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June 8, 2020

Mr. David Ohori
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Subject: Reclamation and Post-Reclamation Radiological Survey Work Plan; Permit CI002RE, Rev. 13-2; Mt. Taylor Mine

Dear Mr. Ohori,

Please find attached the Reclamation and Post-reclamation Radiological Survey Work Plan as required in Section 9.L.3 of the Mt Taylor Mine Permit CI002RE, Rev. 13-2.

If you have any questions, please contact me at (505) 287-7971 or by email at bruce.norquist@ga.com. A hard-copy of this document is also being sent by regular mail.

Sincerely,

Bruce L. Norquist

Bruce Norquist
Facilities Manager, Mt. Taylor Mine
Rio Grande Resources Corporation

CC: Ashlynne Winton, NMED (via email)

Work Plan for Post-Mining Radiological Surveys of Permit Area and Impacted Lands

Mount Taylor Mine

Cibola County, New Mexico

Revision 0

Prepared for:

RIO GRANDE RESOURCES

Mount Taylor Mine

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1. INTRODUCTION

The Mt. Taylor Mine (Site) is a uranium mine in Cibola County near the town of San Mateo, New Mexico (Figure 1). Owned and operated by Rio Grande Resources (RGR), the Site is situated at the foot of Mount Taylor, an extinct volcano. The purpose of this Work Plan is to specify the analytical methods to be used to identify and characterize radiological impacts to soil in the mine permit area and other land areas due to historic mining operations, and after remediation, to verify compliance with regulatory release criteria.

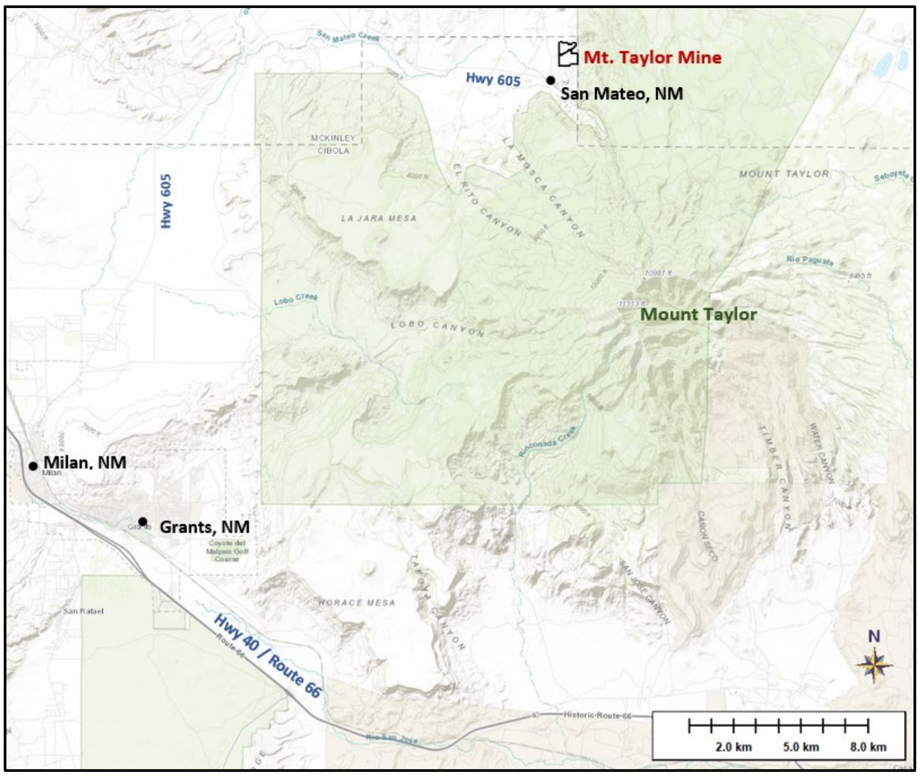

Figure 1: Location of the Mt. Taylor Mine and nearby communities in New Mexico.

Approved by the Mining and Minerals Division (MMD) of the New Mexico Energy Minerals and Natural Resources Department, the Mine Closeout/Closure Plan (RGR, 2013) specifies the following:

> *"The site surveying methodologies will be the portions of the Multi-Agency Radiation Survey and Site Investigation Manual (or equivalent methodologies) for soil characterization that are applicable to uranium mine reclamation. As allowed by MARSSIM, the release criteria of 6.8 pCi/g Ra-226 will be used in lieu of a derived concentration guideline limit (DCGL). Alternatively, portions of MMD's Draft Guidance for Meeting Radiation Criteria Levels and Reclamation at New Uranium Mining Operations may be utilized; however, in its draft form it is written specifically to new mines. All radiological surveys will be conducted by health physicists and health physics technicians."*

These specifications are consistent with regulatory guidance found in the "*Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico*" from MMD and the Mining Environmental and Compliance Section of the New Mexico Environment Department (NMED)

(MMD/NMED, 2016). This Work Plan is designed to incorporate specifications of the MMD/NMED "Joint Guidance" (MMD/NMED, 2016) as well as applicable elements of MARSSIM, the Multi-Agency Radiation Site Survey and Investigation Manual (USNRC, 2000).

In addition to remediation of radiologically impacted land areas, the approved Mine Closeout/Closure Plan (RGR, 2013) specifies the following with respect to buildings that will remain onsite for the post-mine land use (PMLU):

> *"Gamma radiation surveys have been performed routinely on the surface of the service and support area and will continue during closeout, with gamma surveys performed at least monthly and contamination surveys performed at least weekly. After closeout activities are completed, a contamination survey will be performed in buildings retained for PMLU. The radiation and contamination surveys will be used as a part of the radiation safety program to monitor radiation dose and to control intakes of radioactive materials."*

The intent of these specifications is that during closeout activities (e.g. remediation of land areas and radiological surveys of buildings to be retained for the PMLU), radiation safety protocols and monitoring will be used to protect workers and the public under the requirements of the Radiation Protection Program (RPP) and associated Standard Operating Procedures (SOPs) (RGR, 2020). The commitment for post-closeout contamination surveys of buildings retained for the PMLU is not specific, and there is no discussion of this issue in the MMD/NMED Joint Guidance (MMD/NMED, 2016).

