

**PHASE II WORK PLAN
OPERABLE UNIT 3**

**VANADIUM CORPORATION OF AMERICA
NIAGARA FALLS, NEW YORK**

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1.0 INTRODUCTION

1.1 GENERAL

The Vanadium Corporation of America Site (Site) is located in Niagara Falls, Niagara County, New York. The Site location is presented on Figure 1.1 and a Site Plan is presented on Figure 1.2. The Site currently includes property parcels owned by Airco Properties, Inc., SKW Metals and Alloys, Inc., and the Power Authority of New York and Niagara Mohawk Power Corporation. The New York State Department of Environmental Conservation (NYSDEC) has designated the Site as a Class 2 inactive hazardous waste disposal site. NYSDEC has designated the SKW Metals and Alloys, Inc. parcel as Operable Unit 1 (OU1); the Airco Properties, Inc. parcel as Operable Unit 2 (OU2); and the New York Power Authority and Niagara Mohawk Power Corporation parcel as Operable Unit 3 (OU3).

An Order on Consent (Index No. B9-0470-94-12) was executed by NYSDEC and New York Power Authority, Niagara Mohawk Power Corporation, and Cypres Amax Minerals Company (Respondents) for OU3. The Order on Consent outlines the scope of work for conducting a Remedial Investigation/Feasibility Study (RI/FS) for OU3. As presented in the Order on Consent, the work to be performed will be done in a phased manner, as summarized below:

Phase 1 – Additional Data Collection;

Phase 2 – Evaluation of Human Health Impacts;

Phase 3 – Remedial Investigation Report; and

Phase 4 – Remedial Alternatives Analysis/Feasibility Study.

This document entitled "Phase II Work Plan" was prepared to meet the requirements of Phase 2 – Evaluation of Human Health Impacts. The Work Plan Organization is presented in Section 1.2.

1.2 WORK PLAN ORGANIZATION

The Phase 2 Work Plan is organized as follows:

Section 1.0 presents the introduction;

Section 2.0 presents Site background information;

Section 3.0 presents the Site setting;

- Section 4.0 presents a summary of chemical distribution;
- Section 5.0 presents the scope of work to complete the Human Health Risk Assessment;
- Section 6.0 presents the reporting requirements; and
- Section 7.0 presents the schedule for the scope of work as outlined in this Work Plan.

2.0 BACKGROUND

2.1 SITE DESCRIPTION

The Vanadium Corporation of America (Vanadium) site (Site) is located in Niagara Falls, Niagara County, New York. The property is bounded on the north by an automobile depot and vacant property, to the west by Witmer Road (Route 31), on the east by Interstate 190, and on the south by vacant land and industrial facilities. The nearest water bodies are the Lower Niagara River located approximately 1.4 miles west of the property and the New York Power Authority (NYPA) reservoir, located approximately 0.8 miles north of the property. These conduits transfer water from the Upper Niagara River, located to the south, to the NYPA reservoir. Numerous high voltage electrical transmission lines cross the Site.

The Site consists of a 25-acre parcel owned by Airco Properties, Inc. (Airco), a 27-acre parcel owned by SKW Alloys, Inc. (SKW), and right-of-way comprising approximately 88 acres owned by the Niagara Mohawk Power Corporation (NiMo) and the NYPA. The SKW parcel has been designated by NYSDEC as OU1, the Airco parcel has been designated as OU2, and the NYPA and NiMo parcel has been designated as OU3.

2.2 PREVIOUS INVESTIGATIONS

Several previous investigations have been performed at the Site. The majority of the previous investigations focussed on OU1 and OU2. In 1996, NYSDEC performed an investigation under the Immediate Investigative Work Assignment (IIWA) program to evaluate OU3. The investigation by NYSDEC included installing eight monitoring wells for groundwater sampling, 12 soil borings for soil sampling, two test pit samples to investigate the waste piles, and the collection of surface water and sediment samples from the existing pond. Please refer to the IIWA Report for more information (IIWA, 1997). Each sample was analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-Volatile Organic Compounds (SVOCs), and Total Analyte List (TAL) metals and hexavalent chromium. Table 2.1 presents a summary of samples collected and sampling parameters.

In 2001, Golder Associates performed supplemental investigations at the Site that included the collection and analyses of groundwater samples and water level measurements from the existing Site monitoring wells. Seven water samples were collected and analyzed for TAL metals and hexavalent chromium. Table 2.1 presents a

summary of samples collected and sampling parameters. Please refer to the Phase I Work Plan (CRA, 2003) for further information.

