n					1.6E+02	n		1.5E+01	n	
				3.0E-03	I					1	0.1		Tridiphane	58138-08-2	1.9E+02	n	2.5E+03	n					1.8E+01	n		1.3E-01	n	
						7.0E-03	I	V		1		2.8E+04	Triethylamine	121-44-8	1.2E+02	n	4.8E+02	n	7.3E+00	n	3.1E+01	n	1.5E+01	n		4.4E-03	n	
				2.0E+00	P					1	0.1		Triethylene Glycol	112-27-6	1.3E+05	nm	1.6E+06	nm					4.0E+04	n		8.8E+00	n	
						2.0E+01	P	V		1		4.8E+03	Trifluoroethane, 1,1,1-	420-46-2	1.5E+04	ns	6.2E+04	ns	2.1E+04	n	8.8E+04	n	4.2E+04	n		1.3E+02	n	
7.7E-03	I			7.5E-03	I			V		1			Trifluralin	1582-09-8	9.0E+01	c**	4.2E+02	c*					2.6E+00	c*		8.4E-02	c*	
2.0E-02	P			1.0E-02	P					1	0.1		Trimethyl Phosphate	512-56-1	2.7E+01	c*	1.1E+02	c*					3.9E+00	c*		8.6E-04	c*	
						5.0E-03	P	V		1		2.9E+02	Trimethylbenzene, 1,2,3-	526-73-8	4.9E+01	n	2.1E+02	n	5.2E+00	n	2.2E+01	n	1.0E+01	n		1.5E-02	n	
						7.0E-03	P	V		1		2.2E+02	Trimethylbenzene, 1,2,4-	95-63-6	5.8E+01	n	2.4E+02	ns	7.3E+00	n	3.1E+01	n	1.5E+01	n		2.1E-02	n	
				1.0E-02	X			V		1		1.8E+02	Trimethylbenzene, 1,3,5-	108-67-8	7.8E+02	ns	1.2E+04	ns					1.2E+02	n		1.7E-01	n	
				1.0E-02	X			V		1		3.0E+01	Trimethylpentene, 2,4,4-	25167-70-8	7.8E+02	ns	1.2E+04	ns					6.5E+01	n		2.2E-01	n	
				3.0E-02	I					1	0.019		Trinitrobenzene, 1,3,5-	99-35-4	2.2E+03	n	3.2E+04	n					5.9E+02	n		2.1E+00	n	
3.0E-02	I			5.0E-04	I					1	0.032		Trinitrotoluene, 2,4,6-	118-96-7	2.1E+01	c**	9.6E+01	c**					2.5E+00	c**		1.5E-02	c**	
				2.0E-02	P					1	0.1		Triphenylphosphine Oxide	791-28-6	1.3E+03	n	1.6E+04	n					3.6E+02	n		1.5E+00	n	
				2.0E-02	A					1	0.1		Tris(1,3-Dichloro-2-propyl) Phosphate	13674-87-8	1.3E+03	n	1.6E+04	n					3.6E+02	n		8.0E+00	n	
				1.0E-02	X					1	0.1		Tris(1-chloro-2-propyl)phosphate	13674-84-5	6.3E+02	n	8.2E+03	n					1.9E+02	n		6.5E-01	n	
2.3E+00	C	6.6E-04	C					V		1		4.7E+02	Tris(2,3-dibromopropyl)phosphate	126-72-7	2.8E-01	c	1.3E+00	c	4.3E-03	c	1.9E-02	c	6.8E-03	c		1.3E-04	c	
2.0E-02	P			7.0E-03	P					1	0.1		Tris(2-chloroethyl)phosphate	115-96-8	2.7E+01	c*	1.1E+02	c*					3.8E+00	c*		3.8E-03	c*	
3.2E-03	P			1.0E-01	P					1	0.1		Tris(2-ethylhexyl)phosphate	78-42-2	1.7E+02	c*	7.2E+02	c					2.4E+01	c*		1.2E+02	c*	
				8.0E-04	P					1			Tungsten	7440-33-7	6.3E+01	n	9.3E+02	n					1.6E+01	n		2.4E+00	n	
				3.0E-03	I	4.0E-05	A			1			Uranium (Soluble Salts)	NA	2.3E+02	n	3.5E+03	n	4.2E-02	n	1.8E-01	n	6.0E+01	n	3.0E+01	2.7E+01	n	1.4E+01
1.0E+00	C	2.9E-04	C						M	1	0.1		Urethane	51-79-6	1.2E-01	c	2.3E+00	c	3.5E-03	c	4.2E-02	c	2.5E-02	c		5.6E-06	c	
				5.0E-03	S	1.0E-04	A			0.026			Vanadium and Compounds	7440-62-2	3.9E+02	n	5.8E+03	n	1.0E-01	n	4.4E-01	n	8.6E+01	n		8.6E+01	n	
				2.5E-02	I					1	0.1		Vinclozolin	50471-44-8	1.6E+03	n	2.1E+04	n					4.4E+02	n		3.4E-01	n	
				1.0E+00	H	2.0E-01	I	V		1		2.8E+03	Vinyl Acetate	108-05-4	9.1E+02	n	3.8E+03	ns	2.1E+02	n	8.8E+02	n	4.1E+02	n		8.7E-02	n	
		3.2E-05	H			3.0E-03	I	V		1		2.5E+03	Vinyl Bromide	593-60-2	1.2E-01	c*	5.2E-01	c*	8.8E-02	c*	3.8E-01	c*	1.8E-01	c*		5.1E-05	c*	
7.2E-01	I	4.4E-06	I	3.0E-03	I	1.0E-01	I	V	M	1		3.9E+03	Vinyl Chloride	75-01-4	5.9E-02	c	1.7E+00	c	1.7E-01	c	2.8E+00	c	1.9E-02	c	2.0E+00	6.5E-06	c	6.9E-04
				3.0E-04	I					1	0.1		Warfarin	81-81-2	1.9E+01	n	2.5E+02	n					5.6E+00	n		5.9E-03	n	
				2.0E-01	S	1.0E-01	S	V		1		3.9E+02	Xylene, P-	106-42-3	5.6E+02	ns	2.4E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01	n	
				2.0E-01	S	1.0E-01	S	V		1		3.9E+02	Xylene, m-	108-38-3	5.5E+02	ns	2.4E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01	n	
				2.0E-01	S	1.0E-01	S	V		1		4.3E+02	Xylene, o-	95-47-6	6.5E+02	ns	2.8E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01	n	
				2.0E-01	I	1.0E-01	I	V		1		2.6E+02	Xylenes	1330-20-7	5.8E+02	ns	2.5E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n	1.0E+04	1.9E-01	n	9.9E+00
				3.0E-04	I					1			Zinc Phosphide	1314-84-7	2.3E+01	n	3.5E+02	n					6.0E+00	n			n	
				3.0E-01	I					1			Zinc and Compounds	7440-66-6	2.3E+04	n	3.5E+05	nm					6.0E+03	n		3.7E+02	n	
				5.0E-02	I					1	0.1		Zineb	12122-67-7	3.2E+03	n	4.1E+04	n					9.9E+02	n		2.9E+00	n	
				8.0E-05	X					1			Zirconium	7440-67-7	6.3E+00	n	9.3E+01	n					1.6E+00	n		4.8E+00	n	

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

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BOB MARTIN
Commissioner

M E M O R A N D U M

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

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1.0 Introduction

This *Remedial Action Report* (RAR) has been prepared by CB&I Environmental and Infrastructure, Inc. (CB&I) on behalf of PPG for the remediation of chromium-impacted soils at the former Baldwin Oil facility (the Site). The former Baldwin Oil facility is located at 1 Burma Road in Jersey City, New Jersey (Figure 1). 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 NJDEP Site Remediation Program (SRP) Program Interest (PI) number for Site 63 is G000008691. (Note: There is also a NJDEP SRP PI number G000002333 at the Site that is associated with remediation related to the former Baldwin Oil facility operations.)

Site 63 is identified by the New Jersey Department of the Treasury Division of Taxation as Block 21503, Lot 11 (January 2016). Site 63 is bordered by Site 65 and Burma Road to the east, Morris Pesin Drive to the south, and property owned by the New Jersey Turnpike Authority (NJTA) to the north and west. Site 63 occupies approximately 2.11 acres (Figure 1).

In 1990, PPG and the NJDEP entered into an ACO to investigate and remediate locations where chromate chemical production waste (CCPW) or CCPW-impacted materials related to former PPG operations may be present. On June 26, 2009, NJDEP, PPG, and the City of Jersey City entered into a Partial Consent Judgment Concerning the PPG Sites (JCO) with the purpose of remediating the soils and sources of contamination at the Hudson County Chromate sites as expeditiously as possible. The goal of the JCO was to complete the investigation and remediation of the PPG sites within five years, in accordance with a judicially enforceable master schedule. Priority for the remedial activities was given to residential locations where the CCPW and CCPW-impacted materials were present. The provisions of the original ACO remain in effect with the JCO taking precedence where there were conflicts between the two documents.

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. An underground natural-gas pipeline was installed by Spectra Energy Transmission Services (Spectra) along the western and northern boundary of Site 63 in April and May 2013. A valve station building was also installed by Spectra in May 2013. The pipeline and valve station became fully functional in November 2013 (Figure 2).

The case inventory document (CID) summarizes the presence of 11 areas of concern (AOCs) for the Site. This RAR addresses AOC 3b (Eastern Drainage Ditch), AOC 8 (Former Loading Area), and AOC 9 (Soils contaminated with CCPW). This RAR presents a summary of the findings and recommended Remedial Action (RA) for AOC 3b, AOC 8, and AOC 9, a description of the RA; a list of the remedial standards that apply to AOC 3b, AOC 8, and AOC 9; data that documents that the RA is protective of public health, safety, and the environment; figures showing post-RA sample locations; a description of Site restoration activities; the total RA costs; documentation of the off-site transport of wastes; documentation of the source, type, and quantities of fill; and a description of permits required during the RA. AOC 10, which pertains to CCPW-related groundwater impacts at the Site, will be addressed by PPG in future submittals to NJDEP. AOCs associated with the site are summarized in the following table and are differentiated between PPG responsibilities and Baldwin Oils & Commodities Company (SRP PI G000002333) responsibilities:

Table 1-1
Area of Concern Summary Table
Site 63
PPG, Jersey City, New Jersey

AOC ID	AOC Type	AOC Details	PPG Responsibility
AOC 1a to u	Storage tank and appurtenance - Above ground storage tank	Three 500-gallon, two 175-gal, nine 12,000-gallon, and 7 "Large" former ASTs	No*
AOC 2	Storage tank and appurtenance - Rail car	Former Railroad Spur	No*
AOC 3a	Drainage system and area - Drainage swale and culvert	Western Drainage Ditch	No*
AOC 3b	Drainage system and area - Drainage swale and culvert	Eastern Drainage Ditch	**Yes**
AOC 4	Drainage system and area - Storm sewer collection system	Catch Basin	No*
AOC 5	Discharge and disposal area - Historic fill material area/other fill area	Historic Fill	No*
AOC 6a to b	Other areas of concern - Hazardous substance storage or handling area	Former Interior Hazardous Material Storage Areas and Unidentified Drum	No*
AOC 7a to b	Other areas of concern - Discolored area or spill area	Staining in southern and southeastern portions of site	No*
AOC 8	Storage tank and appurtenance - Loading and unloading area	Former Loading Area	**Yes**
AOC 9	Discharge and disposal area - Historic fill material area/other fill area	Soils contaminated with Chromate Chemical Production Waste	**Yes**
AOC 10	Environmental media - Media Ground water	Groundwater contaminated from contact with Chromate Chemical Production Waste	**Yes**
AOC 11	Other areas of concern - Other discharge area	Dumping	No*

*Associated with Baldwin Oils & Commodities Company (SRP PI G000002333)

This RAR was prepared in accordance with the requirements set forth in the *Technical Requirements for Site Remediation* New Jersey Administrative Code, Title 7, Chapter 26E, Subchapter 5.5 (N.J.A.C. 7:26E-5.5), Appendix B of the 1990 NJDEP ACO, and the June 26, 2009 JCO.

2.0 Summary of Findings and Recommendations for AOCs

2.1 Summary of Previous Soil Investigation Findings

CB&I conducted an Open Public Records Act (OPRA) file review on December 15, 2015 at NJDEP Previous Site investigations included soils samples collected in December 1987 by the NJDEP throughout the Site for chromium analysis and contained elevated concentrations (maximum concentrations of 3,150 ppm). A copy of the investigation report and data were not available for detailed review despite the completion of a diligent records review at NJDEP.

Soil sampling was performed in September 1998 and January 1999 to collect preliminary information for planning the remediation activities. Twenty soil borings were advanced. One hundred and nine analytical samples were submitted for Total Chromium and Hexavalent Chromium analyses (IT Corporation, 2000).

As preparation for the incoming Spectra gas pipeline, TRC completed a Preliminary Assessment/Phase I Environmental Site Assessment and a Limited Phase II Site Investigation Report (2011). The investigation consisted of the advancement of nine soil borings, the installation and sampling of four temporary well points, and the sampling of monitoring wells installed by others. A total of 34 soil samples and 8 groundwater samples were collected and analyzed for a suite of contaminants including CCPW metals. No CCPW nodules were identified in the boring logs for the investigation. However, hexavalent chromium was identified in three borings (SB5, SB11, and SB13) at depths greater than the final excavation extents as documented by this report.