Based on guidance found in NRC Regulatory Guide 8.30 for uranium recovery facilities (USNRC, 2002), the survey methods and criteria for unrestricted release of equipment as specified in the RPP/SOPs are assumed to represent acceptable radiological conditions in buildings retained for the PMLU after Site closeout. This assumption does not apply to buildings or indoor workspaces where licensed activities have occurred under Radioactive Materials License (RML) SO043-12 with the Radiation Control Bureau (RCB) of the New Mexico Environment Department (NMED). Facilities at the Mt. Taylor Mine that are subject to licensing requirements are believed limited to the ion-exchange (IX) building, Room 203 of the former Administrative Building (where licensed instrument calibration standards are stored), and portions of the former core shed building where licensed instrument calibration sources may have once been used to support an onsite laboratory for analysis of effluent discharge samples. Licensed facilities will be evaluated under a separate Decommissioning Plan based on the guidance in NUREG-1757 (USNRC, 2006).

2. RADIOLOGICAL RELEASE CRITERIA

The MMD/NMED Joint Guidance specifies the following radiological criteria for release of radiologically impacted land areas based on radium-226 (Ra-226) concentrations in soil:

1) The concentration of Ra-226 in land averaged over any area of 100 square meters (m^2) shall not exceed the background level by more than:

    (a) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and

    (b) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.

2) Site post-reclamation radiation level ("PRRL") for gamma radiation should not exceed the site-specific value of gamma radiation that correlates to 5 pCi/g Ra-226 above background at the 95th percentile value.

3) For sites at which contaminated material exceeding the target radium activity level discussed above is emplaced in an on-site repository, cover material for the repository must achieve radon flux equal or less than 20 pCi/m^2/s.

The MMD and NMED have previously approved a representative background soil Ra-226 concentration for the Mt. Taylor Mine Site of 1.8 pCi/g (RGR, 2013), giving a total (gross) soil release criterion of 6.8 pCi/g Ra-226. An equivalent PRRL of 24 µR/hr has been identified based on a prior, Site-specific statistical regression between Ra-226 concentrations and terrestrial gamma radiation levels (see Section 3.2.1).

3. HISTORICAL SITE ASSESSMENT

One of the first steps in a MARSSIM-based radiological survey is to perform a Historical Site Assessment (HSA). MARSSIM specifies the following objectives for the HSA:

1. <u>Identify potentially contaminated areas</u>.
   - Classification of investigation areas as "impacted" or "non-impacted" based on historical information, process knowledge and any previous site data.
   - Informs the technical approach, scope, and design of radiological surveys.
2. <u>Identify the nature of the contamination</u>.
   - Identification of specific radionuclides and physical/chemical forms likely to be present.
3. <u>Identify potentially contaminated media</u>.
   - For MARSSIM-based surveys, relevant media are limited to contaminated surface soils and surface contamination on structures.

The following subsections provide historical information for the HSA.

3.1 Operational History

Gulf Mineral Resources Company (Gulf) acquired the property and began mine development in 1971. Ore production occurred between 1979 – 1982, and after a transfer of ownership to Chevron Resources Company (Chevron) in 1985, production resumed through 1990. RGR acquired the mine and other Chevron property in 1991. In 1999 the Mine entered standby status under Mine Permit C1002RE with MMD. On December 29, 2017, the permit changed to an active status, and on December 3, 2019, RGR notified MMD of intentions to begin the Site closeout/closure process.

Based on institutional knowledge of historic Site operations, potentially impacted land areas are expected to include 1) onsite locations within fenced (access controlled) portions of the mine permit area (Figure 2, left), 2) adjacent and/or hydrologically downgradient arroyos or ephemeral runoff drainages, 3) a maintained, graveled access road that bisects the mine site (State Highway 334), and 4) a 6.5 km discharge pipeline corridor and outfall receiving area in San Lucas Canyon under Discharge Permit DP-61 (Figure 2, right).