In 2003, Conestoga-Rovers & Associates (CRA) performed a Phase I Investigation at OU3. This investigation included the advancement of 15 soil borings for soil sampling, installation of 14 monitoring wells for shallow groundwater sampling, collection of hydraulic water level measurements, excavation of 21 test pit locations to delineate the extent of slag, collection of 31 surface soil samples from across the Site, and the collection of surface water and sediment samples from 17 locations from the existing ponds/water bodies on Site. All samples were analyzed for TAL metals and hexavalent chromium. The soil and sediment samples were also laboratory analyzed for pH. Table 2.1 presents a summary of samples collected and sampling parameters. For additional information, please refer to the Phase I Work Plan (CRA, 2003) and Phase I Letter Report (CRA, 2004).

3.0 SITE SETTING

This section summarizes existing geologic and hydrogeologic information for the Site. The information is based on previous investigations at the Site and at immediately adjacent properties.

3.1 GEOLOGY

The geologic structure beneath the Site consists of four units and includes, in descending order: fill material, glaciolacustrine deposits, glacial till, and bedrock. These geologic units are briefly discussed in the following sections. A cross-section of the Site geology is presented on Figure 3.2 of the Phase I Work Plan (CRA, 2003).

Fill Material

Fill material overlies much of the Site. The predominant fill material consists of whitish gray slag; cinders; and whitish gray, fine-grained, lime-like material. Over the majority of the Site, particularly the eastern side, the slag is covered with a layer of topsoil of varying thickness. Figure 1.2 shows the areas of the Site with exposed slag material at the ground surface. It should be noted that there are small areas on the eastern side of OU3 where the slag has been exposed. The fill thickness generally ranges from 1 to 21 feet.

Glaciolacustrine Deposits

Glaciolacustrine deposits directly underlie the fill unit, or are exposed at the surface in some areas. These deposits consist of laminated reddish brown to brown, soft to stiff, dry to moist, silty clays, clayey silts, sandy silts, and silty sands. The thickness of this unit generally ranges from 2 to 26 feet.

Glacial Till

The glacial till unit underlies the glaciolacustrine unit. The glacial till unit is relatively thin and consists of a dense, heterogeneous mixture of reddish brown to brown clay, silt, sand, gravel, and dolostone rock fragments. The till predominantly consists, however, of silt and clay. The thickness of this unit generally ranges from 1 to 7 feet.

Bedrock

Bedrock underlies the glacial till and consists of the Eramosa Dolostone of the Lockport Dolostone Group. This dolostone is characterized as dolostone/limestone, that is weathered to dense, medium to dark gray, fine to coarse crystalline, and thin to massively bedded. This formation also contains vugs that are filled with gypsum, dolomite, or calcite crystals. The depth to the top of the Eramosa Dolostone generally ranges from 7 to 32 feet below ground surface (bgs).

3.2 SITE HYDROGEOLOGY

The hydrogeologic structure beneath the Site consists of four units and includes, in descending order: a shallow hydrogeologic zone consisting of fill material and the upper portion of the glaciolacustrine deposit; an intermediate hydrogeologic zone (confining unit) consisting of the deeper portion of the glaciolacustrine deposit; a deep hydrogeologic zone consisting of the glacial till; and, the upper bedrock hydrogeologic zone. Monitoring well locations are presented on Figure 3.1.

Shallow Hydrogeologic Zone

Historical groundwater data for monitoring wells completed in the shallow hydrogeologic zone (see Figure 3.1) indicate that groundwater in this zone is mainly in the fill material, perched on top of the glaciolacustrine deposit, and within the upper portion of the glaciolacustrine deposit. Figures 2.2 to 2.5 of the Phase I Letter Report (CRA, 2004) present the shallow aquifer groundwater contours. Water levels in this zone fluctuate widely due to precipitation and evaporation. Water levels are generally higher during wet weather conditions, and lower during hot weather conditions. Historical water level data suggest that perched groundwater under the Site flows to the south and southwest, toward a topographic low.

Intermediate Hydrogeologic Zone

During historical investigations, ten soil borings were advanced into the glaciolacustrine deposit at the Site, from which soil samples were collected for hydraulic conductivity testing. The results for vertical hydraulic conductivity ranged from 1.00×10^{-9} cm/s to 3.50×10^{-6} cm/s, with the arithmetic mean and geometric mean being 3.67×10^{-7} cm/s and 1.52×10^{-8} cm/s, respectively. Previous investigations have therefore characterized this zone as a confining layer, restricting downward movement of groundwater from the shallow to the deep hydrogeologic zone.