Additional site investigations were included in the Remedial Investigation Report (RIR), prepared by Tetra Tech dated March, 2013. The RI scope of work included the advancement of 62 soil borings and the collection and analysis of 328 soil samples (Tetra Tech, 2013). This included samples at the locations of the exceedances reported in the TRC report; however, TetraTech's sampling did not identify similar exceedances. Large-diameter borings were completed by CB&I in March 2016 to remove reported exceedances associated with historical boring locations SB5, SB11, SB13, ED012, and PPG63/65_B73 which are discussed further in Section 4.6.11.

Additional RI work to complete delineation of soil exceedances was performed by CB&I in December 2012 and March 2013. This scope included the advancement of 7 soil borings and the collection and analysis of 36 samples. A Design Boring Investigation was performed by CB&I in August and September 2013 that included the advancement of 64 soil borings and the collection and analysis of 370 soil samples.

In addition to the above reports, CB&I conducted an Open Public Records Act (OPRA) file review on December 15, 2015 at NJDEP to determine if any other records are available. No additional records were identified.

Soil sample summary tables for these previous investigation activities are included in Attachment 1. Post-Remedial summary laboratory analytical data for soil remaining onsite are included in Attachment 2. Figures depicting post-remedial soil conditions are included as Attachment 3.

All soil investigations documented the presence of CCPW and analytical exceedances of the NJDEP's Soil Remediation Standards (SRS) and/or the Chromium Soil Cleanup Criteria (CrSCC). Summary tables presenting the analytical results from these investigations are presented in Attachment 4. Full laboratory analytical reports are included as Attachment 5. Soil boring logs from these investigations are included in Attachment 6.

CB&I used the information from the RIR, additional delineation samples, and the design boring samples to develop proposed excavation areas and depths in the cut line submission that was conditionally approved by the independent technical consultant, Weston Solutions, Inc. (Weston Solutions) in a memorandum dated January 29, 2014 (Attachment 7). Weston Solutions required additional revisions to the cut lines, which were submitted on March 13, 2014 and approved via email on April 4, 2014 (Attachment 7).

2.2 Geology

Prior to Site remedial activities the Site geology consisted of shallow layers of historic fill materials including soil, gravel, slag, and coal/ash including layers impacted by CCPW for approximately 0 to 5 feet below ground surface (bgs) which overlie additional fill materials. Underlying these fill materials are native soils consisting of meadow mat, silts, clays, and sand at depths of approximately 8 to 10 feet bgs (0 feet mean sea level (msl)). Laboratory analytical results demonstrated that the fill materials not only were impacted by CCPW, PAHs, and metals, but also by chlorinated organic compounds and petroleum hydrocarbons from historic Site activities.

Site 63 lies within the glaciated section of the Piedmont Physiographic Province of the Appalachian Highlands, along the eastern edge of the Newark Basin; the area is underlain by formations of Recent and Pleistocene sediments. The Triassic age bedrock throughout the region is composed of non-marine sedimentary rocks, consisting mainly of sandstone, mudstone, and conglomerate. The Triassic Newark Supergroup consists of non-marine sedimentary rocks with diabase intrusives. It is common for the Triassic Newark Supergroup to exhibit a slight dip to the northwest with local warping and occasional faulting. The formations generally strike northeast to southwest and dip between 10 to 20 degrees northwest. The Newark Supergroup can be divided into three formations based on lithology: 1) the Stockton Formation, 2) the Lockatong Formation, and 3) the Passaic Formation (AECOM, 2011).

The Stockton Formation beneath Site 63 has a gray to reddish-brown sandstone, combined with conglomerate, siltstone, and shale. The siltstone may be gray, green, or purple and fossiliferous. The Stockton Formation is about 850 feet thick beneath Sites 063. The Lockatong Formation, located west of the Site, consists of fossil-rich, thinly laminated to thickly bedded, gray to black siltstone and shale. A diabase sill of Lower Jurassic Age intrudes the Lockatong Formation west of the Site within Jersey City. The Passaic Formation is located west of the Site, and it is the thickest formation (about 10,000 feet). The Passaic consists of reddish-brown mudstones, shale, siltstone, and sandstone with interbedded conglomeritic sandstones along the basin margins (AECOM, 2011).

2.3 Recommended Remedial Action

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 or site-specific IGW SSLs. The Synthetic Precipitation Leaching Procedure (SPLP) method was used to determine a site-specific impact-to-groundwater concentration for nickel of 205 mg/kg.

3.0 Identification of Applicable Remedial Standards/Criteria

3.1 Remediation Standards/Criteria

The remedial actions described in the RAWP were performed in accordance with the following regulatory requirements and NJDEP Guidance.

- N.J.A.C. 7:26C – *Administrative Requirements for the Remediation of Contaminated Sites*, dated May 4, 2015.
- N.J.A.C. 7:26D – *Soil Remediation Standards*, dated May 7, 2012 (readopted without change April 27, 2015).
- N.J.A.C. 7:26E – *Technical Requirements for Site Remediation*, dated May 7, 2012.
- NJDEP *Field Sampling Procedures Manual*, dated August 2005 (last updated April 2011).
- NJDEP *Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria*, dated September, 2012.
- NJDEP *Development of Site-Specific Impact to Groundwater Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure* (SPLP) Guidance, dated November 2013.
- NJDEP Memorandum from Lisa P. Jackson to Irene Kropp, Subject: Chromium Moratorium, February 8, 2007.
- NJDEP Chromium Soil Cleanup Criteria, September 2008, revised April 2010.
- NJDEP Administrative Consent Order, Dated July 19, 1990.
- JCO between NJDEP, PPG, and the City of Jersey City, June 26, 2009.

3.2 Soil Remediation Standards/Criteria

Soil Remediation Standards for acceptance of post-excavation results for CCPW-related metals for the Site were based on the May 2012 NJDEP Residential Direct Contact Soil Remediation Standards (RDC SRS)[1], the NJDEP's Letter of February 8, 2007 related to the lifting of the Chromium Moratorium[2], and the NJDEP's September 2008 CrSCC document[3].

The 2007 and 2008 Soil Cleanup Criteria were used only for Trivalent Chromium and Hexavalent Chromium. The May 2012 NJDEP Residential Direct Contact Soil Remediation Standards were used for Antimony, Nickel, Thallium, and Vanadium. The NJDEP Default Impact to Groundwater Soil Screening Levels (IGW SSLs) are additional criteria for Antimony, Nickel, and Thallium except for when SPLP data was used to establish a site-specific IGW SSL. The SPLP was used to determine a site-specific impact-to-groundwater concentration for nickel of 205 milligrams per kilogram (mg/kg) (Attachment 13).

The soil remediation standards/criteria include the following values:

[1] N.J.A.C. 7:26D, Remediation Standards, May 7, 2012 (readopted without change April 27, 2015).
[2] NJDEP Memorandum from Lisa P. Jackson to Irene Kropp, Subject: Chromium Moratorium, February 8, 2007.
[3] NJDEP Chromium Soil Cleanup Criteria, September 2008, revised April 2010.

Table 3-1
Soil Remediation Standards/Criteria
Site 63
PPG, Jersey City, New Jersey

Metals	RDC SRS (mg/kg)	CrSCC (mg/kg)	IGW SSL (mg/kg)
Trivalent chromium	NA	120,000	NA
Hexavalent chromium	NA	20	NA
Antimony	31	NA	6
Nickel	1,600	NA	205*
Thallium	5	NA	3
Vanadium	390**	NA	NA

NA = Not Applicable.
*Site-Specific IGWSSL developed using SPLP methodologies as described in the NJDEP *Development of Site-Specific Impact to Groundwater Soil Remediation Standards Using the SPLP* Guidance, dated November 2013.
** The use of the USEPA Regional Soil Screening Level of 390 mg/kg for vanadium is proposed as an alternative remediation standard for the site. Based on: https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-november-2015

PPG is responsible for CCPW and CCPW-related impacts only and not for any other chemicals exceeding NJDEP SRS that may be present at the Site. This RAR addresses only the soil impacts for which PPG is responsible (AOC 3b, AOC 8, and AOC 9). Other chemicals above NJDEP RDC SRS were managed if co-located and co-mingled with chromium and CCPW-related constituents, but the RAWP did not include excavation of these chemicals to achieve current NJDEP RDC SRS.

4.0 Description of the Remedial Action

The remedial action selected by PPG for contaminated soils was excavation and off-site disposal of the excavated materials at landfills permitted to accept the excavated materials. The following facilities were used for the disposal of CCPW, contaminated soils, contaminated concrete, wood, soils contaminated with polychlorinated biphenyls and CCPW-related metals, soils contaminated with petroleum, solvents and CCPW-related metals, and soils that contained low level radioactive waste slag that were co-located with CCPW-related metals.

All materials removed were sent to one of the following treatment/disposal facilities:

Non Hazardous

- Clean Earth of Philadelphia (CEP), Philadelphia, Pennsylvania; and/or
- Cumberland County Improvements Authority Landfill, Deerfield Township, New Jersey.

Hazardous

- Stablex, Blainville, Québec, Canada;
- EQ Detroit Inc., Detroit, Michigan;
- EQ - Michigan Disposal Waste Treatment Plant, Belleville, Michigan;
- EQ - Wayne Disposal Inc. Site #2 Landfill, Belleville, Michigan; and/or
- EQ Envirite, York, Pennsylvania.

Metal Rail

- Cinelli Iron & Metal Company, Hackensack, New Jersey, for recycling

Radioactive

- Waste Control Specialists (WCS), Andrews, TX.

Water

- Passaic Valley Sewage Commission (PVSC) Wastewater Treatment Plant, Newark, New Jersey

4.1 Remediation along the Spectra Energy Pipeline Right-of-Way

The initial RA was started prior to the finalization of the Remedial Action Work Plan (RAWP) for the Site due to the installation of an underground natural gas pipeline along the western boundary of the Site by Spectra Energy (Spectra). The Spectra Energy Excavation Management Plan (SEEM Plan), dated November 6, 2012, and the SEEM Plan Addendum, dated November 26, 2012, were distributed to the NJDEP prior to the Spectra pipeline installation at the site. NJDEP approved the SEEM Plan and SEEM Plan Addendum in a letter dated December 12, 2012 (included in Attachment 7). The letter stated NJDEP would consider the remediation of CCPW complete, within the limits of the pipeline excavation corridor proposed in the Plan at the subject property, if implemented in accordance with the SEEM Plan.

During April and May 2013, portions of the Site were excavated by Spectra for construction of a high pressure buried natural-gas pipeline that traversed the western section of the Site. The pipeline was constructed in an eleven foot wide excavation that was part of a fifty-foot wide easement. The excavation depths ranged from eight to ten feet below ground surface (bgs) across the excavated area. As-built survey drawings depicting the excavation extents are included as Attachment 8.

Soil excavation activities for the pipeline installation proceeded from the north of the Site to the south. The soils excavated during the pipeline construction were stockpiled by Spectra's contractor on a PVC liner and covered for later transportation and disposal from the Site by PPG. As pipeline construction activities continued southward, the excavated areas were backfilled with imported clean fill material.

Soil analytical results from the design soil boring program and the analytical results from the RI soil boring program, as well as visual inspection were used to pre-determine the depths of the excavation along Spectra pipe line placement. Soil samples were collected from the stockpiles in accordance with the NJDEP's 1998 *Revised Guidance for the Remediation of Contaminated Soils* and the requirements of the waste disposal facility. An eight-point grab composite sample was collected for every 800 cubic yards of soil. Based on analytical results of the samples, soil stockpiles were designated as hazardous and non-hazardous waste for disposal.

Dust suppression and soil load-out was performed by AWT Environmental Services, Inc. (AWT). CB&I conducted perimeter air monitoring during all activities for the soil load-out as a control for all fugitive dust emissions. CB&I also served as construction manager during soil load-out activities. A truck wash decontamination pad was constructed and utilized to decontaminate vehicles and prevent the tracking of soil onto public roads.

Soil load-out activities began on July 23, 2013. Approximately 276 tons of hazardous soil was transported to Stablex Canada between July 24, 2013 and August 29, 2013. Approximately 3,318 tons of non-hazardous soil was transported to the Clean Earth of Philadelphia (CEP) facility for disposal between July 23, 2013 and August 29, 2013. Copies of waste manifests and a tally of disposal quantities for both hazardous and non-hazardous soil are provided in Attachment 9.

On July 26, 2013, a truckload of the stockpiled soil triggered CEP's portal monitor radiation detection alarm. The alarm indicated a radioactivity level of greater than 10 MicroRoentgen per hour (µR/hour). Per CEP's standard procedure, the truck was directed to an isolated area at the facility where secondary screening with a hand-held radiation detector measured a maximum level of 532 µR/hour on contact with the left rear of the vehicle. CEP contacted the Pennsylvania Department of Environmental Protection (PADEP) and provided the screening results. PADEP completed a Department of Transportation Exception Form to allow the material to return to the Site.

When the truck carrying soil with elevated radiation levels returned to the Site, the material was unloaded onto a high-density polyethylene liner and covered with the same material and the truck was decontaminated. All remaining soil shipments from the Site were held until each soil pile was screened to determine the source of the radioactivity. Additional screening was performed during the week of August 5, 2013. This work included screening the remaining soil stockpiles and the area of the Site from which the soil had been excavated. Isotopic identification was accomplished using a Canberra Inspector portable gamma spectrometer. The CB&I Radiological Technician established the location where the radioactive items were concentrated at the north end of the Site between the Spectra pipeline and the fence and between the pipeline and Burma Road. A portion of the area with elevated readings was excavated by Spectra during the installation of an electrical line. The soil from that area was stockpiled on Site. CB&I also determined via the use of a hand-held gamma spectrometer that the source of the radioactive material was thorium series radionuclides (Thorium-232 and daughters) located in low level radioactive waste slag.