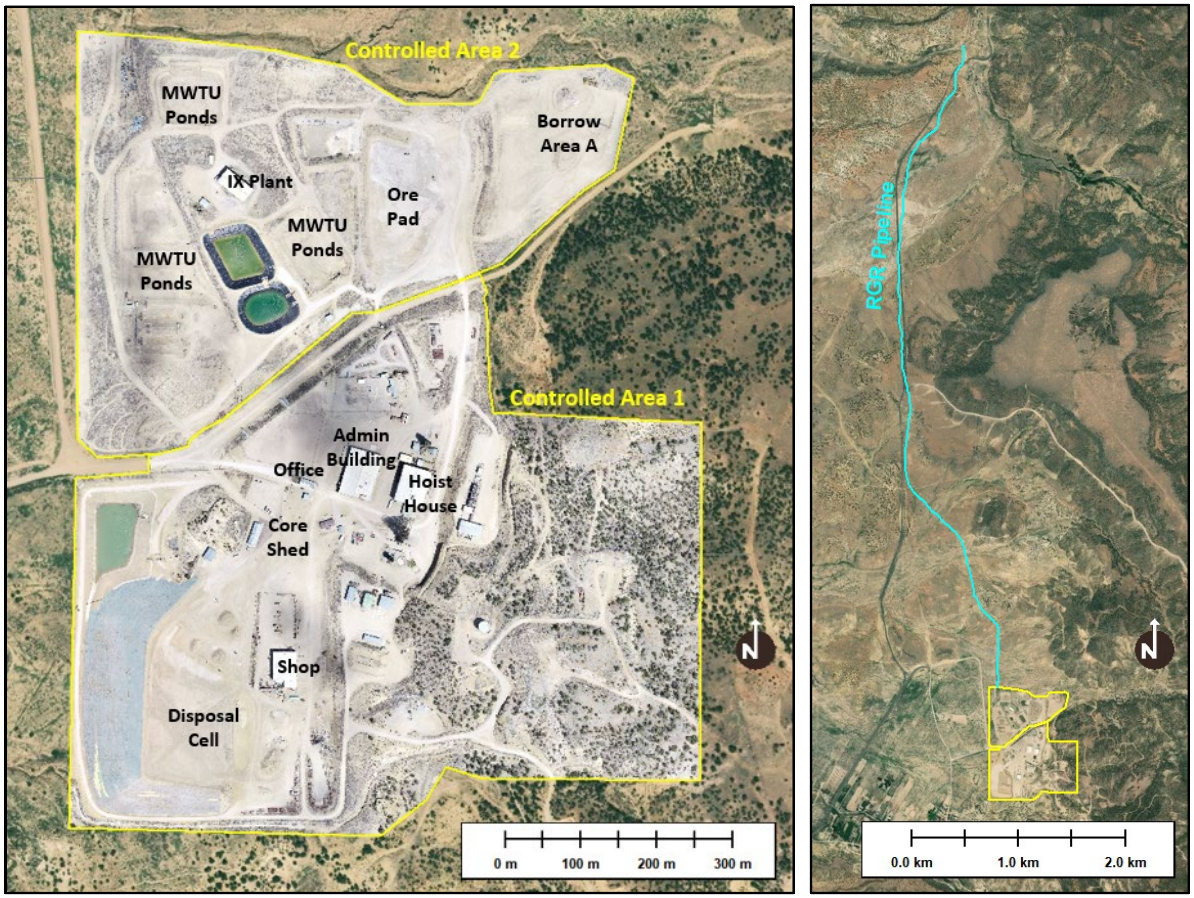

Figure 2: Potentially impacted land areas within 176 acres of operationally Controlled Areas (left) and along the 6.5 km pipeline corridor used to convey treated mine water for discharge in San Lucas Canyon under DP-61 (right).

3.2 Existing Radiological Survey Data

3.2.1 Onsite Gamma Radiation Surveys

Since 2017, a gamma radiation survey has been performed annually within operationally Controlled Areas of the Site to monitor changes in radiological conditions during a period of remedial excavations in the MWTU ponds, construction of the disposal cell and placement of contaminated mine materials, and gradual removal of ore from the ore stockpile for offsite processing at the White Mesa Mill in southeastern Utah. The most recent gamma survey, conducted March 27, 2020, shows elevated exposure rates [micro-Roentgen per hour (μR/hr)] in certain operational areas within the Controlled Area boundaries (Figure 3, left). Based on a previously established statistical regression between gamma exposure rate[1]

[1] Exposure rates were statistically derived from an applicable cross-calibration between sodium iodide (NaI) scintillation detectors and a high-pressure ionization chamber (HPIC) as previously developed for permitting efforts at the nearby Roca Honda Mine (SENES, 2013). See Section 4.1.4 for additional information.

and Ra-226 concentrations in surface soil (0-15 cm) (Figure 4), gamma-based predictions of Ra-226 levels across the Site (Figure 3, right) indicate that portions of the Controlled Areas will require soil remediation to meet the 6.8 pCi/g Ra-226 criterion for release of impacted land areas.

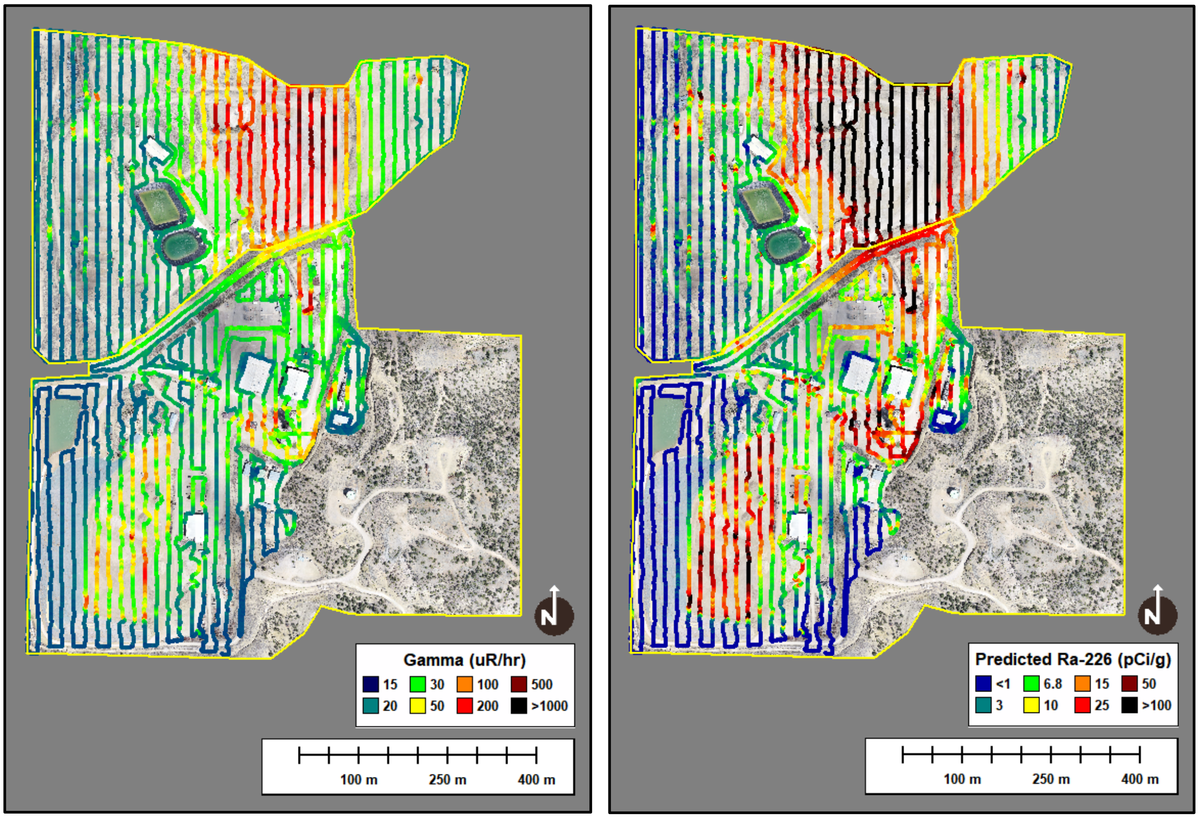

Figure 3: Measured gamma exposure rates (left) and respectively predicted Ra-226 concentrations in surface soil (0-15 cm) (right) across operationally Controlled Areas at the Mt. Taylor Mine.

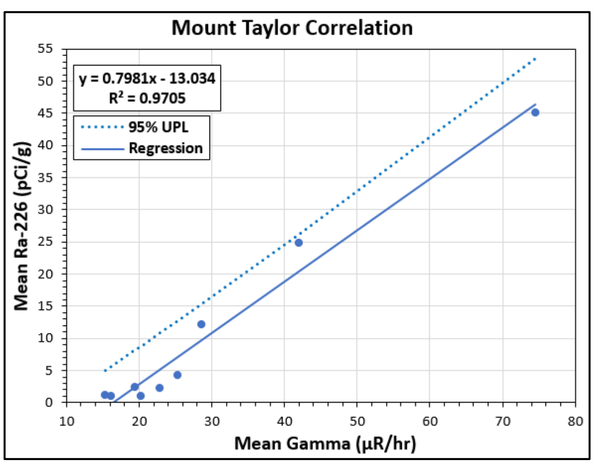

Figure 4: Statistical regression between gamma exposure rate and soil Ra-226 concentration at the Mt. Taylor Mine Site.