Deep Hydrogeologic Zone

Historical groundwater data for monitoring wells completed in the glacial till indicate the presence of a groundwater divide that generally trends northwest-southeast through the center of the Site. Figure 3.5 of the Phase I Work Plan (CRA, 2002) shows historical deep overburden aquifer groundwater contours. From the groundwater divide, groundwater in the deep hydrogeologic zone flows toward the northeast and southwest. Monitoring wells completed in the glacial till in the eastern portion of the Site are typically dry due to the dewatering effect of the NYPA conduits.

Upper Bedrock Hydrogeologic Zone

Historical groundwater data for monitoring wells completed in the upper bedrock indicate the presence of a groundwater divide, generally coincident with the groundwater divide in the deep hydrogeologic zone. Figure 3.6 of the Phase I Work Plan (CRA, 2002) shows historical bedrock aquifer groundwater contours. From the groundwater divide, groundwater in the upper bedrock hydrogeologic zone flows toward the northeast and southwest. The NYPA conduit crosses under the eastern edge of the Site. Previous investigations have reported a steep horizontal gradient in the upper bedrock groundwater flow as it approaches the NYPA conduits.

4.0 ENVIRONMENTAL CONDITIONS

Through previous investigation at OU3, it has been determined that the primary contaminants are TAL metals, hexavalent chromium, and pH. The following sections provide brief discussions of the chemical distribution in surface soil, subsurface soil, sediment, surface water, and groundwater. It is to be noted that surface soil and subsurface soil also include slag material.

4.1 SURFACE SOIL

The results of the Phase I investigations indicate that beryllium, total chromium, copper, iron, mercury, nickel, selenium, vanadium, and zinc were detected above the NYSDEC TAGM 4046 Determination of Soil Cleanup Objectives and Cleanup Levels (RSCOs). Elevated hexavalent chromium and pH values were also detected in surface soils. In general, the highest concentrations of total and hexavalent chromium, copper, nickel, and selenium in the surface soils were detected in the areas of exposed slag. Lower concentrations were generally detected in areas where the slag is covered by common fill or topsoil. More information can be found in the Phase I Letter Report (CRA, 2004).

4.2 SUBSURFACE SOIL

The samples collected from the slag/fill material have elevated concentrations of primarily total chromium, hexavalent chromium, and pH relative to the underlying native soil. Some of the slag samples also had elevated concentrations of copper, nickel, and zinc relative to the native soils. Several slag/fill and native soil samples also had concentrations of arsenic above the RSCO. Additional information is provided in the Phase I Letter Report (CRA, 2004).

4.3 SEDIMENT

The results of the Phase I investigations indicate that in general, total chromium, copper, manganese, and zinc were detected at concentrations above the NYSDEC Lowest Effect Levels (LELs) and Severe Effect Levels (SELs) in sediment samples. Elevated hexavalent chromium and pH values were also detected in sediments. The highest concentrations of total chromium were detected in the ditch at the north end of the Site, north of and within the large pond in the middle of the Site, as well as at the western end of the ditch that runs along the southern portion of the Site adjacent to the fence line and across

Witmer Road. The highest concentrations of manganese and zinc were also found at the western end of the ditch and across Witmer Road. Hexavalent chromium was only detected north of the large pond in the center of the Site. The highest pH values were detected around the large pond in the middle of the Site, the ditch that runs along the fence line at the north end of the Site, south of the slag area, and the east end of the ditch running along the southern portion of the Site.

4.4 SURFACE WATER

The results of the Phase I investigations indicate that in general, iron and thallium were detected at concentrations above the NYSDEC Ambient Water Quality Standards (AWQS) in the surface water. Elevated concentrations of hexavalent chromium were also detected in surface water. The highest concentration of total chromium was detected along the ditch at the southwestern end of the Site. The highest concentrations of hexavalent chromium were detected along the western edge of the identified slag area.

4.5 GROUNDWATER

The historical groundwater data indicate that the shallow groundwater is impacted with elevated concentrations of primarily total chromium, hexavalent chromium, and manganese. Much lower concentrations of these parameters were detected in the overburden and bedrock wells. The historical Site data are presented in the Phase I Work Plan (CRA, 2003).

During the Phase I investigations, only shallow groundwater monitoring wells were sampled. The results of the Phase I investigations indicate that the highest concentrations of total chromium and total hexavalent chromium in shallow groundwater were detected in the center of the Site. Additional information can be found in the Phase I Letter Report (CRA, 2004).