On August 13, 2013, load-out of the stockpiled soils associated with construction of gas pipeline resumed and continued through August 29, 2013. To prevent any material with elevated radiation levels above background from leaving the Site, the stockpiled material was thoroughly screened prior to transport off Site. A CB&I Radiological Technician performed a gamma scan of the soil utilizing a 2-inch by 2-inch Sodium Iodide gamma scintillation detector. This allowed CB&I to effectively identify and remove any slag materials containing elevated levels of radioactive thorium from the stockpile. The CB&I Radiological Technician also scanned each individual backhoe bucket of soil prior to loading onto the trucks. The CB&I Radiological Technician then scanned the trucks to make sure they were less than 10 µR/hr above background (the alarm

set point for gateway radiation monitors) prior to leaving the Site. Any materials identified greater than 10 µR/hr above background were removed and placed in 55-gallon drums, labeled, and properly stored on-site for future disposal.

The several pieces of slag material identified during the Spectra material load-out were combined with six 55-gallon drums of material with elevated radiation from subsequent excavating activities that were taken to WCS in Andrews, TX for disposal. The remaining non-hazardous soil/debris was removed and disposed at CEP. Hazardous PCB-impacted material was disposed at Stablex Canada. Waste manifests for all soil disposal activities associated with this remedial action are included in Attachment 9.

4.2 Remediation of the Remainder of Site 63

The remedial action at the remainder of the Site (not including the Spectra pipeline ROW) included the excavation of CCPW and soil impacted by CCPW, which included chromium, hexavalent chromium, antimony, nickel, thallium and vanadium, offsite transport and disposal of affected soil, backfilling of the excavations, and restoration of the affected areas. The remedial action was performed in accordance with the NJDEP-approved RAWP.

Access agreements and state and local permitting requirements were obtained as required by Site conditions.

CB&I served as Construction Manager as Agent (CMAA) to manage and coordinate the work of multiple contractors hired by PPG to perform the required remedial construction and support work. Because of the detection of Low-Level Radioactive Waste (LLRW) in the form of thorium impacted radioactive slag during the soil load-out associated with Spectra's gas line construction (see Section 4.1), CB&I also segregated and managed radioactive slag during Site remediation activities. This work was initially conducted under CB&I's Nuclear Regulatory Commission (NRC) Material License with New Jersey State reciprocity until December 2014, after which time CB&I obtained a New Jersey State Radioactive Materials License.

Emilcott Associates, Inc. (Emilcott) of Morristown, New Jersey performed the air monitoring at the Site to assess Site conditions; evaluate whether the measures used to control potential fugitive emissions were effective; and document ambient air quality/conditions in the immediate vicinity of the Site. Copies of their monthly reports are included as Attachment 10. During the course of the remediation, fugitive dust was controlled and measurable exceedances of the community air monitoring plan criteria were not observed. Air samples collected for laboratory analysis reported contaminant concentrations below criteria.

Entact Environmental Services (Entact) of Latrobe, Pennsylvania performed the remediation construction activities at the Site. These services consisted of excavation and backfilling, decontamination, demolition, dewatering, and Site restoration.

WTS coordinated transportation and disposal for the following waste streams:

- Non-Hazardous Soil/Debris
- Hazardous Soil
    - CCPW-impacted material
    - Volatile Organic Compound (VOC) impacted soil
    - Sediment removed from piping encountered during excavation work
- Hazardous Debris
    - CCPW-impacted concrete
    - Metal and plastic piping encountered during excavation work
    - Railroad ties
    - Wood debris
    - Blooming concrete
    - Drums in Grid WC-9

- LLRW
    - Thorium impacted radioactive slag
- Hazardous Water
    - Removed from piping encountered during excavation work
- Non-Hazardous Water
    - Surface water runoff
    - Decontamination wastewater
    - Groundwater

In general, soil excavation activities proceeded from the north to the south. Soil load-out starting at the northern end of the Site and working toward the south was based on areas containing radioactive thorium encountered and identified during the load-out of the excavated soils associated with the gas pipeline excavation. Soils were excavated in a grid system that had been pre-characterized for waste classification and acceptance at an appropriate disposal facility. The Site was divided into ten waste class grid cells (WC-1 through WC-8A, WC-8B, and WC-9) (Figure 4). A portion of WC-8B and all of WC-9 are located on NJTA property, specifically the southeastern portion of New Jersey Turnpike Interchange 14B Ramp NT. The parcel is identified by the NJTA as Parcel 28N (formerly parts of Lots 13 and 18B in Block 2154). Soil analytical results from the design soil boring program and the analytical results from the RI soil boring program were used to determine the depths of the excavation.

4.3 Pre-Construction Activities

The following activities were conducted prior to starting excavation of chromium-impacted soils:

- Approval of all permit applications and plans submitted to the state and local agencies
- Implementation of a Soil Erosion and Sedimentation Control Plan / Storm Water Pollution Prevention Plan (SESCP/SPPP)
- Obtaining access agreements from affected property owners
- Implementation of an Air Monitoring Plan (AMP)
- Development of a Site-Specific Health and Safety Plan (HASP)
- Site utility clearance activities
- Equipment mobilization and set up of temporary facilities
- Removal of guardrails and set up Site perimeter fencing
- Establish work zones
- Removal of Fabriform® drainage structure
- Abandonment of monitoring wells located within extent of excavation

All necessary permits were obtained and approved from the state, local, and county agencies prior to initiation of activities covered by the permits as detailed in Section 5.6.

Pre-construction field activities started with the implementation of the Erosion and Sedimentation (E&S) Control Plan. The E&S controls consisted primarily of hay bales to contain any soil potentially displaced during remedial activities. The hay bales were installed along the down-gradient perimeter of the Site (Burma Road). Sediment filters were installed in the storm water catch basins located along Burma Road.

Access agreements were obtained from the Site property owner Nisan12 (Site 63), the NJTA, and Texas Eastern Transmission, LP (Texas Eastern), operators of the Spectra Pipeline. In addition to the access agreements, a Jersey City traffic permit (lane occupancy) was obtained from the City of Jersey City.

The AMP was developed to provide specific procedures for measuring, documenting, and responding to potential airborne impacts during remedial activities at the Site. The AMP assessed Site conditions, evaluated whether the measures used to control potential fugitive dust emissions were effective and document ambient air quality/conditions in the immediate vicinity of the Site. The AMP was approved by Weston Solutions prior to initiation of work.

A site-specific HASP was developed for the remedial action at the Site in accordance with Occupational Safety and Health Administration (OSHA) 1910.120. The HASP documents policies and procedures to be followed to protect workers and the public from potential hazards posed at this Site. The HASP includes training program protocols, medical surveillance program, equipment maintenance programs, personal hygiene practices, project air monitoring plan, dust control plan and other information. A complicating factor when developing this HASP was identifying contaminants beyond the base CCPW metals of concern. Given the Site's historical use as a chemical mixing plant, additional contaminants of concern were identified throughout the Site based on the waste classification sampling that was completed. Additional contaminants of concern included chlorinated solvents and other VOCs, polycyclic aromatic hydrocarbons (PAHs), as well as elevated concentrations of miscellaneous petroleum hydrocarbons. Further complicating this Site were detection, monitoring, handling, and storage of radioactive materials which were also covered in the HASP.

In addition to contacting the New Jersey One-Call system, a utility survey was conducted prior to intrusive Site activities. A private utility locator, TPI Environmental Inc. (TPI Environmental) of Easton Pennsylvania, performed a geophysical survey to mark underground utilities (gas, sewer, water, phone, cable, electrical, etc.) that exist within the proposed excavation area. No utilities were identified within Site 63, though a water main was identified running through Site 65 along the edge of Burma Road. During excavation several unidentified underground pipes were encountered and are discussed below.

Equipment was delivered to the Site during the initial mobilization phase and on an as-needed basis as work progressed. Temporary facilities including field office trailers, sanitary facilities, and equipment storage Conex/intermodal boxes were mobilized and set up for use during remedial actions.

Guardrails located along Burma Road were removed and replaced with jersey barriers. A security fence was erected on top of the jersey barriers and around the Site perimeter to secure the Site.

Work zones were established to exclude unauthorized personnel from entering the Site and to prevent contamination from being tracked off Site or into clean work zones. The following work zones were established:

- A Secure Zone was established to exclude unauthorized personnel from entering the Site. The Secure Zone consisted of a steel chain link fence and locking gates. Warning signs were placed on the fence to prevent unauthorized entry into work areas.
- A Support Zone was established to stage office trailers, sanitary facilities, storage conex/intermodal boxes, and vehicle parking.
- An Exclusion Zone encompassed areas associated with impacted material and/or heavy equipment hazards. Temporary fence was installed to isolate the exclusion zones and modified Level D personal protective equipment (PPE) including Tyvek was required when working in the exclusion zone.
- A Contamination Reduction Zone and truck decontamination pad were constructed for transition from the Exclusion Zone. The Contamination Reduction Zone prevented the track-out of sediment onto off-site streets, other paved areas, and sidewalks from vehicles exiting the Site.

The existing concrete Fabriform® drainage structure that covered AOC 3b (Eastern Drainage Ditch) located along the eastern boundary of Site 63 was removed prior to excavation activities. The existing high-density polyethylene (HDPE) liner that had been installed as an Interim Remedial Measure (IRM) in the footprint of the former Baldwin Oil structure in the central portion of the site was removed. The temporary liner IRM installed on the northern end the site was also removed and disposed.

During the course of the excavation, monitoring wells MW-01, MW-02, MW-04, MW-06 MW-07, MW-08, MW-09, MW-10 and MW-11 were properly abandoned in accordance with the NJDEP's *Sealing of Abandoned Wells Technical Requirements* (N.J.A.C. 7:9D) by NJ-licensed well drillers. Well abandonment documentation is included in Attachment 11. Further discussion of well abandonment activities is included in Section 4.6.1.

4.4 Excavation, Radiological Screening, and Off-Site Disposal

Excavation began on April 28, 2014 in the northern portion of the Site in waste class grid cell WC-8A (as shown in Figure 3) and was initially completed on May 19, 2015 with the completion of a re-dig outside the original excavation limits behind Spectra's valve station. Additional work occurred in February 2016 to remove CCPW nodules along the electrical line for the Spectra valve station (Section 4.6.10) and in March 2016 to remove previously identified exceedances in SB5, SB11, SB13, ED012, and B73 (Section 4.6.11). Additional investigation and a test pit were conducted in November 2016 (Section 4.6.12).

Prior to the start of the original excavation in April 2014, the initial vertical and horizontal limits of excavation were surveyed and marked. As excavation was performed by Entact utilizing a CAT 300 excavator, a CB&I Radiological Technician performed a gamma scan of each individual backhoe bucket containing excavated soil. This allowed for the removal of any materials containing elevated levels of radioactive thorium from the soil prior to loading onto trucks. Once each truck was loaded, a CB&I Radiological Technician scanned the truck to make sure readings were less than 10 µR/hr above background prior to leaving the Site. When radioactive material was identified, it was segregated and removed from the soil. The radioactive material was placed in 55-gallon drums, labeled and properly stored in a locked Conex box on Site for future disposal.

The screening protocol for the radioactive slag was modified for the southern portion of the Site (WC-1, WC-2, WC-3, and WC-4). Beginning on August 18, 2014, material excavated from these grid cells was directly loaded into trucks without scanning each bucket of soil; however, each truck was thoroughly scanned by CB&I's Radiological Technician prior to leaving the Site. If the truck was found to equal or exceed 10 µR/hr above background, its contents would have been unloaded and scanned to identify and remove any materials containing elevated levels of radioactive slag. No detections were made of radioactive materials during these scans.

Vegetation that covered the excavation limits associated with WC-9 was cleared so that a surface pre-scan for radioactive thorium slag could be conducted. The pre-scan was conducted to determine the amount of surface slag and level of effort to segregate the material prior to and during excavation activities. WC-9 is located on NJTA's property, therefore NJTA had a representative from Distinct Engineering Solutions, Inc. of North Brunswick, New Jersey on Site with the CB&I radiologic technician during the surface scan.

As excavation of CCPW-impacted material within the excavation proceeded, an excavator with a hammer attachment was used to break up any existing slabs, concrete, or other concrete obstacles such as former storage tank and building foundations within the limits of the excavation to allow access to underlying soils.

Waste manifests for all soil and debris loaded for offsite disposal are presented in Attachment 9.

Entact verified vertical excavation extents using GPS survey equipment to document that proposed excavation depths were achieved. Once the excavation limits were met to the targeted depths within each waste class grid cell, a representative from Weston Solutions and/or a CB&I geologist inspected the completed excavation for visible CCPW. If visible CCPW was noted, excavation would continue in half foot increments until inspection revealed no presence of CCPW. Post-excavation samples were collected if the excavation depth extended more than 12 inches beyond the original targeted cutline limits.

The confirmation samples were analyzed for:

- Hexavalent Chromium using method United States Environmental Protection Agency (USEPA) SW-846 3060A digestion and USEPA SW-846 7196A, as modified by NJDEP;
- pH using method USEPA SW-846 9045C, D;
- Redox Potential using method ASTM International Method D1498-76M, and
- Total Chromium, Antimony, Nickel, Thallium, and Vanadium using USEPA SW-846 6010C.

Surface water runoff, storm water, and groundwater entering the excavation and decontamination wastewater were transferred utilizing pumps into closed-top fixed-axle storage (frac) tanks. After receiving

analytical results indicating the water in the frac tanks was non-hazardous, WTS coordinated the transportation and disposal of the water from the frac tanks to the PVSC Wastewater Treatment Plant facility located in Newark, New Jersey.