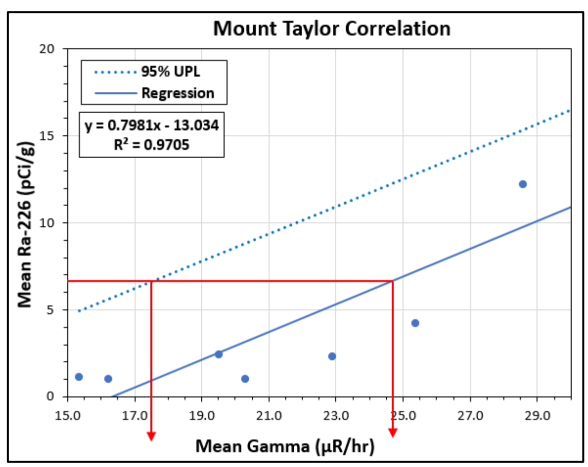

Figure 5: Determination of the PRRL and conservative gamma cutoff for 95% probability of compliance with 6.8 pCi/g Ra-226 soil release criterion.

Close examination at the low-end of the regression curve (Figure 5) indicates that on average, a gamma exposure rate of about 24.5 µR/hr is approximately equivalent to the 6.8 pCi/g Ra-226 soil release criterion. As such, a gamma exposure rate of 24.5 µR/hr will be the PRRL in accordance with MMD/MNED Joint Guidance criteria (MMD/MNED, 2016) as specified in Section 2 of this Work Plan. In addition, based on the 95% upper prediction limit (UPL) on the regression (Figure 5), a "gamma cutoff" of 17.5 µR/hr will serve as a conservative remedial action goal that provides a 95% probability of compliance with the 6.8 pCi/g Ra-226 soil release criterion. Note that compliance with the gamma cutoff is not a regulatory requirement, but is intended as a remedial tool to be used at the operator's discretion to help ensure that FSS soil sampling results will confirm compliance and minimize the risk of higher overall costs associated with a failure to pass the FSS (e.g. re-mobilization for additional soil remediation and FSS data collection).

3.2.2 Radiological Data for Offsite Areas

In 2012, RGR conducted a field soil investigation that included gamma dose rate measurements and soil sampling in potentially impacted offsite areas, in particular along the deeply incised Marquez Arroyo north of Controlled Area boundaries, along with several small, downgradient runoff drainage channels to the west of Controlled Area boundaries (Fitch, 2012). Sampling and measurement locations for the 2012 soil investigation are shown in Figure 6, and the results are provided in Table 1. While two locations along Marquez Arroyo had gamma readings near the PRRL (24.5 µR/hr)[2], none of the locations sampled had Ra-226 concentrations that exceeded the 6.8 pCi/g Ra-226 soil release criterion. This suggests that gamma exposure rates in the vicinity of the two elevated locations may be influenced by gamma shine from nearby onsite areas.

In addition, in 2019 RGR collected gamma survey and soil sampling data in Borrow Area B (RGR internal reference) west of Controlled Area boundaries (Figure 7). Predicted soil Ra-226 concentrations based on gamma survey data indicate that surface/subsurface soils excavated from Borrow Area B this area had Ra-226 concentrations below the approved background Ra-226 concentration (< 1.8 pCi/g). These results were confirmed with discrete soil samples collected in the excavation (Table 2). While all Borrow Area B samples were below the 6.8 pCi/g soil release criterion, locations sampled outside of the excavation and next to the access road just outside the Controlled Area boundaries (Figure 7) had Ra-226 concentrations that were slightly elevated relative to the approved background value.

[2] Assuming that a measured dose rate value (µrem/hr) is numerically equivalent to the gamma exposure rate (µR/hr).

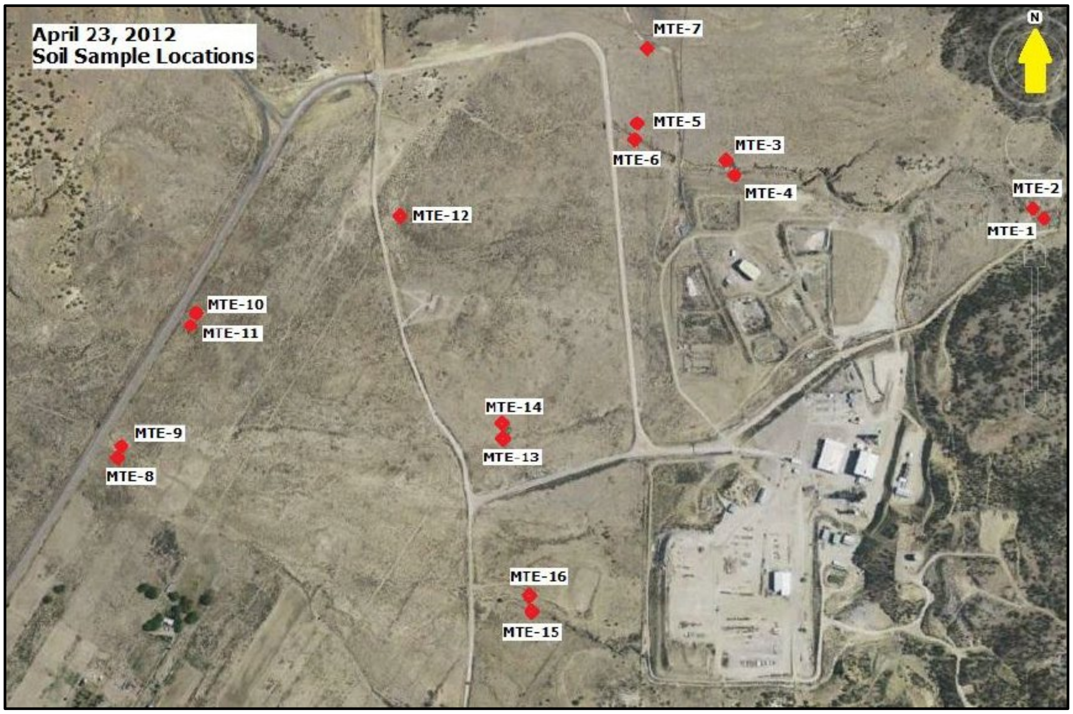

Figure 6: Offsite sampling/measurement locations for 2012 soil investigation (Fitch, 2012).