5.0 HUMAN HEALTH RISK ASSESSMENT

A baseline Human Health Risk Assessment (HHRA) will be conducted for the Site. The purpose of the HHRA is to evaluate the potential human health risks posed by Site-related chemicals under current and potential future Site conditions, assuming no additional remedial actions are taken at the Site. The specific goals of the risk assessment are:

- Identify and provide analysis of baseline risks (defined as risks that might exist if no further remediation were applied at the Site) and identify what areas of the Site may require further remedial action;
- Provide a basis for determining the level of chemicals that can remain on Site and still not adversely impact public health; and
- Provide a basis for comparing potential health impacts of various remedial alternatives.

5.1 REGULATORY GUIDANCE

This section presents the proposed HHRA for the Site developed in accordance with the following Comprehensive Environmental Response, Compensation, and Liability Act of 1989 (CERCLA) guidance, the Risk Assessment Guidance for Superfund (RAGS):

- USEPA Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part) A, EPA/540/1-89/002, December 1989.
- USEPA RAGS Supplemental Guidance, Standard Default Exposure Factors, Interim Final, OSWER Directive 9285.6-03, March 25, 1991.
- USEPA Exposure Factors Handbook, EPA/600/P-95/002Fa, August 1997.
- USEPA RAGS Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments, Interim, Publication 9285.7-O1D, January 1998.
- USEPA RAGS Part E, Supplemental Guidance, Dermal Risk Assessment, Final, July 2004.

5.2 BASIC FRAMEWORK

The HHRA will be conducted following the basic framework provided in USEPA RAGS (1989). In general, a HHRA includes the following components:

- Identification of Contaminants of Concern (COCs);
- Exposure Assessment;
- Toxicity Assessment; and
- Risk Characterization.

5.2.1 IDENTIFICATION OF CONTAMINANTS OF CONCERN (COCs)

As part of the Identification of COCs step, the nature and extent of Site contamination is determined through analysis of the chemical database for the exposure media. In addition, the background Site conditions will also be established, if possible. Soil and sediment analytical data collected during the Phase I investigation and previous Site investigations will be used in the HHRA. Only the surface water and groundwater analytical data collected within the last two years will be used in the HHRA as these data are considered to be most representative of current conditions.

For each medium of concern, all relevant analytical data collected will be tabulated in a database and examined to evaluate the chemicals present, their distribution and the potential cross-media migration of chemicals. Analytical data will be validated prior to application in the HHRA. Non-detect sample results for a chemical will be included in the assessment if the chemical has been positively detected in another sample of the same medium. Estimated results, usually indicated by a qualifier, will be included in the evaluation. Duplicate samples will be averaged and considered as one sample.

As part of the Identification of COCs, the selection of COCs for each medium will be completed using a screening process. The COC screening process that will be applied involves a comparison of the maximum detected concentration of each contaminant in a specific medium to a risk-based concentration associated with target risks and conservative default exposure assumptions. The most up-to-date risk-based concentrations (RBCs) from USEPA Region III and Region IX and NYSDEC TAGM 4046 Determination of Soil Cleanup Objectives and Cleanup Levels will be used to identify COCs in the soils for the HHRA. COCs in groundwater will be identified based on a comparison to the primary maximum contaminant Levels (MCLs). For each medium, chemicals with maximum concentrations less than their respective screening value will not be identified as COCs, and will not be retained in the HHRA quantitative process.

5.2.2 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is to estimate the magnitude and frequency of potential human exposure to each COC identified in each exposure medium. In accordance with USEPA guidance, both Reasonable Maximum Exposure (RME) and Central Tendency (CT) exposure scenarios will be determined and evaluated in the HHRA. The RME scenario typically uses upper-bound estimates of exposure, whereas the CT scenario uses more average estimates of exposure. For each exposure variable used to estimate the chemical dose for an evaluated exposure scenario, both a CT and a RME value will be identified, such that the calculated exposure doses will result in a range of exposure and risk.

RME and CT exposure point concentrations will be developed for each COC in each medium consistent with the USEPA guidance including "Supplemental Guidance to RAGS: Calculating the Concentration Term" (Office of Solid Waste and Emergency Response, Publication No. 9285.7-081, May 1992), "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites" (Office of Emergency and Remedial Response, OSWER 9285.6-10, December 2002), and "Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9, QA00 Update" (Office of Environmental Information, EPA/600/R-96/084, July 2000). RME exposure point concentrations will be the lower of the 95th percentile upper confidence level (UCL) and the maximum detected concentration. Appendix A contains the methodology used to calculate the CT and RME exposure concentrations.