4.5 Post-Excavation Soil Sampling

Post-excavation soil samples were routinely collected during the course of the remedial activities. Post-excavation base samples were collected whenever excavation within a cell grid progressed greater than 1-foot deeper than originally designed. Post-excavation sidewall samples were collected along the perimeter of the excavation every 30-feet to define the lateral extents of the excavation. Summaries of laboratory analytical results are provided as Attachments 2 and 4. Attachment 3 presents figures that show the location of the post-remediation base of excavation samples and post-remediation excavation sidewall samples, as well as the topographic extents of the bottom of the excavation. Validation reports for the results are included in Attachment 5. Analytical data was qualified but was generally found to be usable, as discussed in Section 6.0.

4.6 Summary of Activities

Pre-construction activities including mobilization and set up of temporary facilities, removal of guard rails, placement of jersey barriers and temporary fencing, implementation of the erosion and sedimentation control plan, establishment of work zones, utility clearance, removal of the concrete Fabriform® drainage structure within the Eastern Drainage Ditch (AOC 3b), removal of IRMs (HDPE liner and temporary liner), clearing vegetation, and removal of Site debris (garbage) were performed from April 14, 2014 through April 25, 2014. On April 28, 2014, excavation began in the northern portion of Site in waste class grid cell WC-8A.

Post-excavation samples were collected from areas outside the original proposed excavation extents where visible CCPW was removed; the samples were sent for laboratory analysis. Prior to sample collection, the areas were visually inspected and cleared of CCPW by Weston Solutions and/or a CB&I geologist.

Prior to backfilling, an orange demarcation barrier was placed in the excavation. Excavation grid areas that were excavated with vertical extents verified and visually cleared were backfilled with certified clean stone fines/screenings from Weldon Material Inc.'s Fanwood Crushed Stone Company Quarry located in Watchung, New Jersey. ANS Consultants, Inc. (ANS) of South Clinton, New Jersey verified backfill compaction using a nuclear density gauge.

Additional excavation (re-dig) was completed for failed post-excavation soil samples. An area of approximately 30 feet by 30 feet was excavated for each failed sample. If the sample location was backfilled, the backfill material was removed to a depth of one foot above the failed sample and segregated for reuse. Backfill material immediately above the failed sample and additional soil associated with the re-excavation was segregated and classified as hazardous or non-hazardous and was transported offsite for disposal at an appropriate facility.

The following summarizes the different complications that occurred during the completion of the excavation:

4.6.1 Well Abandonment

On April 22, 2014, before excavation began B&B Drilling Inc. properly abandoned Monitoring Wells MW-01, MW-02, MW-07, MW-08 and MW-11 in accordance with the NJDEP's Sealing of Abandoned Wells Technical Requirements (N.J.A.C. 7:9D). Monitoring wells MW-4, MW-6, MW-9, and MW-10 could not be located and were not abandoned prior to excavation; however, they were identified and abandoned when encountered during excavation activities. Monitoring well MW-5 was also later abandoned. MW-3 was never located, but is assumed to have been destroyed during excavation activities. MW-12 remains onsite. Well abandonment documentation is included in Attachment 11.

4.6.2 Excavating Near Spectra Pipeline

A Spectra representative was required onsite when excavation was conducted within Spectra's 50 foot right of way (ROW). Entact implemented an approved excavation support plan for excavation conducted within 10 feet of Spectra's gas line. The excavation support was accomplished by excavating through a trench box running parallel to the excavation immediately adjacent to the pipeline. Excavation through the trench box continued to the proposed depth of the cut lines and laterally until clean fill associated with the pipeline installation was encountered. Once the soil was visually inspected, backfill was placed in the trench box and compacted to within two feet of the top of the trench box.

4.6.3 Former Piping Encountered

During excavation activities, several former piping structures were encountered. These included the following:

- A metal pipe approximately 36-inches in diameter and 20 feet in length running parallel to Spectra's gas line was encountered in waste class grid cells WC-6 and WC-8A. During removal, the pipe separated at a seam into two 10 foot sections. Water and sediment were removed from each length of pipe prior to wrapping each section in plastic and loading into roll off containers for disposal as hazardous debris.
- Several pipes were uncovered and removed during excavation activities in WC-1. One pipe was approximately 4-inches in diameter and 25 feet in length. Another pipe was approximately 3-inches in diameter and four feet in length. The smaller pipe was identified suspected asbestos containing material and a sample was collected and submitted for laboratory analysis. The pipe was wrapped in plastic and segregated from the active work area and stored in the exclusion zone until analysis determined if the pipe contains asbestos like material. It was determined that the pipe did not contain asbestos.
- A concrete drain pipe was encountered and removed during excavation activities along Burma Road in WC-1. The concrete was reduced to 24-inch pieces with the excavator and hammer attachment and was segregated for disposal as hazardous waste.
- A metal pipe was encountered (approximately five feet north of gridline 3 running east to west) and removed during excavation activities in WC-1. The pipe was 8-inches in diameter and 15 to 20 feet in length and no fluids were present. The pipe was segregated for disposal as hazardous waste.
- A plastic pipe filled with concrete running parallel to Spectra's gas line was encountered and removed during excavation activities on the western side of the gas line. The pipe was segregated for disposal as hazardous waste.

4.6.4 Concrete and Debris

Concrete structures and various other debris were encountered during excavation. concrete chip samples (PPG 63/65_CCS01 to CCS03) were collected and sent for laboratory analysis. A concrete footer was encountered during excavation activities in waste grid cells WC-2, WC-3, and WC-4. The footer was located approximately 40 feet off of Burma Road and ran parallel to Burma Road. At each end, the concrete footer made a right angle toward Spectra's gas line and then paralleled the gas line. The footer was reduced to 24-inch pieces with the excavator and hammer attachment. Chromium-impacted concrete was segregated for disposal as hazardous waste. Hazardous debris (railroad ties, wood debris, and blooming impacted concrete) were transported off Site for disposal.

4.6.5 High VOC Area

During excavation in WC-7 in May 2014, sustained elevated PID readings (10-30 ppm) were noted in the breathing zone. Excavation activities were stopped until the situation could be assessed. Notification was made to PPG, Entact, and CB&I's health and safety specialist. It was determined the source of the elevated PID readings were associated with historic Site operations and former ASTs located in the area of WC-7. ASTs were formerly located in an area approximately 130 feet by 30 feet (within WC-5 and WC-7).

Based on the PID readings, VOC delineation and additional waste classification samples were collected from areas of elevated PID reading noted during excavation activities in WC-7. Once analytical results were obtained, WTS worked with disposal facilities to determine that soil from the former AST location could be designated for disposal as non-hazardous from the VOC area (100 feet x 30 feet). Hazardous high VOC soils (an elevated toxicity characteristic leaching procedures [TCLP] concentration) were limited to an area (30 feet x 30 feet).

Once personnel performing work in the exclusion zone were fit tested and cleared through their respective companies to wear a respirator as part of Level C PPE requirements, soil excavation activities resumed in WC-7. Site personnel working in the exclusion zone during load-outs of the VOC soil operated in Level C PPE, including a respirator. VOC-impacted soil classified as non-hazardous and VOC impacted soil classified as hazardous were excavated from portions of WC-5 and WC-7 (former AST field footprint) and transported off Site for disposal at appropriate disposal facilities.

Also, since surface and groundwater associated with the high VOC excavation area was pumped into the tank, and may have impacted results from tthe original waste profile samples that were collected and analyzed, additional water samples were collected. The water samples were analyzed for VOCs, SVOCs, and extractable petroleum hydrocarbons (EPH). Although sample results revealed the presence of targeted VOC, SVOC, and/or EPH contaminants, the concentrations remained below PVSC acceptance criteria.

4.6.6 Former Railroad Spur

A former railroad spur traversing the Site from north to south alongside Burma Road was removed and cut into 5 foot lengths for disposal. The metal railroad spur along with miscellaneous scrap metal (rebar) and metal pipe were decontaminated and taken to Cinelli Iron & Metal Company for recycling. As discussed above, railroad ties were transported off site as hazardous debris for disposal.

4.6.7 Utility Pole Relocation

PSE&G was retained by PPG to relocate three telephone poles located along Burma Road. Once the impacted soil was excavated and new telephone poles were set in clean backfill, the original telephone poles were removed. The impacted soil was excavated and segregated, and properly disposed at one of the disposal facilities identified above.

4.6.8 Drums Encountered

During excavation activities in waste class grid cell WC-9, partially disintegrated drums containing a white solid material were uncovered. The drums, solid white material, and surrounding soil were segregated and placed in a berm containment cell. A composite waste classification sample was collected and analyzed for the target compound list and TAL metals. As a conservative measure, these drums were disposed of as hazardous waste.

4.6.9 West of Spectra Pipeline

There were discussions between Weston Solutions, CB&I, and PPG concerning the possibility of soil impacts to be present on the western side of Spectra's gas line and the need to verify this possibility. On April 13, 2015, Site activities resumed with the mobilization of Site personnel and equipment to start excavation activities on the western side of Spectra's gas pipeline. As confirmation sampling was not conducted on the western sidewall of the Spectra Pipeline trench when it was excavated, an exploratory trench led by a CB&I Geologist and observed by a Weston Solutions representative was completed running parallel to the pipeline. A portion of this excavation extended onto NJTA Maintenance District 9, which was acquired by the NJTA as Parcel R28DD (formerly a portion of Block 1497, Lot 3R), as depicted on Figures 3A through 3E.

Sidewall samples were collected for every 30 linear feet of the trench for analysis. The results indicated that all impacted material was removed to the west of the Spectra Pipeline. Approximately 1,845 tons of non-hazardous soil was transported to the CEP facility for disposal between April 15, 2015 and April 30, 2015.

Copies of waste manifests and a tally of disposal quantities for non-hazardous soil are provided in Attachment 9.

4.6.10 Nodule Chase in Northeast Corner

In WC-8b, Weston Solutions indicated that CCPW nodules had been left in place during the excavation along the electrical line for the Spectra valve station that is buried along the site boundary. On February 29, 2016, a crew mobilized to the site and hand excavated a trench 2-feet wide, 2-feet deep and 30-feet long. CCPW nodules were observed and this material was stockpiled for offsite disposal. The trench was visually cleared by a Weston Solutions representative and a CB&I geologist. A post-excavation sample was collected, analyzed, and validated. The analytical results indicated that all impacted material had been removed and the stockpile containing approximately 5.28 tons of material was loaded for offsite disposal on March 2, 2016.

4.6.11 Historical Soil Boring Exceedance Removals

Following an additional review of historical site analytical data, which is referenced in Section 2.1, CB&I determined that previously reported sample locations with exceedances for hexavalent chromium may have remained in historical soil boring locations SB5, SB11, SB13, ED012, and B73 following soil excavation activities based on reported excavation contour maps.

In March 2016, a supplemental round of remedial investigation borings were completed by CB&I to confirm whether hexavalent exceedances were present at five select historical boring locations: SB5, SB11, SB13, ED012, and B73. Each location was over-drilled using an 8-inch diameter hollow stem auger to a target depth/elevation as determined by the previous borings at these locations. Cuttings were characterized and logged as the auger advanced. All cuttings were collected and drummed for offsite disposal, which occurred on April 14, 2016 (Attachment 9). The clean backfill was clearly identifiable and uniform so the vertical extent of the excavation was definitively determined where encountered. Once the target depth was achieved, soil samples were collected from the target depth using a 3-inch diameter acetate-lined Geoprobe macro-core. Soils were characterized and logged (Attachment 6). Soil samples were collected for laboratory analysis for total chromium and hexavalent chromium. Sample results are reported in Attachments 1, 2 and 4 and are depicted on Figures 3A through 3E.

False positives (i.e., errant exceedances) for hexavalent chromium were reported for three of the five sample locations as shown in Table 2J of Attachment 2. These hexavalent chromium results were suspect as the initial hexavalent chromium concentrations reported were greater than the reported total chromium results for the same samples. The laboratory re-homogenized the soil samples and collected new aliquots that were processed and analyzed both by EPA Method 7196A and by alternative EPA Method 7199 for confirmation of the hexavalent chromium results. Total chromium was also re-analyzed to confirm the original reported concentrations. In all three samples, the re-analysis reported hexavalent chromium results of 2.7 mg/kg or less. Based on the results of the confirmatory analyses, it can be concluded that contamination is not present above the applicable criteria at these locations.

4.6.12 Supplemental Investigation

During excavation of the Site between April 2014 and May 2015, perimeter sidewall samples were collected; however, not all perimeter sidewall samples were collected at a frequency of 1 sample per 30 linear feet of sidewall nor did all 900-square foot sampling grids have a base sample as per the NJDEP *Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil* (March 2015, Version 1.2). To complete the post-remediation confirmation sampling, additional analytical data (Hexavalent Chromium and CCPW metals) would be required through collection of soil samples along the perimeter of and from the bottom of the excavation.

CB&I initiated the supplemental soil investigation in November 2016. CB&I advanced borings to collect specified sidewall (SWR001-SWR017, PPG63/65_SW25R2, SW93 and SW119) and base samples (BR001-

BR010) as discussed below. The samples are reported in Attachments 1, 2 and 4. Sample locations are shown in Attachment 3 on Figure3E.

On November 10, 2016, during the advancement of soil boring SWR015, four feet of backfill material was observed in the macro-core. The surface elevation of SWR015 was 9.2 feet msl and the reported survey contours of the excavation extents indicate the base elevation of the excavation was approximately 7 feet msl, indicating that approximately 1.2 feet of backfill material should be present at this location. The NJDEP's independent technical consultant, Weston Solutions, was present on the Site to observe the advancement of this soil boring. Additional borings were completed in this location within a 2-foot radius of SWR015 and four feet of backfill material was observed in each boring. Based on this observation, CB&I concluded that in the vicinity of proposed sidewall samples SWR014 and SWR015 (Grid E21), the two larger excavations had in fact been connected excavation activities. CB&I concluded that sidewall samples SWR014 and SWR015 in Grid E21 were not required based on the lack of sidewalls in this area. Weston concurred, provided an additional base excavation soil sample (BR009) was collected within Grid E21. Sample BR009 was successfully collected.