Table 1: Offsite sampling/measurement data for April 23, 2012 soil investigation (Fitch, 2012).

Location #	Description	Sample Time	NAD 27 Northing	NAD 27 Easting	Dose Rate (µrem/h)	U-238 (pCi/g)	Ra-226 (pCi/g)
MTE-1	Marquez Arroyo Top of Grade; clay	10:20	1580869	561223	18	1.6	1.7
MTE-2	Marquez Arroyo Thalweg; very sandy	10:25	1580963	561211	15	0.3	0.7
MTE-3	Marquez Arroyo Top of Grade; clay	10:50	1581289	559191	26	0.5	1.4
MTE-4	Marquez Arroyo Thalweg; sandy	10:58	1581226	559201	24	0.2	1.2
MTE-5	Marquez Arroyo Top of Grade; clay	11:05	1581507	558551	18	0.4	1.4
MTE-6	Marquez Arroyo Thalweg; sandy	11:10	1581479	558532	15	0.4	1.5
MTE-7	N¼ Corner Section 24; clay	11:30	1582031	558654	13	0.6	1.5
MTE-8	Drainage Top of Grade; clay	12:37	1579422	555004	14	1.2	2.8
MTE-9	Drainage Thalweg; clay	12:40	1579428	555009	14	1.1	1.8
MTE-10	Drainage Top of Grade; clay	12:52	1580023	555383	14	0.3	1.2
MTE-11	Drainage Thalweg; clay	12:54	1580047	555376	13	0.4	1.2
MTE-12	Marquez Arroyo fan; clay	13:40	1580724	556946	13	0.9	2.1
MTE-13	Drainage Thalweg; sandy clay	13:55	1579390	557582	14	1.4	2.7
MTE-14	Drainage Top of Grade; clay	14:05	1579410	557576	14	0.4	1.1
MTE-15	Drainage Thalweg; sandy	14:45	1578344	557794	14	1.0	2.0
MTE-16	Drainage Top of Grade; clay	14:50	1578386	557805	13	0.3	0.8

Notes:

1. The term "grade" above refers to the natural surface outside of and atop the drainage feature.
2. Dose Rate Instrument: Eberline PRM-7 #182, BKG = 10-12 µrem/h
3. Coordinates reported are New Mexico State Plane Coordinates in the New Mexico West UTM projection.

Figure 7: Gamma survey-based prediction of Ra-226 concentrations for excavated and adjacent portions of Borrow Area B, with annotated locations for confirmatory soil samples.

Table 2: Offsite soil sampling data for Borrow Area B.

Lat	Long	Location ID	Sampling Date	Soil Depth (cm)	U-nat (mg/kg)	U-nat (pCi/g)	Ra-226 (pCi/g)	Th-230 (pCi/g)	Th-232 (pCi/g)
35.343268	-107.637878	B1	7/19/2018	0-15	11.0	7.4	3.9	2.1	0.5
35.343555	-107.638213	B2	7/19/2018	0-15	4.0	2.7	1.9	1.5	0.6
35.343215	-107.639166	B3	7/19/2018	0-15	1.0	0.7	1.3	0.5	0.1
35.343217	-107.640231	B4	7/19/2018	0-15			0.8		
35.342907	-107.641245	B5	7/19/2018	0-15			1.1		
35.343458	-107.640767	BA-B1	6/12/2019	0-15			0.9		
35.343403	-107.639998	BA-B2	6/12/2019	0-15			0.9		
35.342826	-107.640070	BA-B3	6/12/2019	0-15			0.8		
35.342909	-107.640700	BA-B4	6/12/2019	0-15			0.8		
35.343171	-107.640380	BA-B5	6/12/2019	0-15			1.0		

3.2.3 Data Gap Analysis

Onsite radiological conditions across most of the Controlled Areas are adequately characterized to inform the remedial excavation of impacted soil. However, eastern portions of Controlled Area 1 (Figures 2 and 3) include steep terrain and access roads that will need to be surveyed to determine whether these areas require remediation to meet the 6.8 pCi/g Ra-226 soil release criterion. In addition, the MMD/NMED Joint Guidance specifies that "*At an existing mine site, vertical sampling should be performed as necessary to establish the vertical radium activity profile within the soil.*" In general, RGR expects to determine the depth of radiological soil contamination in excess of the 6.8 pCi/g Ra-226 release criterion for surface soil (0-15 cm) based on onsite excavation control with gamma survey measurements relative to the gamma cutoff and/or PRRL (Figure 5). Verification of compliance with the Ra-226 release criterion will be determined through direct soil sampling at the surface of excavated areas followed by radiometric analysis at a qualified commercial laboratory. Subsurface soil core samples will be collected only in areas where, based on operational history and Site knowledge, buried radiological contamination may exist (e.g. leach fields or fill materials around shaft collars).

Because some offsite migration of radiological contaminants could have occurred since the 2012 Soil Investigation (Fitch, 2012), RGR property between the Site and Highway 605 needs to be characterized with a spatially comprehensive gamma survey. The deeply incised Marquez Arroyo north of the Site will need to be re-characterized to identify any impacts that may have occurred since 2012, and areas north of Marquez Arroyo that could have received some windblown material from onsite areas will require characterization to delineated the extent of any windblown impacts. State highway 334, a maintained, gravel road that bisects the mine site, has not previously been characterized and will require gamma surveys and soil sampling at representative locations. Finally, radiological surveys have yet to be conducted along the 6.5 km discharge pipeline corridor and around the outfall area at the pipeline terminus in San Lucas Canyon.

4. METHODS

This Section specifies the general approaches and methods that will be used to meet the following analytical objectives:

A. Characterize radiological conditions across potentially impacted land areas to identify/delineate soil impacts relative to the 17.5 µR/hr gamma cutoff goal and 24.5 µR/hr PRRL.
B. Classify survey area designations under MARSSIM guidelines (i.e. Class 1, 2, 3 or non-impacted).
C. Guide remedial excavation of impacted soils to meet the 6.8 pCi/g Ra-226 release criterion.
D. Final analytical verification of compliance with the 6.8 pCi/g Ra-226 soil release criterion across all impacted land areas.