To determine whether an exposure to COCs in a medium exists, the environmental and human components that lead to human exposure must be evaluated. An exposure pathway consists of four necessary elements:

- i) a source and mechanism of chemical release to the environment;
- ii) an environmental transport medium;
- iii) a point of potential human contact within the impacted medium (exposure point); and
- iv) a human exposure route (ingestion, dermal contact, or inhalation) at the contact point.

As part of the HHRA, exposure pathways will be determined to be complete, potentially complete, or incomplete. For an exposure pathway to be complete, the aforementioned four elements must be present, which indicates that the exposure is occurring. Potentially complete exposure pathways have one element temporarily missing, which

may reasonably be complete in the future. Incomplete exposure pathways have one or more elements missing which, within reason, will never be present. Complete and potentially complete exposure pathways will be evaluated in the HHRA, while incomplete exposure pathways will not be retained in the risk assessment process.

5.2.2.1 CONCEPTUAL SITE MODEL

A preliminary conceptual site model (CSM) has been developed based on the existing data. The purpose of the preliminary CSM is to define the dynamics of the Site and to provide an aid in understanding and describing the Site.

Exposure pathways involving soils typically include direct contact to COCs in soil through incidental ingestion and dermal contact. Indirect exposure pathways for soil can involve soil-to-air, soil-to-groundwater, and soil-to-biota (i.e., vegetative cover).

Exposure pathways involving groundwater typically include direct contact to COCs in water through ingestion of potable drinking water and dermal contact. Indirect exposure pathways for groundwater can involve groundwater-to-air, groundwater-to-surface water, and groundwater-to-biota (i.e., groundwater uptake by vegetative cover). There is no current use of groundwater at the Site, including ingestion as a potable source. Groundwater at the Site discharges into the NYPA underground hydro conduits where it is conveyed to the forebay before ultimately discharging to the Niagara River. Hence, there is no potential for groundwater at the Site to impact groundwater off Site.

Currently, there are no buildings on Site. It is highly unlikely that any buildings would be constructed on the Site in the future. Nevertheless, to be conservative, the soil-to-indoor air and groundwater-to-indoor air will both be evaluated as a potential future exposure.

Exposure pathways involving air typically include direct inhalation of COCs in air.

A preliminary graphical CSM for OU3 is provided on Figure 5.1. At this stage, the preliminary CSM is conservative and includes all potentially complete exposure pathways. Some exposure pathways, while potentially complete, may ultimately be determined to be insignificant and not evaluated in the HHRA based on new data collected as part of the ongoing studies at the Site.

An exposure pathway is the course a COC takes from the source to the potential receptor. In developing potentially significant exposure pathways, consideration was

given to current and reasonably expected future land uses. The current and future land uses considered in the preliminary CSM are:

- Current: vacant industrial land and utility corridors; and
- Future: vacant industrial land and utility corridors.

Based on these assumptions and the results of the media-specific screening, the exposure scenarios and pathways that maybe quantified in the HHRA are summarized in Figures 5.1. The preliminary CSM shown on Figure 5.1, presents a summary of the exposure media, exposure pathways, exposure routes, and exposed receptors that will be potentially considered in this HHRA. The following media and potential human exposures (i.e., complete pathways) that potentially may be identified for quantitative evaluation in the HHRA are:

1. On-Site Surface Soil – Current/Future Condition:
 - Dermal contact with surface soil by trespassers; and
 - Incidental ingestion of surface soil by trespassers.
2. On-Site Surface Soil – Future Condition:
 - Dermal contact with surface soil by industrial/commercial workers; and
 - Incidental ingestion of surface soil by industrial/commercial workers.
3. On-Site Soil (surface and subsurface) - Future Condition:
 - Dermal contact with soil by construction/utility workers; and
 - Incidental ingestion of soil by construction/utility workers.
4. On-Site Groundwater – Future Condition:
 - Dermal contact with groundwater by construction/utility workers; and
 - Incidental ingestion of groundwater by construction/utility workers.
5. Air – Current/Future:
 - Inhalation of airborne particulate and volatile COPCs originating from surface soil by trespassers; and
 - Inhalation of volatile COPCs originating from groundwater by trespassers.
6. Air – Future:
 - Inhalation of airborne particulate and volatile COPCs originating from surface soil by industrial/commercial workers;
 - Inhalation of airborne particulate and volatile COPCs originating from soil by construction/utility workers during an excavation event;