Soil boring location SWR016 and an additional soil boring approximately 2-feet west of SWR016 revealed four feet of backfill material. The depth of backfill material observed corresponds with the average depth of excavation in excavation area WC-8B. Soil boring location SWR013 was advanced and backfill material was observed from surface grade to 1.5-feet below grade, confirming that SWR013 was located within the main excavation of WC-9 (average cut of 1.5 feet). CB&I and Weston discussed the potential for the area of soil between SWR013 and SWR016 to have been excavated and proceeded to advance one additional soil boring between the two boring locations to confirm. Four feet of backfill material was observed between SWR013 and SWR016, indicating that this "wedge" of material had been excavated. CB&I concluded that that SWR016 did not need to be collected as proposed, since a sidewall was not present in this location, and Weston concurred.

Approximately four feet of backfill material was observed at proposed location SWR012, when one foot or less was anticipated. An additional soil boring was advanced two feet to the east of SWR012 and five feet of backfill material was observed. CB&I and Weston discussed CB&I's observations, and concurred that the "wedge" of material located in the vicinity of SWR012 (Grid B27) had been excavated. CB&I concluded that SWR012 did not need to be collected as proposed and Weston concurred.

Five feet of backfill material was observed at proposed location SW25R, when one foot or less was anticipated. Additional borings within two feet of proposed location SW25R confirmed the presence of four to five feet of backfill material. Four additional borings were attempted to the northwest to confirm the limit of the excavation in this area; however, refusal was encountered in each boring location at approximately two feet below grade. During the excavation of this area in November 2014, a large concrete pad was encountered. CB&I concluded that the soil boring refusal in November 2016 was due to the presence of this concrete pad.

In order to confirm the extent of the excavation in Grid B27, CB&I returned to the Site on November 22, 2016 to soft-dig multiple locations within the Grid. During excavation activities, the sidewall of the excavation in this area was identified approximately 10 feet to the east of the location of PPG 63/65_SW25R. Six-inches of backfill material was observed at location PPG 63/65_SW25R2, indicating the presence of the sidewall. Soil sample PPG 63/65_SW25R2 was collected from 4.3-4.8 feet below grade. CB&I directed soft-digging of additional locations in the vicinity of PPG 63/65_SW25R2 to identify the limits of the excavation. The confirmed extent of the excavation in this area is depicted on Figures 3A through 3E in Attachment 3.

During initial investigation by Tetra Tech in 2013, CCPW nodules were observed at the surface of soil boring 063_E005, which was located on the western site property boundary on NJTA Maintenance District 9 (Parcel R28DD (formerly a portion of Block 1497, Lot 3R)) property. At the NJDEP's request, CB&I initiated an investigation of 063_E005. In November 2016, with a CB&I Geologist and Weston Solutions representative present, a 3 foot long by 3 foot wide by 1.5 foot deep test pit was excavated and the spoils were screened for

CCPW nodules. No CCPW nodules were observed in the test pit location surrounding historical soil boring location 063_E005. One base sample and four sidewall samples were collected and analyzed for hexavalent chromium and CCPW-related metals. Exceedances of the applicable standards/criteria were not reported. The analytical findings are reported in Attachments 2 and 4 and on Figure 3E of Attachment 3. The test pit was backfilled to grade with clean gravel to the satisfaction of the NJTA. The clean gravel was obtained from a small stockpile that remained following the completion of the excavation activities on Site 63. The spoils from the test pit were containerized in two 55-gallon drums and removed from the site on February 22, 2017. Waste manifests for these drums are included in Attachment 9.

5.0 Documentation of the Protectiveness of the Remedial Action

Soil analytical results from the remedial design soil boring program and the analytical results from the RI soil boring program were used to pre-determine the depths of the excavation. These sampling results, as well as the supplemental investigation and sample results, served as the post-excavation samples used to document the effectiveness and completeness of the soil remediation.

Once the excavation limits were met to the targeted depths, the NJDEP's independent technical consultant, Weston Solutions, and / or a CB&I geologist inspected the completed excavation for visible CCPW. If visible CCPW was noted, excavation would continue in half-foot increments until inspection revealed no presence of CCPW. Post-excavation samples were collected if the excavation depth extended more than 12 inches beyond the original targeted excavation limits.

Because all confirmation soil samples were below their respective soil remediation standards (antimony vanadium, thallium, and nickel) and soil cleanup criteria (trivalent and hexavalent chromium), all CCPW impacted soil on Site 63 has been remediated.

The final post-remediation analytical data is presented in Attachment 2. This Attachment presents base of excavation soil samples, sidewall samples, concrete post-excavation samples, as well as historical soil samples from unexcavated areas. These sample results represent the original Site soils that were left in place after excavation of shallower soils. These results all fall below the SRS, CrSCC, and IGW SSL.

Attachment 3 presents figures that show the location of the post-remediation base of excavation samples and post-remediation excavation sidewall samples. Figures also depict the topographic extents of the bottom of the excavation. As shown in these figures the excavation extended to the property boundary along Burma Road and Pesin Drive and past the northern boundary of the lot onto NJTA property.

Attachment 4 presents a complete summary of all Laboratory Analytical data including those samples from areas that were excavated as part of the remediation. The samples generally reveal an exceedance of the SRS, CrSCC, or IGW SSL. In several cases base or sidewall post-excavation samples were collected and failed. In these cases additional excavation was conducted and sample points were collected again. In several cases, the excavation was advanced deeper than a clean sample due to constructability issues or in some cases CCPW nodules were observed. All samples that were excavated are marked as such in the tables.

Attachment 5 presents the Data Validation reports, the complete Laboratory Analytical Reports, and confirmations that Hazsite electronic data deliverables (EDDs) were submitted to NJDEP. As discussed above, the laboratory analytical data gathered was found to be usable for the purposes of defining the extents of the remedial excavation.

Attachment 6 presents the available boring logs from all historic phases of investigations completed at the Site. As discussed above, these logs defined the Site's subsurface geology and the observed extents of CCPW nodules that were used to define the proposed extents of the excavation.

Compliance averaging results are presented in Attachment 12. The compliance averaging technique was used with regard to several marginal thallium and vanadium exceedances that were reported in the pre-post-excavation sampling.

SPLP calculations are presented in Attachment 13. The SPLP was used to determine a site-specific impact-to-groundwater concentration for nickel of 205 mg/kg.

Waste manifests for all soil and debris loaded for offsite disposal are presented in Attachment 9.

Copies of weight tickets for the clean backfill imported to the Site are provided in Attachment 14.

5.1 As-Built Diagrams

As-built drawings depicting the final extents of both the Spectra Pipeline and main excavations are provided in Attachment 8. In addition, an as-built diagram of the final Site grades including construction of the storm water drainage swale adjacent to Burma Road is presented in Attachment 8.

5.2 Description of Site Restoration Activities

Upon completion of the soil remedial action at the Site, restoration activities were implemented. Copies of weight tickets for the clean backfill imported to the Site are provided in Attachment 14**.**

The contractor cleaned the entire Site of all rubbish and surplus, discarded materials, and debris. All equipment and temporary facilities were removed from the Site including temporary electric service, phone and internet hookups.

Approximately four inches of ¾ inch gravel was placed as a final grade and spread on top of the compacted coarse aggregate backfill used to fill the excavation.

Guardrail removed along Burma Road and Morris Pesin Drive was replaced in-kind. Temporary fencing around the Site perimeter (Burma Road and Morris Pesin Drive) was replaced with eight foot high chain link fence. The fence was topped with 3-strands of barbed wire.

The surface Fabriform® drainage structure located along Burma Road was removed during pre-construction activities and replaced with a storm water drainage swale. The storm water drainage swale was installed at a depth of 0.5' bgs at its southern end to a depth of 1.5' bgs where it terminates at a storm water catch basin. It was constructed with a one foot slope over its 300' length. An As-Built Diagram of the final Site grades including construction of the storm water drainage swale adjacent to Burma Road is presented in Attachment 8. The backfill throughout the entire Site was capped with a 4-inch thick layer of ¾-inch stone (70 loads of ¾-inch stone from Watchung Quarry).

5.3 Total Remedial Action Cost

The total cost of the Remedial Action at Site 63 was approximately $13,334,050. The number includes the costs for consultants, Site investigation, remedial design, contractors, excavation equipment, transportation and disposal of impacted soil, clean backfill, dewatering, water disposal, Site restoration, construction oversight and engineering.

5.4 Documentation of Waste Generation and Disposal

There were two sets of loadouts related to the Spectra Pipeline excavations: the first between July and August 2013 and the second in April 2015 to the west of the pipeline. During the Spectra Pipeline excavations, 236 trucks carrying approximately 5,163 tons of non-hazardous soil were excavated and removed from the Site. Non-hazardous soil from the first excavation in 2013 was transported to CEP for disposal. Fourteen roll-off containers from the first excavation in 2013 carrying approximately 276 tons of hazardous were transported to Stablex Canada for disposal. Non-hazardous soil from the second excavation in 2015 to the west of the pipeline was transported to the Cumberland County Improvements Authority for disposal.

During the excavation of the remainder of Site 63, an additional 893 truckloads (approximately 22,514 tons) of impacted non-hazardous fill material were removed from the Site and transported to the Cumberland County Improvements Authority for disposal. An additional 307 truckloads and roll-off containers (approximately 7,354 tons) of CCPW-impacted hazardous fill material were removed from the Site and transported to EQ Detroit, Inc., Michigan Disposal, Inc., Wayne Disposal, Inc., EQ Envirite, and/or Stablex Canada for disposal. Waste manifests for all soil and debris loaded for offsite disposal are presented in Attachment 9.

Surface water runoff, storm water, and groundwater entering the excavation and decontamination water were transferred utilizing pumps into closed-top fixed-axle storage (frac) tanks. After receiving analytical resulting indicating the water in the frac tanks was non-hazardous, WTS coordinated the transportation and disposal of the water from the frac tanks to the PVSC wastewater treatment plant facility located in Newark, New Jersey. A total of 161 tanker loads (approximately 1,032,000 gallons) of impacted storm water, groundwater, and decontamination water were removed from the Site. Disposal tickets for all impacted water disposed offsite are included in Attachment 9.

Approximately 459 pieces of radioactive thorium slag in six 55-gallon drums (1,041 pounds) were removed from the Site and transported for offsite disposal. Disposal documentation for all slag disposed offsite are included in Attachment 9.

All material removed off Site were sent to one of the following treatment/disposal facilities:

Non Hazardous

- CEP, Philadelphia, Pennsylvania; and/or
- Cumberland County Improvements Authority Landfill, Deerfield Township, New Jersey.

Hazardous

- Stablex, Blainville, Québec, Canada;
- EQ Detroit Inc., Detroit, Michigan;
- EQ - Michigan Disposal Waste Treatment Plant, Belleville, Michigan;
- EQ - Wayne Disposal Inc. Site #2 Landfill, Belleville, Michigan; and/or
- EQ Envirite, York, Pennsylvania.

Metal Rail

- Cinelli Iron & Metal Company, Hackensack, New Jersey, for recycling

Radioactive

- WCS, Andrews, TX.
- **Water**PVSC Wastewater Treatment Plant, Newark, New Jersey

Copies of disposal facility permits and the Waste Manifests are presented in Attachment 9.

5.5 Documentation of Source, Type, Quantities, and Location of Fill

For the Spectra gas line excavation, an estimated 2,000 tons of clean fill material was imported to the site by Spectra's subcontractors from two sources: Amboy Aggregates of South Amboy, New Jersey and Tilcon's Quarry off Mount Hope Road in Wharton, New Jersey. The material from Amboy Aggregates consisted of sand while the material from Tilcon consisted of stone fines and screenings from their stone crushing operations. Laboratory analytical data from samples collected of the quarry material in accordance with the remedial workplan are included in Attachment 14. Clean fill certifications for these materials are provided in Attachment 14.

For the main excavation, a total of 1,528 truckloads (approximately 37,704 tons) of clean fill material were imported to the Site from Weldon Material Inc.'s Fanwood Crushed Stone Company Quarry of Watchung, New Jersey. The material consisted of stone fines and screenings from their stone crushing operations. Laboratory analytical data from samples collected of the quarry material in accordance with the remedial workplan are included in Attachment 14. Copies of weight tickets for the clean fill imported to the Site and a clean material certification for this material from Weldon Materials, Inc. are provided in Attachment 14.

5.6 Identification of Required Permits and Authorizations

The permits and approvals needed for the remedial action are listed below.

- A Soil Erosion and Sediment Control Permit from Hudson-Essex-Passaic (HEP) County Soil Conservation District (Attachment 11)
- Jersey City Temporary Construction Trailer Permit, City of Jersey City
- Jersey City Traffic Control Permit, City of Jersey City
- Plan Review for potential impact to city storm water infrastructure on Site, Jersey City Municipal Utility Authority
- Electrical Service Permit – Field Trailer, City of Jersey City
- Review of RAWP for potential impact to utility poles, PSE&G
- Well Abandonment, NJDEP (Attachment 11)
- Construction dewatering permit, PVSC (Attachment 11)
- New Jersey Pollutant Discharge Elimination System (NJPDES) Discharge to Surface Water General Permit for Construction Activity - Storm water (Attachment 11)

All necessary permits were obtained prior to initiation of activities covered by the permits.