For the purposes of this Work Plan, the methods needed to address objectives A through C above are collectively referred to as "*Remedial Support Surveys*" (RSS), whereas those needed to address objective D above are referred to as "*Final Status Surveys*" (FSS). The basic analytical methods that will be employed under this Work Plan include the following:

1) Gamma radiation measurements (RSS excavation control) or GPS-based gamma surveys (walkover, UTV-based, or other suitable method).
2) Cross-calibration of GPS-based gamma survey data to obtain estimates of true exposure rate as measured with a high-pressure ionization chamber (HPIC).
3) Use of Site-specific gamma/soil Ra-226 correlation to predict Ra-226 concentrations based on gamma survey readings.
4) Direct soil sampling and laboratory analysis of Ra-226 concentrations as specified in Table 4 (Section 4.3).

These methods will be used to accomplish the two basic analytical objectives as defined above (RSS or FSS), but the manner in which they will be applied and/or evaluated may vary by objective.

4.1 Gamma Radiation Surveys

GPS-based gamma surveys will be performed in a manner consistent with the methods and procedures specified in SOP-7 (*GPS-based Gamma Radiation Surveys*) as provided in the RPP Manual (RGR, 2020). The objective is to identify and characterize radiological contamination in surface soils residing at or near the ground surface. Traditionally, gamma radiation and soil Ra-226 concentrations are correlated for this purpose (USNRC, 2003; Johnson et al., 2006; Whicker et al., 2006 and 2008). Although analytical uncertainty in gamma-based predictions of Ra-226 is higher at any given location (versus soil sampling and direct laboratory analysis), when evaluated collectively, gamma survey data provide much higher spatial resolution of the distribution of radiological contamination across large land areas (Lively, 2013).

4.1.1 Instrumentation

All gamma survey measurements will employ a Ludlum Model 44-10 gamma detector (scintillometer with 2" x 2" NaI crystal) coupled with a Ludlum Model 2221 ratemeter, or similar. Gamma surveys may involve walkover scanning or scanning with instruments mounted on a utility terrain vehicle (UTV) (Figure 8). In either case, the detector will be positioned at approximately 0.5 meters above the ground surface during the survey.

Figure 8: Example detector mounting configurations for walkover and UTV gamma scanning systems.

The scanning system will be connected to a field computer with data acquisition software, programed to record the gamma count rate and simultaneous global positioning systems (GPS) coordinates every 1 second while scanning. For walkover surveys, nominal scan speed will range from about 0.5 to 1.5 meters/second (typical walking speed of 1-2 mph). For UTV surveys, nominal scan speed will be on the order of 2-4 mph. Scan speeds may vary depending on terrain, obstructions, and safety considerations. For all land area surveys, the GPS receiver will be mounted with a clear view of the sky while scanning.

4.1.2 Scan Sensitivity

Prospective (a priori) estimates of the minimum detectable concentration (MDC) of Ra-226 in soil while scanning, referred to in MARSSIM as the "scan MDC" (USNRC, 2000), were calculated based on an assumed average scan speed of 1.5 m/s, a detector height of 0.5 m, and with an assumed background count rate of 12,000 counts per minute (cpm).[3] A resulting graph of scan MDC versus size (diameter) of the area of contaminated soil (referred to as a "hotspot") is shown in Figure 9.

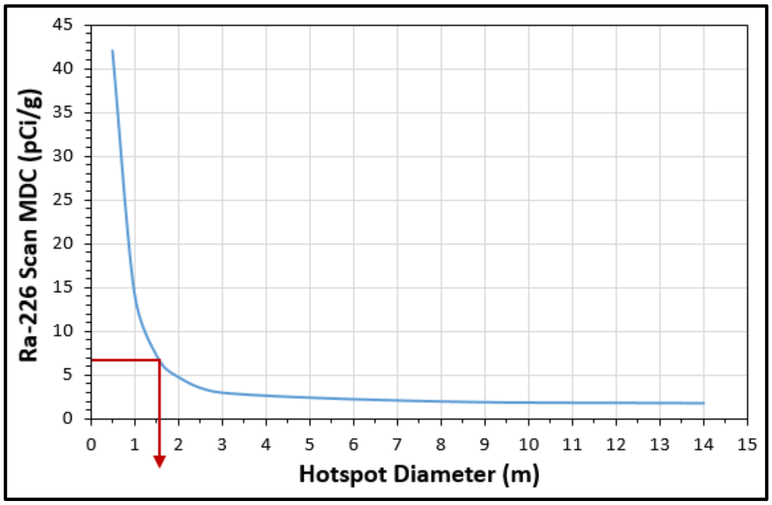

Figure 9: Scan MDC versus hotspot diameter for gamma surveys.

As indicated in Section 2, the total (gross) cleanup criterion specified for Ra-226 in surface soil (0-15 cm) is 6.8 pCi/g Ra-226, averaged across any 100-m^2 area. Calculated scan MDCs for the walkover gamma survey method (Figure 9) show that a single 1-second count rate reading will be able to detect Ra-226 concentrations in surface soil at the cleanup criterion (6.8 pCi/g) for hotspots as small as about 1.5 meters in diameter (representing a contaminated area of about 1.8 m^2). The gamma scanning methods defined in this Work Plan are clearly sensitive enough to meet the specified survey objectives.

4.1.3 Scan Coverage

The density of scan coverage will depend on the purpose of the gamma survey (RSS or FSS). For the FSS, scan coverage will further depend on the MARSSIM-based classification of the area in question (Class 1, 2, 3 or non-impacted). Gamma survey scan coverage for each objective is detailed in Sections 6 and 7. To summarize, the minimum scan coverage in all survey areas will involve 10-meter scan transects for consistency with the 100-m^2 areal specification across which the 6.8 pCi/g average Ra-226 soil release criterion applies (see Section 2). Minimum scan transect spacing for the FSS is summarized as follows:

- Class 1 survey units: 3-meter scan transects (100% coverage).[4]

[3] A priori estimates of scan MDCs were calculated based on a published method (Alecksen and Whicker, 2016) and online calculator (ERG, 2020) designed specifically for electronically recorded, GPS-based gamma surveys, along with estimated Site-specific background gamma readings.