- Inhalation of volatile COPCs originating from groundwater by construction/utility workers during an excavation event;
 - Inhalation of volatile COPCs originating from groundwater by industrial/commercial workers; and
 - Inhalation of indoor air COPCs originating from soil and groundwater by industrial/commercial workers.
7. Surface Water - Current/Future:
- Dermal contact with surface water by trespassers;
 - Incidental ingestion of surface water by trespassers; and
 - Inhalation of vapors originating from surface water by trespassers.
8. Surface Water - Future:
- Dermal contact with surface water by industrial/commercial and construction/utility workers;
 - Incidental ingestion of surface water by industrial/commercial and construction/utility workers; and
 - Inhalation of vapors originating from surface water by industrial/commercial and construction/utility workers.
9. Sediment – Current/Future:
- Dermal contact with sediment by trespassers; and
 - Incidental ingestion of sediment by trespassers.
10. Sediment –Future:
- Dermal contact with sediment by industrial/commercial and construction/utility workers; and
 - Incidental ingestion of sediment by industrial/commercial and construction/utility workers.

5.2.3 TOXICITY ASSESSMENT

The purpose of the Toxicity Assessment is to identify the types of adverse health effects a compound may potentially cause, and to define the relationship between the magnitude of exposure (dose) and the occurrence of specific health effects for a receptor (response). Adverse effects are designated by USEPA as either carcinogenic or non-carcinogenic. USEPA has derived dose-response toxicity factors for various compounds. The dose-response factors for potential carcinogenic compounds are termed Cancer Slope Factors (CSFs), and dose-response factors for potential

non-carcinogenic compounds are termed Reference Doses (RfDs). The Toxicity Assessment will provide a description of the USEPA methodology towards deriving CSFs and RfDs. The most up-to-date toxicity factors (RfDs and CSFs) for the COCs will be obtained from the latest version of the USEPA Region III RBC Table. If no information is available regarding the toxicity of a contaminant for a particular complete pathway, extrapolation of data from other exposure routes will be utilized.

Toxicity factors are available for the inhalation and oral ingestion exposure routes. Oral toxicity factors will be applied in evaluating risk from dermal exposures, accounting for potential differences between absorbed versus administered doses as specified in USEPA dermal guidance (USEPA, 2004). The toxicity factors will be presented in the HHRA in tabular form along with the COCs Chemical Abstracts Service (CAS) number, source, primary target organ (non-carcinogens), combined uncertainty/modifying factor (non-carcinogens), EPA weight of evidence cancer classification, dermal adjustment factor, and publication date.

5.2.4 RISK CHARACTERIZATION

The Risk Characterization combines the results of the Exposure Assessment with the results of the Toxicity Assessment to derive quantitative estimates of cancer risk and non-cancer hazard for each evaluated exposure scenario. The potential for both non-carcinogenic and carcinogenic effects is estimated for each potential exposure pathway for each exposure scenario evaluated in the HHRA.

An uncertainty assessment will be conducted as part of the Risk Characterization to provide a discussion on the uncertainty associated with the many assumptions used throughout the risk assessment process.

6.0 REPORTING

The Phase II Report will be submitted in the form of a bound report, and will present the Human Health Risk Assessment. The report will follow the following format:

- Section 1.0: Introduction
Presents background information relevant to the HHRA, presents the purpose of the HHRA, and outlines the organization of the HRHA.
- Section 2.0: Hazard Identification
Presents a brief summary of the nature and extent of the contamination or hazard identification due to the historical operations at the Site, presents the Conceptual Site Model (CSM), and presents the selection of Contaminants of Concern (COCs).
- Section 3.0: Exposure Assessment
Presents a summary of the exposure settings, identifies the potential exposure pathways, and quantifies exposure based on the exposure assumptions.
- Section 4.0: Toxicity Assessment
Presents a summary of the toxicity data used to calculate the non-carcinogenic hazards and carcinogenic risks.
- Section 5.0: Risk Characterization
Presents an assessment of the potential risks to human health posed by soil, groundwater, surface water, sediment, and air impacts and includes the uncertainty analysis.

7.0 SCHEDULE

The schedule for completing the HHRA and preparing the Phase II Report is presented on Figure 7.1.

8.0 REFERENCES

- Conestoga-Rovers & Associates (CRA), 2004. Phase I Letter Report. Vanadium Corporation of America, Niagara Falls, New York. Dated August 6, 2004.
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