6.0 Reliability of Data: Validation and Usability

The purpose of this section is to ensure that analytical data produced by the laboratory are presented in a clear and useable format. In addition, data quality and technical usability was evaluated prior to data use. The samples collected at the site were analyzed according to USEPA SW-846 analytical methodologies, in which data reduction and reporting schemes are well developed and clearly defined. The employment of this method ensures comparability with other similarly analyzed environmental samples. Reduction, validation and reporting specifications for these analyses are detailed below. Validation Reports for all data packages are included in Attachment 5A.

Data, as presented in the analytical data packages included as Attachment 5B, was primarily reviewed and validated using the following combination of method-specific criteria with professional judgement, as appropriate:

- New Jersey Department of Environmental Protection (NJDEP) *Standard Operating Procedure: Quality Assurance Data Validation of Analytical Deliverables Inorganics (Based on USEPA SW-846 Methods), SOP No. 5.A.16* (NJDEP, 2002);
- United States (US) Environmental Protection Agency (EPA) *"National Functional Guidelines for Inorganic Data Review"*, OSWER Publication 9240.1-51, EPA540-R-10-011, January 2010 (US EPA, 2010);
- US EPA *"ICP-AES Data Validation, SOP No. HW-2a, Revision 15"* (USEPA, 2012);
- NJDEP *Standard Operating Procedure (SOP) for Analytical Data Validation of Hexavalent Chromium* (NJDEP, 2009).
- NJDEP, *Data of Known Quality Protocols Technical Guidance*, Version 1.0, April 2014.
- NJDEP, *Data Quality Assessment and Data Usability Evaluation Technical Guidance*, Version 1.0, April 2014.
- NJDEP, *Analytical Laboratory Data Generation, Assessment and Usability Technical Guidance*, Version 1.0, April 2014.
- NJDEP, *Quality Assurance Project Plan Technical Guidance*, Version 1.0, April 2014.

The analytical data have been found to be of adequate quality and of sufficient precision, accuracy, representativeness, comparability, completeness, and sensitivity for the intended purpose. Data associated with parameters that did not meet quality control (QC) specifications or compliance requirements, were qualified in accordance with US EPA Region II/NJDEP specifications/guidelines, as appropriate. No gross QC failures were noted and no data were rejected except as noted below. The investigator has confidence that the laboratory data are usable for their intended purpose as part of a remedial action to demonstrate compliance with applicable standards and criteria and close out AOCs. As the data quality objectives have been met, these analytical data may be relied on with confidence and used to support defensible conclusions regarding the site. Although some analytical data may have been qualified, the data generated during the course of the work detailed here were generally found to be usable, with the following cases of note:

<u>Sample Delivery Group (SDG) data packages JB85013A, JB85013, JB85013R, and JB85013RT</u>

As detailed in the validation report for JB85013, sample PPG63/65_B73 was affected by low soluble matrix spike recovery. Since the soluble MS recovery in QC Batch GP86008 was below QC limits (75-125%), the Cr+6 results for the samples in this QC batch are also subject to qualification, as estimated values to be flagged with "NJ-" for the potential low bias, as presented in Table 11 of the validation report. Although the soluble MS recovery in QC Batch GP86008 was less than 50%, the associated sample results (PPG63/65_B64R) were qualified as estimated values and flagged with "NJ-", rather than be rejected, because the insoluble recovery (64.2%) was above 50% and may be a better representation of the ability to recover Cr+6 from the soil matrix than that indicated by the soluble MS recovery value, a data usability approach previously discussed with Mr. Joseph Sanguiliano of the NJDEP. However, the non-detect result in PPG63/65_B73 (JB85013-7R) was rejected ("NR") as a conservative approach because of the total

chromium concentration of 319 mg/Kg. Like the initial Cr+6 analysis, the low soluble MS recovery again suggests a potential low bias in the ability to recover Cr+6 in this QC batch.

The PPG63/65_B73 location was re-sampled in March 2016 following over drilling activities (see Section 4.6.11). The new analytical data for sample at this location passed QC and was found to be usable.

SDG JB85287

As detailed in the validation report for JB85287, sample PPG63/65_B74 among others was affected by low soluble matrix spike recovery. Following evaluation of the MS recoveries, the Cr+6 results were qualified as estimated values and flagged with "NJ" due to the confounding recoveries. The results were not rejected because of the acceptability of the insoluble MS recovery that is perhaps better representative of the ability to recover Cr+6 from the soil matrix than that represented by the soluble MS recovery. The non-detect result in PPG63/65_B74 (JB85287-1) was possibly subject to rejection because the soluble MS recovery (- 3.2 %) was below the 50% criterion where DV guidelines recommend rejection of associated results (NJDEP, 2009). However, by evaluating the data usability of the reported results, it was judged appropriate to qualify the sample Cr+6 result as an estimated value flagged with "NJ", because of the acceptability of the insoluble MS recovery and the pH-adjusted post-spike recovery, as well as the elevated post-digestion MS recovery (141 %). These confounding MS recoveries suggest an indeterminate bias direction. The non-detect result in PPG63/65_B74 (JB85287-1) is supported by the reducing condition of the soil, and the acceptability of the insoluble MS recovery. Review of the chromium data for samples of PPG Site 63/65 indicates that almost all samples at Site 63/65 that exhibited total chromium results of 650 mg/Kg or less had, with few exceptions, corresponding Cr+6 results below the SCC limit. The decision not to reject the non-detect result in PPG63/65_B74 (JB85287-1) was based on the absence of a definitive bias and the acceptability of the insoluble MS recovery which may better represent the ability to recover Cr+6 from a soil matrix than the soluble MS recovery result.

SDGs JC16626/JC16626A

Following an additional review of historical site analytical data, which is referenced in Section 2.1, CB&I determined that previously reported exceedances for hexavalent chromium remained in historical soil boring locations SB5, SB11, SB13, and ED012. These locations were over-drilled in March 2016 (Section 4.6.11) and soil samples SB5-A, SB11-A, SB13-A, and ED012-A were collected. The qualified soil sample results from the initial Cr+6 analysis in SDG JC16626 are presented in Table 7 of the data validation report, alongside those qualified results obtained from the re-analysis of samples in SDG JC16626. Both sets of analytical Cr+6 results for the five soil samples and their reanalysis are qualified as estimated values (NJ-) due to a potential low bias, with the MS recoveries exhibiting similar recoveries in the re-analyses that were performed within the 30-day holding time. The Cr+6 concentrations determined during the re-analysis of samples in SDG JC16626 differ from those of the initial analysis, but differences may be attributable to sample non-homogeneity or, as mentioned above, possible outliers caused by the presence of potential false positives.

Professional judgement was applied in qualifying the Cr+6 results in both analyses as estimated values (NJ-) from the Method 7196A analyses due to a potential low bias, as suggested by the MS results. Although the soluble MS recoveries were below 50% in the initial and re-analysis of the soil sample analyses for both affected QC batches analyzed by EPA Method 7196A, the Cr+6 results were not rejected, but qualified as estimated values flagged with "NJ-", based on data usability concepts as previously discussed with Mr. Joseph Sanguiliano of the NJDEP. Data validation guidance rarely recommends rejection of detected sample results (USEPA, 2010). All but one sample re-analysis result of these two QC batches exhibited detected Cr+6 results in the analyses associated with the 24% and 22.7% soluble MS recoveries. The corresponding total chromium concentrations displayed chromium results less than 30 mg/Kg, with one sample (JC16626-10) containing 244 mg/Kg chromium.

While three Cr+6 results exceeded the CrSCC in the initial analysis, no Cr+6 results of the reanalysis exceeded 3 mg/Kg Cr+6. The laboratory attributed the disparity in Cr+6 results to soil sample non-homogeneity. However, since Method 7196A is acknowledged to be affected by the presence of organic matter interferences, the disparity may also be associated with the organic materials of unknown composition within the soil matrix. Additionally, the insoluble MS recoveries were within QC limits for both the initial and re-analysis and may be a better representation of the ability of the analysis to recover Cr+6 from the soil matrix than the soluble MS recovery result and support the judgement to not reject the Cr+6 results for the observed low soluble MS recoveries. Furthermore, the Cr+6 results of the re-analysis using Method 7199 were non-detect results in four of the samples with a detected result of 0.86 mg/Kg in JC16626-1RA and these results support those exhibited by the re-analysis using Method 7196A. The QC results in the Method 7199 analysis all met QC requirements and the Cr+6 concentrations appear more consistent with the corresponding total chromium results, such that the unqualified results of the re-analysis using Method 7199 would be the preferable set of results to report, an approach supported by the laboratory. The decision to qualify the Cr+6 results, rather than reject, is supported by the acceptable insoluble MS and post spike recoveries within QC limits and the very low total chromium concentrations (< 30 mg/Kg) in all but one sample and the presence of these samples in a reducing soil environment, as characterized by the Eh-pH phase diagram positioning.

Following review of the initial and re-analyses, the data validator recommended that the results of the re-analysis from Method 7199 be reported, since they were not subject to qualification and appear consistent with the results of the total chromium analysis. Based on the results of the confirmatory analyses, it can be concluded that contamination is not present above the applicable criteria at these locations.

7.0 Receptor Evaluation

In order to assess potential impacts to human and environmental receptors associated with the Site, a receptor evaluation was conducted. As outlined in the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E), sensitive receptors are divided into four primary categories. The four receptor evaluation categories are summarized below:

- **Land Use**: Sensitive populations such as schools, playgrounds, daycare facilities, etc. within 200 feet of the subject property must be identified and evaluated.
- **Groundwater**: Groundwater use in the vicinity of an impacted property must be evaluated by conducting a well search. Further, any potable/domestic supply wells identified within 250 feet upgradient, 500 feet sidegradient, or 500 downgradient feet of a known point of groundwater contamination must be sampled.
- **VI**: If VOCs are present in groundwater above the NJDEP GWSL and/or free phase petroleum product is identified on a property and structures are located in the vicinity of the impacted media, VI must be evaluated.
- **Ecological**: An ecological evaluation consists of identifying COCs on an impacted property, identifying sensitive ecological receptors on or adjacent to an impacted property, and identifying potential migratory pathways between the COCs and any identified sensitive ecological receptors.

Each of the above referenced receptor categories are evaluated in the following subsections. A stand-alone copy of the *Receptor Evaluation Form* will be provided to the NJDEP under separate cover for administrative purposes.

7.1 Land Use

The Site is located in an industrialized area of Jersey City, New Jersey. No sensitive land use populations were identified on the Site or within 200 feet of the subject property.

7.2 Groundwater

A well search was completed in March 2016 to identify potentially potable wells located within the distances specified in N.J.A.C. 7:26E-1.14. Potentially potable wells were not identified within a ½-mile radius of the site. CB&I directed the installation of three permanent monitoring wells (MW-101 through MW-103) on the site in May 2016. Groundwater samples were collected from these wells using low-flow purging and sampling techniques on June 23, 2016 and July 21, 2016. The groundwater samples were analyzed for hexavalent chromium, total chromium, and CCPW-related metals.

The results of the groundwater sampling events revealed the presence of vanadium at concentrations of 1,090 parts per billion (ppb) in MW-101 and 173 ppb in MW-103 in June 2016 and 561 ppb in MW-101 and 121 ppb in MW-103 in July 2016. The NJDEP Groundwater Quality Standard for Class II-A Aquifers (GWQS) for vanadium pentoxide[4] is 60 ppb. Vanadium was not reported in excess of the laboratory method detection limit (MDL) in MW-102 during the June 2016 or July 2016 sampling event. Hexavalent chromium was not reported at concentrations in excess of the MDL in MW-101, MW-102, and MW-103. Total chromium was not reported at concentrations in excess of the MDL and/or the GWQS of 70 ppb in MW-101, MW-102, and MW-103. The remaining targeted contaminants were not reported at concentrations in excess of the MDL and/or respective GWQS during the June 2016 or July 2016 sampling event. The results of the initial groundwater investigation following soil remediation activities was documented in CB&I's *Summary of Results - Groundwater Remedial Investigation* correspondence, dated October 10, 2016. Additional remedial

[4] A GWQS has not been established for total vanadium. The USEPA Integrated Risk Information System (IRIS) database, which is incorporated into N.J.A.C. 7:9D by reference, has not assigned a Carcinogenic Slope Factor or Reference Dose for vanadium and a GWQS cannot be calculated.

investigation activities associated with groundwater at the site have been proposed and the results, including figures and analytical summary tables, etc., will be provided under separate cover in a forthcoming RIR.

PPG's responsibilities for groundwater contamination associated with the Site is limited to CCPW-related contaminants.

7.3 Vapor Intrusion

PPG's responsibilities for groundwater contamination associated with the Site are limited to CCPW-related contaminants, which do not pose a vapor intrusion risk. It should be noted that there is the potential for vapor intrusion issues to be associated with other historic operations that occurred at the Site in connection with Baldwin Oils (PI G000002333).

7.4 Ecological

In accordance with the requirements set forth in N.J.A.C. 7.26E-1.16, an Ecological Evaluation was completed at the Site in March 2016. As the entire Site consisted of historic fill and was fully developed, no ecological sensitive natural resource (ENSR) receptors have been identified on the subject property. The Site is surrounded on three sides by roads or asphalt paved driveways. On the northern boundary there is a thin strip of forested land that abuts a NJTA exit ramp. As all shallow CCPW-impacted soil has been removed from the site and replaced with clean fill from a NJ-licensed quarry, no CCPW-related contaminants of potential ecological concern (COPECs) are present that could pose a potential impact to any adjacent ecological receptors. As no COPECs are present, there are no contaminant migration pathways (CMPs) present at or off site. No further ecological evaluation is required.