[4] Based on empirical field observations, lateral NaI detector response to significantly elevated planar (non-point) gamma sources at the ground surface is estimated to be about 2 meters, giving the detector an estimated "field of view" of about 4 meters in diameter at the ground surface. This does not imply a detector can register increased gamma readings from a small hotspot 2 meters away, but does suggest that scattered photons from larger elevated source areas (e.g. 100 m^2) are likely to be detected at that distance. The 100-m^2 basis for regulatory release criteria

- Class 2 survey units: 6-meter scan transects (50% coverage).
- Class 3 survey units: 10-meter scan transects (30% coverage).

Areas classified as "non-impacted" will not require a final status survey. These specifications on scan coverage are consistent with MARSSIM protocols (see Section 6.1 for additional information).

4.1.4 Instrument Cross-calibrations

The gamma survey instruments specified in Section 4.1.1 do not measure the exposure rate directly, instead measuring the number of photon interactions occurring within the detector's sensitive NaI volume per unit time, in this case in units of cpm. To determine the exposure rate, NaI count rate data must be cross-calibrated against an instrument that directly measures exposure rate in units of µR/hr. All NaI count rate data generated with GPS-based gamma surveys will be cross-calibrated against a high-pressure ionization chamber (HPIC), an instrument known to be the most accurate commercially available means of measuring the true total exposure rate from both cosmic and terrestrial sources (Whicker and Chambers, 2015).

The cosmic component of the total exposure rate varies as a function of elevation (Stone et al., 1999), and given the relatively consistent elevations across potentially impacted land areas, the contribution of cosmic radiation to the total exposure rate is expected to essentially be constant across all gamma survey areas. The terrestrial component of the total exposure rate, however, is expected to vary primarily as a function of Ra-226 concentrations in soil, and the NaI detectors specified in this Work Plan are highly sensitive to changes in terrestrial exposure rate. Knowledge of the total exposure rate allows estimation of total external radiation dose to humans.

As previously indicated, a valid NaI/HPIC cross-calibration relationship has been adopted from that previously developed for permitting efforts at the nearby Roca Honda Mine (SENES, 2013). Instrument cross-calibration measurements were taken in the same local environs as the Mt. Taylor Mine and discharge pipeline corridor, and the instruments specified for GPS-based gamma surveys are identical to those used for the Roca Honda Mine. The cross-calibration data and conversion equation are provided in Figure 10. The equation in Figure 10 will be used to convert all GPS-based gamma survey data as measured 0.5 meters above the ground surface into equivalent exposure rates as measured 1 meter above the ground surface.

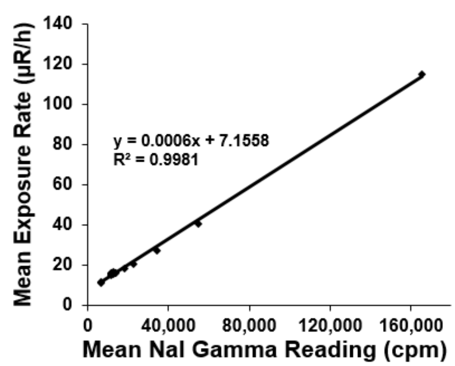

Figure 10: NaI/HPIC Cross-calibration relationship (adopted from SENES, 2013).

included consideration of the fact that smaller areas of contamination have proportionally lower potential for human exposure/dose. Concentrations at the release criterion for areas smaller than 3 meters in diameter would produce negligible dose to any future receptor, far below any hotspot criterion under MARSSIM (NRC, 2000). Based on these considerations, 3-meter transect spacing is considered equivalent to 100% ground coverage.

4.1.5 Gamma/Ra-226 Correlation

A Site-specific gamma/Ra-226 correlation for the Mt. Taylor Mine was developed in 2018 (see Figures 4 and 5, Section 3.2.1). Based on established methods (e.g. Johnson et al., 2006; Whicker et al., 2006 and 2008), a total of 9 representative areas were carefully selected to determine the average gamma radiation level within 9 individual 100 m^2 correlation plots, along with composite sampling to determine the average Ra-226 concentration in surface soil (0-15 cm) across each plot. Correlation plot numbers, location coordinates, and radiometric analysis results are provided in Table 3. Criteria for selection of correlation plot locations included relatively homogeneous gamma readings across each plot, representativeness across an appropriate range of gamma levels, and an emphasis on locations where radiological conditions were expected to capture the 1.8 pCi/g background soil Ra-226 concentration and the 6.8 pCi/g Ra-226 soil release criterion. To the extent possible, locations that were potentially subject to the confounding effects of gamma shine from nearby source areas (e.g. MWTU ponds and ore stockpile area) were avoided.

Table 3: Site-specific Gamma/Ra-226 correlation data for the Mt. Taylor Mine.

Correlation Plot Location	Latitude	Longitude	Mean Gamma (CPM)	Mean Gamma (μR/hr)	Mean Ra-226 (pCi/g)
1	35.34300	-107.64191	13664	15.4	1.1
2	35.34272	-107.63945	15127	16.2	1.0
3	35.34353	-107.63840	20610	19.5	2.4
4	35.34497	-107.63751	21917	20.3	1.0
5	35.34407	-107.63761	26261	22.9	2.3
6	35.34351	-107.63749	30387	25.4	4.2
7	35.34462	-107.63717	35701	28.6	12.2
8	35.34260	-107.63329	112246	74.5	45.0
9	35.33964	-107.63270	57995	42.0	24.8

As shown in Figure 5 (Section 3.2.1), the linear regression between mean gamma exposure rate and mean Ra-226 concentration was used to determine the PRRL (24.5 μR/hr) along with a conservative gamma cutoff value intended as a conservative remedial action goal (17.5 μR/hr) that provides a 95% statistical probability of compliance with the 6.8 pCi/g Ra-226 soil release criterion. As previously indicated, the gamma cutoff goal is not a regulatory requirement, and because local background Ra-226 concentrations may vary somewhat across potentially impacted land areas, it may not be possible to attain compliance in some areas with the gamma cutoff goal without excavating significant amounts of non-impacted background soils. Again, the gamma cutoff goal is intended only as remedial tool to be used at the operator's discretion (to minimize the risk of economic consequences due to a failure to pass the FSS). FSS demonstration of compliance with both the PRRL and 6.8 Ra-226 soil release criterion is necessary to enable release of the survey unit from the mine permit to the PMLU.