8.0 Conclusions and Recommendations

8.1 Soil

Based on the results of the soil sampling conducted at the Site including the post-excavation sampling completed, as well as the documentation of the final grades of the excavation, and the supplemental investigations in 2016, this remedial action is found to be complete for AOC 3b, AOC 8, and AOC 9. The remedial action has removed CCPW-impacted soil and fill materials from the Site in a manner that is protective of public health, safety, and environment. Impacted materials have been replaced with clean fill from a New Jersey licensed quarry. Based on the results of the remedial action detailed herein, PPG requests the closure of AOC 3b, AOC 8, and AOC 9 by the NJDEP through the issuance of a No Further Action equivalent document.

8.2 Groundwater

Groundwater samples were collected from these wells using low-flow purging and sampling techniques on June 23, 2016 and July 21, 2016. The groundwater samples were analyzed for hexavalent chromium, total chromium and CCPW-related metals. The results of the groundwater sampling events revealed the presence of vanadium at concentrations in excess of the GWQS. The remaining targeted contaminants were not reported at concentrations in excess of the MDL and/or respective GWQS during the June 2016 or July 2016 sampling event. Additional remedial investigation activities associated with groundwater at the site have been proposed and the results, including figures and analytical summary tables, etc., will be provided under separate cover in a forthcoming RIR.

9.0 References

The following documents, publications, maps, etc. were used as source materials for this RAR:

- N.J.A.C. 7:26C – *Administrative Requirements for the Remediation of Contaminated Sites*, dated May 4, 2015.
- N.J.A.C. 7:26D – *Soil Remediation Standards*, dated May 7, 2012 (readopted without change April 27, 2015).
- N.J.A.C. 7:26E – *Technical Requirements for Site Remediation*, dated May 7, 2012.
- NJDEP *Field Sampling Procedures Manual*, dated August 2005 (last revised April 2011).
- NJDEP *Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria*, dated September, 2012.
- NJDEP *Development of Site-Specific Impact to Groundwater Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure* Guidance, dated November 2013.
- NJDEP Memorandum from Lisa P. Jackson to Irene Kropp, Subject: Chromium Moratorium, February 8, 2007.
- NJDEP Chromium Soil Cleanup Criteria, September 2008, revised April 2010.
- NJDEP Administrative Consent Order, Dated July 19, 1990.
- *Final IRM Workplan – Group 6 – Site 63/065*, IT Corporation, June 14, 1991
- *Draft Remedial Investigation Work Plan Group 12 – Site 63 – Baldwin Oil and Site 65 – Burma Road*, ICF Kaiser Engineers, Inc., November 1991
- *Draft Interim Remedial Action Report – Site 63 – Baldwin Oil Site – Site 065 – Burma Road Site*, IT Corporation, January 2000
- JCO between NJDEP, PPG, and the City of Jersey City, June 26, 2009.
- *Site Investigation Report*, IT Corporation, 2000
- *Preliminary Assessment/Phase I Environmental Site Assessment*, TRC Companies, 2011
- *Limited Phase II Site Investigation Report*, TRC Companies, August 2011
- *Remedial Investigation Workplan Non-Residential Chromate Chemical Production Waste Sites – Sites 63 and 65*, AECOM, March 2011
- *Receptor Evaluation*, AECOM, November 2012
- *Excavation Management Plan*, Spectra Energy, November 6, 2012
- *Excavation Management Plan Addendum*, Spectra Energy, November 26, 2012
- *Remedial Investigation Report*, TetraTech, April 2013

- *Final Remedial Action Workplan*, CB&I, August 2013
- *Summary of Results - Groundwater Remedial Investigation*, CB&I, October 10, 2016
- State of New Jersey Department of the Treasury Division of Taxation New Jersey Property Tax List Search, https://tre-dotnet.state.nj.us/TYTR_TLSPS/TaxListSearch.aspx

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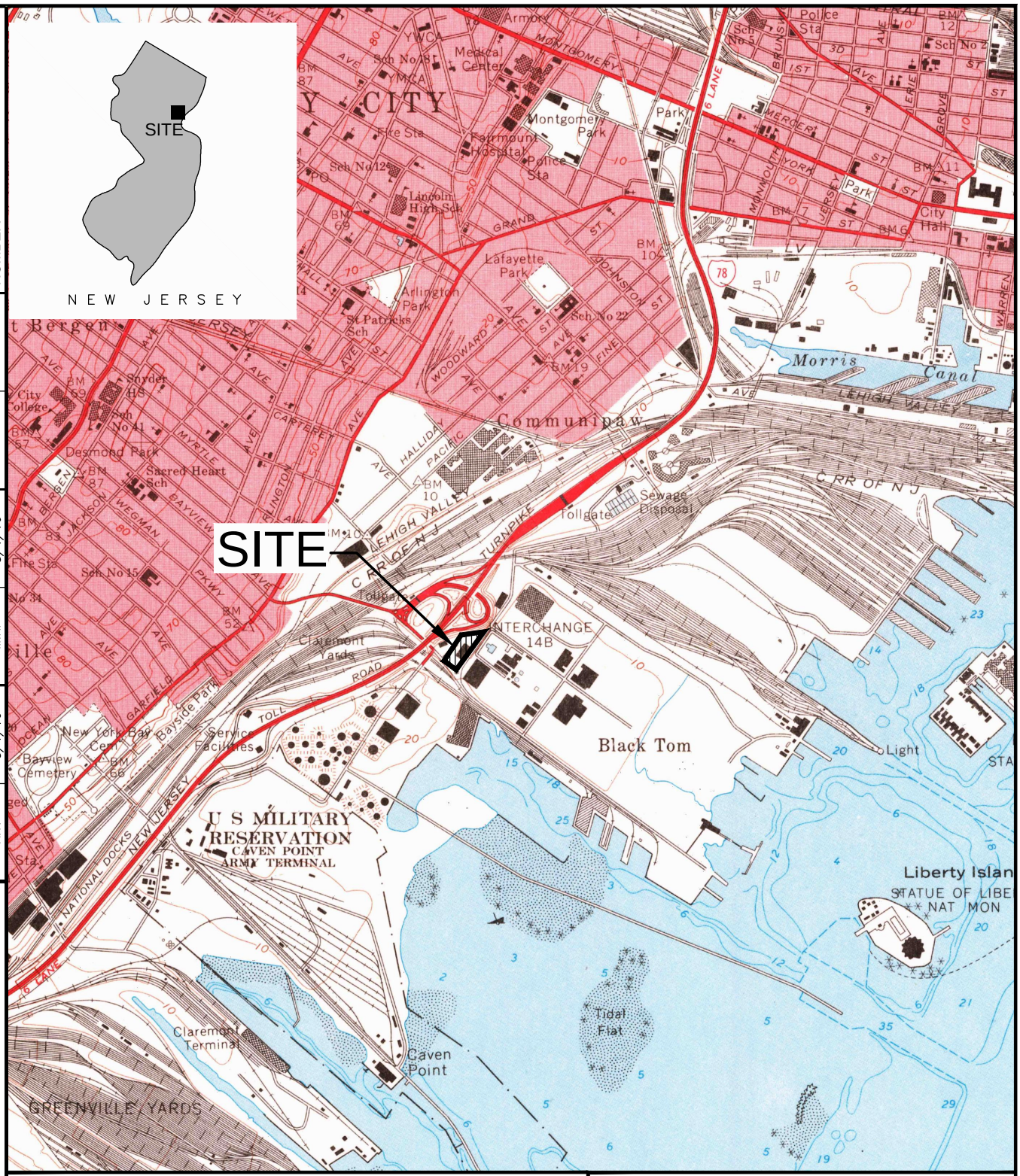
FIGURES



DRAWING NUMBER 146429-A1

	APPROVED BY	CHECKED BY	DRAWN BY
	--	3/1/16	3/1/16
	--	M.K.	A.Y.

N

SCALE

0 2000' 4000'

Site Coordinates:
Lat 40° 42' 03" N
Long 74° 04' 04" W

Sources:
JERSEY CITY, NJ USGS Topographic Quadrangle, 7.5-minute series, dated 1967

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200 Horizon Center
Trenton, New Jersey 08691

FIGURE 1

SITE LOCATION MAP

SITE 063
1 BURMA ROAD
JERSEY CITY, NEW JERSEY

File: K:\Project\146429-PPG\146429-A1.dwg
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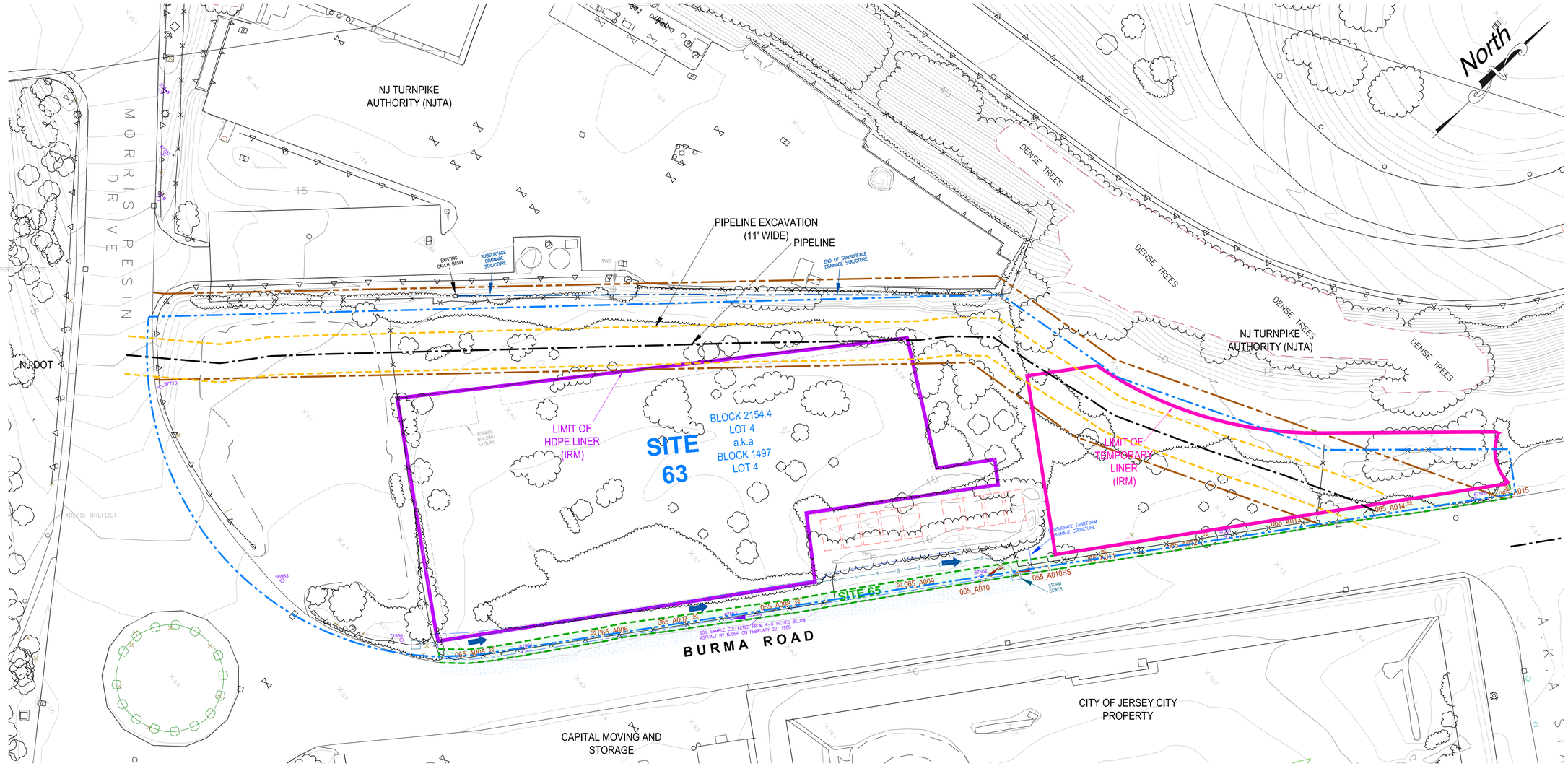
Plotted By: Andrius.Yanavicius

OFFICE
Trenton, NJ

DRAWING NUMBER
146429-D4-1



Legend

- SITE 63 BOUNDARY
- SITE 65 BOUNDARY
- 50' EASEMENT BOUNDARY
- DRAINAGE FLOW DIRECTION
- FORMER ABOVE GROUND STORAGE TANK
- SUBSURFACE FABRIFORM DRAINAGE STRUCTURE
- SUBSURFACE DRAINAGE STRUCTURE
- STORM SEWER
- PIPELINE CENTERLINE WITH 11' ROW
- a.k.a. ALSO KNOWN AS
- TRAFFIC SIGNAL
- RAILROAD SIGNAL
- SHRUB
- ROCK
- HYDRANT
- GATE/VALVE
- UNCERTAIN HYDRANT
- MANHOLE
- UNCERTAIN MANHOLE
- CATCH BASIN
- UTILITY BOX
- UNCERTAIN CATCH BASIN
- 67707 UTILITY POLE & POLE NUMBER
- STREET LIGHT
- GUY ANCHOR
- ELECTRIC DEVICE
- FLAG POLE
- ATHLETIC POLE
- POST
- ROAD SIGN
- U.S. MAIL DROP
- MONUMENT
- UNCERTAIN OBJECT
- × 723.8 SPOT HEIGHT
- DTM POINT
- TREE
- TREE LINE
- SCRUB LINE
- HEDGE ROW
- FENCE
- RETAINING WALL

Sources:

LIMITS OF HDPE LINER, SUBSURFACE FABRIFORM DRAINAGE STRUCTURE & STORM SEWER LOCATIONS TAKEN FROM IT CORPORATION'S DRAWING TITLED "EXTENT OF HDPE LINER", FILE NAME: GP12-017, DRAWING NUMBER 7-2, DATED JANUARY 11, 2000.

BASEMAP INFORMATION SUPPLIED BY C.T. MALE ASSOC.'S DRAWING TITLED "TOPOGRAPHIC SURVEY, SITES 63-65", DRAWING NUMBER 10.352, DATED JUNE 20,2010

LOT & BLOCK INFORMATION SOURCE:
1) HUDSON COUNTY DEPARTMENT OF PLANNING, HUDSON COUNTY, GIS SHAPEFILE, JANUARY 1,2007
2) NEW JERSEY GEOGRAPHIC INFORMATION NETWORK, MOD IV TAX PARCEL SEARCH DATABASE.

LOCATION OF FORMER ABOVEGROUND STORAGE TANKS TAKEN FROM IT CORPORATION'S DRAWING TITLED "EXISTING SAMPLING DATA" FILE NAME: GP12-012. DRAWING NUMBER 4-1, DATED JANUARY 11, 2000.

LOCATION OF SUBSURFACE DRAINAGE STRUCTURE TAKEN FROM IT CORPORATION'S DRAWING TITLED "SITE MAP" FILE NAME: GP12-010. FIGURE NUMBER 1, DATED JUNE 17, 1999.

LOCATION OF EXISTING TEXT BORINGS AND EXISTING POST-EXCAVATION SOIL SAMPLES TAKEN FROM IT CORPORATION'S DRAWING TITLED "EXISTING SAMPLING DATA" FILE NAME GP12-012. DRAWING NUMBER 4-4, LAST REVISED ON JANUARY 11, 2000

30 15 0 30
Scale in Feet

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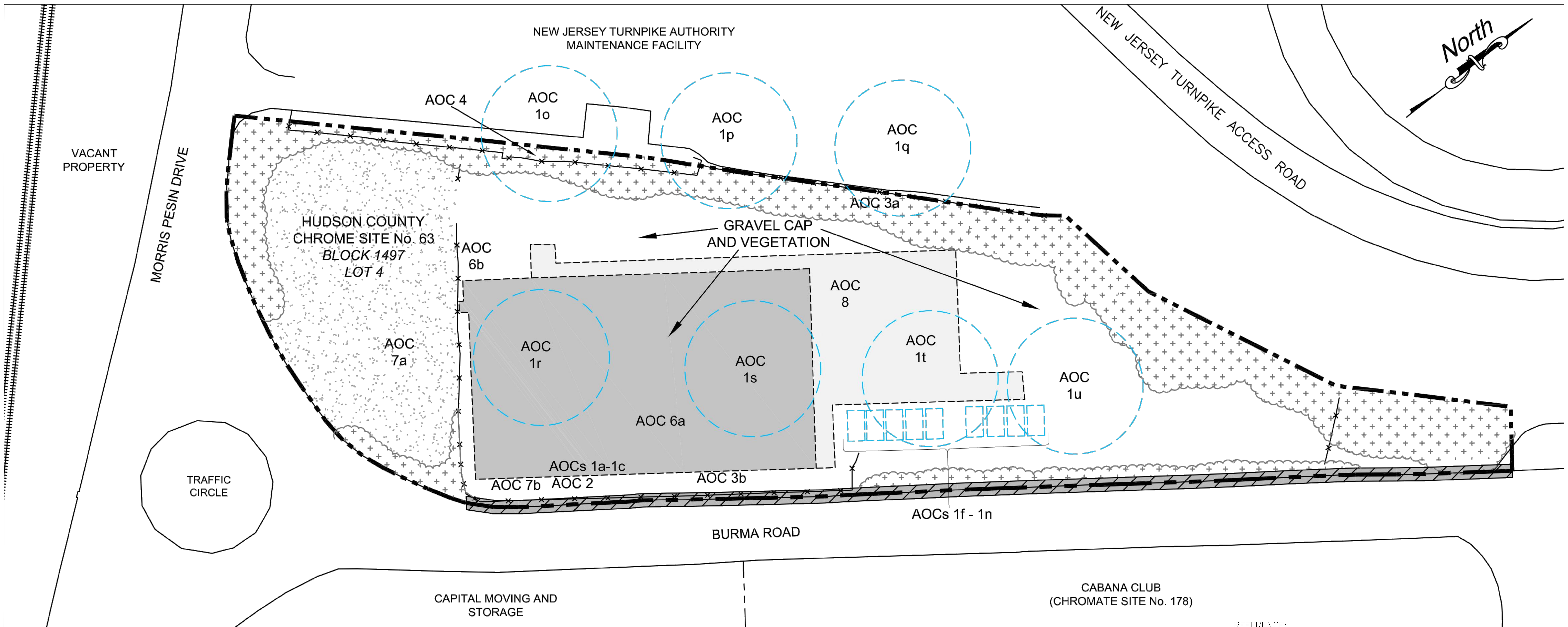
Trenton, New Jersey 08691

DESIGNED BY: --	PPG INDUSTRIES HUDSON COUNTY, NEW JERSEY			
DRAWN BY: A.Y.	FIGURE 2 SITE PLAN SITE 063 1 BURMA ROAD JERSEY CITY, NEW JERSEY			
CHECKED BY: M.K.				
APPROVED BY: M.K.	DATE: 3/1/16	SCALE: AS SHOWN	DRAWING NO. 146429-D4-1	REV. NO. -



REFERENCE:

"SITE PLAN WITH AREAS OF CONCERN" BY TRC ENVIRONMENTAL, DRAWING DATED JULY 2011.

0 60 FT.
APPROXIMATE SCALE

AREAS OF CONCERN

AOC	Description
AOC 1a	Former 500-Gallon AST - contents unknown
AOC 1b	Former 500-Gallon AST - contents unknown
AOC 1c	Former 500-Gallon AST - contents unknown
AOC 1d	Former 175-Gallon AST - contents unknown (not shown)
AOC 1e	Former 175-Gallon AST - contents unknown (not shown)
AOC 1f	Former 12,000-Gallon AST - Mineral Spirits (3,000-gallons) and Kerosene (9,000-gallons)
AOC 1g	Former 12,000-Gallon AST - VM & P Naphtha Solvent (3,000-gallons) and Mineral Spirits (9,000-gallons)
AOC 1h	Former 12,000-Gallon Linseed Oil AST
AOC 1i	Former 12,000-Gallon Linseed Oil AST
AOC 1j	Former 12,000-Gallon Linseed Oil AST
AOC 1k	Former 12,000-Gallon Bal-tine AST
AOC 1l	Former 12,000-Gallon AST - "Bal-tine" (3,000-gallons) and Turpentine (9,000-gallons)
AOC 1m	Former 12,000-Gallon Turpentine AST
AOC 1n	Former 12,000-Gallon Isopropyl Alcohol AST
AOC 1o	Former Large AST - contents unknown
AOC 1p	Former Large AST - contents unknown
AOC 1q	Former Large AST - contents unknown
AOC 1r	Former Large AST - contents unknown
AOC 1s	Former Large AST - contents unknown
AOC 1t	Former Large AST - contents unknown
AOC 1u	Former Large Water AST
AOC 2	Former Railroad Spur
AOC 3a	Western Drainage Ditch
AOC 3b	Eastern Drainage Ditch
AOC 4	Catch Basin
AOC 5	Historic Fill (not shown)
AOC 6a	Former Interior Hazardous Material Storage Areas
AOC 6b	Unidentified Drum
AOC 7a	Staining - Southern Portion of Site
AOC 7b	Staining - Southeastern Portion of Site
AOC 8	Former Loading Area
AOC 9	Chromium Soil Contamination (not shown)
AOC 10	Ground Water Contamination (not shown)
AOC 11	Dumping (not shown)

EXPLANATION

- SITE PROPERTY BOUNDARY
- CHAIN–LINK FENCE
- RAILROAD LINE
- VEGETATION
- APPROXIMATE LOCATION OF HUDSON COUNTY CHROME SITE No. 65
- FORMER BUILDING
- FORMER LOADING DOCK
- GRAVEL SURFACE
- FORMER ABOVEGROUND STORAGE TANK (AOCs 1f–1n)
- FORMER ABOVEGROUND STORAGE TANK (AOCs 1o–1u)

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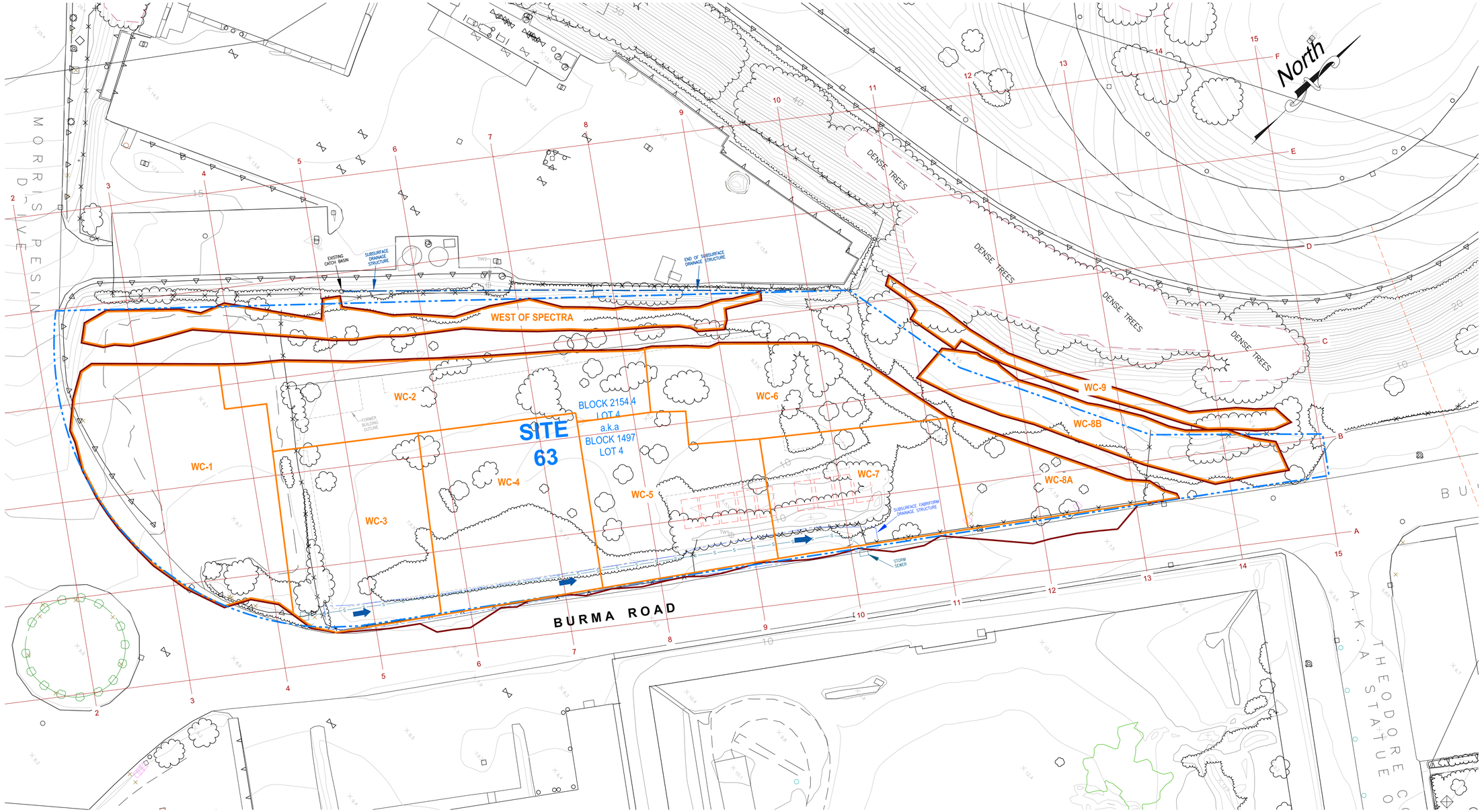
DESIGNED BY: --	PPG INDUSTRIES HUDSON COUNTY, NEW JERSEY
DRAWN BY: A.Y.	FIGURE 3 AOC MAP SITE 063 1 BURMA ROAD JERSEY CITY, NEW JERSEY
CHECKED BY: M.K.	
APPROVED BY: M.K.	DATE: 3/1/16 · SCALE: AS SHOWN · DRAWING NO. 146429–D4–2 · REV. NO. -

OFFICE Trenton, NJ

DRAWING NUMBER 146429-D4-3



Legend

- WC-8 — WASTE CLASSIFICATION AREA BOUNDARY AND ID
- EXCAVATION BOUNDARY
- SITE 63 BOUNDARY
- DRAINAGE FLOW DIRECTION
- FORMER ABOVE GROUND STORAGE TANK
- SUBSURFACE FABRIFORM DRAINAGE STRUCTURE
- SUBSURFACE DRAINAGE STRUCTURE
- S — STORM SEWER
- 60' GRID

30' 0 30'
SCALE: 1" =30'

REFERENCE:
SITE DRAWING BY AECOM, DRAWING FILE 2011-02-23_SamplingPlan 16. DWG

XREF Files: IMAGE Files: CB_Logo-Color-CMYK.jpg
Plotted By: Kevin Gonzalez

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Trenton, New Jersey 08691

DESIGNED BY: --	PPG INDUSTRIES HUDSON COUNTY, NEW JERSEY			
DRAWN BY: A.Y.	FIGURE 4 WASTE CLASSIFICATION AREA GRID MAP SITE 063 1 BURMA ROAD JERSEY CITY, NEW JERSEY			
CHECKED BY: M.K.				
APPROVED BY: M.K.	DATE: 3/7/16	SCALE: AS SHOWN	DRAWING NO. 146429-D4-3	REV. NO. -