4.2 Soil Sampling

Soil samples will be collected in a manner consistent with the methods and procedures specified in SOP-8 (*Soil Sampling for Radiometric Analysis*) as provided in the RPP Manual (RGR, 2020). Equipment may include a manual auger-type barrel sampler, shovel, hand trowel or similarly appropriate sampling equipment. Sampling equipment will be cleaned between each sample collection to prevent cross-contamination of samples. Samples will be collected as discrete grab samples or as 100 m^2 composites depending on sampling objectives. Surface soil samples will be collected to a depth of 15 cm. Subsurface soil samples, if collected, will likely require powered direct-push or rotary drill coring methods with depths to be determined on a case-by-case basis depending on the nature and circumstances of the potentially buried contamination.

Discrete surface soil samples will be collected across all FSS survey units for statistical analysis with an applicable MARSSIM-based method (see Section 6). If a discrete FSS sampling location reveals a Ra-226 concentration in excess of the 6.8 pCi/g soil release criterion, a 100 m^2 composite sample may subsequently be collected at that same location to evaluate compliance with the 100 m^2 areal dimensions of the Ra-226 release criterion as defined in the MMD/NMED Joint Guidance (MMD/NMED, 2016) and as specified in Section 2 of this Work Plan. All soil samples will be analyzed for Ra-226 using the analytical method and Minimum Detectable Concentration (MDC) specifications shown in Table 4.

Table 4: Radioanalytical method and MDC limit.

Radioanalyte	Analytical Method	MDC (pCi/g)
Ra-226	EPA 901.1 (M)	0.2

5. REMEDIAL SUPPORT SURVEYS

5.1 General RSS Approach

Remedial Support Surveys (RSS) include gamma scanning and soil sampling as needed to support characterization of radiological impacts to soil, assignment of survey area classifications under MARSSIM protocols, and use of the gamma cutoff goal and PRRL to guide remedial excavations in areas identified to require cleanup. The primary objective of the RSS is to guide remediation of impacted land areas to maximize the probability that compliance with the release criteria will be successfully achieved and analytically demonstrated based on FSS data.

GPS-based gamma survey data collected for RSS purposes will be used categorize FSS survey areas as Class 1, 2, or 3 as these classifications will define the FSS gamma scan coverage required under MARSSIM protocols (see Section 4.1.3). After soil cleanup, these MARSSIM-based survey units will require a FSS to demonstrate compliance with the 6.8 pCi/g Ra-226 soil release criterion and 24.5 µR/hr PRRL in accordance with the specifications of the MMD/NMED Joint Guidance (MMD/NMED, 2016). Areas classified as "non-impacted" based on RSS data will not require further radiological surveys or evaluation under the mine reclamation and closeout/closure process.

5.2 RSS Gamma Scanning

Gamma survey coverage for RSS purposes will vary depending on the nature and extent of the potentially impacted land area. The Site's RSO will direct RSS activities including specification of scan density across the various land areas to be surveyed. For initial characterization across large areas, 20-30 meter transect spacing has proven effective for revealing the areal extent of radiological impacts and the spatial distribution of terrestrial gamma radiation levels (see Figure 3). For the discharge pipeline corridor, 5-meter transects oriented parallel to the pipeline and extending laterally out to 10 meters on either side should be sufficient to identify and characterize any soil contamination due to pipeline leaks.

For excavation control, a GPS-based scan system is not required as this activity generally involves a technician taking frequent interim measurements as excavation proceed at any given location. The data need not be recorded for excavation control measurements as the FSS alone will be used to determine compliance. The key objectives of the RSS are as follows:

1. Guide the necessary depth of excavation needed to meet the gamma cutoff and/or PRRL.
2. Minimize incidental over-excavation of non-impacted background soils.

The second RSS objective above is important as onsite disposal capacity for contaminated soils is limited and placement of significant amounts of background-level soils in the repository would be problematic. To the extent possible, the goal of the RSS is selective removal and onsite disposal of impacted soils alone. Once excavation control measurements appear to have resulted in attainment of the target gamma radiation levels, the RSO may require a screening level GPS-based survey to map and evaluate recorded data to verify that the survey unit is ready for the FSS.

5.3 FSS Area Classification

Remedial support characterization gamma survey data for scanned land areas will be converted to gamma-based estimates of Ra-226 concentrations in surface soil for use in determination of FSS area classifications. These classifications are described in MARSSIM as Class 1, 2 or 3 impacted areas, or as non-impacted areas, under a graded approach with respect to FSS requirements:

- *Class 1 Areas*: Areas that have, or had prior to remediation, a potential for radiological contamination above the Ra-226 soil release criterion. Based on existing characterization data (Figure 3), a large portion of the Controlled Areas within the mine permit area warrants a Class 1 designation.

- *Class 2 Areas*: Areas that have, or had prior to remediation, a potential for radiological contamination in excess of background, but below the Ra-226 soil release criterion. Class 2 will include areas where initial gamma survey data predict the area has Ra-226 concentrations that generally range between 50% of the release criterion and the criterion itself (between 3.4 and 6.8 pCi/g), and where hotspots in excess of the Ra-226 release criterion are not apparent.

- *Class 3 Areas*: Areas with the potential to have slight radiological contamination, but only at a small fraction of the Ra-226 soil release criterion. Class 3 areas will include areas where initial gamma survey data predict soil Ra-226 concentrations that exceed background, but not by more than 50% of the Ra-226 soil release criterion (i.e. Ra-226 concentrations between 1.8 and 3.4 pCi/g).

- Non-impacted Areas: Areas where gamma-based predictions of Ra-226 concentrations in surface soil do not exceed the approved background Ra-226 concentration of 1.8 pCi/g. In such areas, no further scanning or sampling is required with respect to the Site reclamation and closeout/closure process.

Class 1-3 survey area classifications will have specific FSS data collection and evaluation protocols as described in Section 7 of this Work Plan.

5.4 RSS Soil Sampling

Soil sampling for RSS purposes will generally play only a screening-level role in support of remedial decisions on the depth of excavation across impacted land areas, and to provide confidence that the area in question is ready for the FSS. RGR has recently developed a rapid, onsite Ra-226 soil sample analysis capability based on gross-gamma measurements in a very low background lead-shielded counting well. This onsite sample processing/analysis lab can provide screening-level measurements of Ra-226 concentrations within hours after sample collection. Over the past several years, this onsite lab capability has produced estimates of Ra-226 levels in soil samples that have generally proven reliable for analytical screening purposes. RSS soil samples will generally be analyzed only in the onsite soils lab, but depending on the available evidence, the RSO may require offsite analysis as indicated below.

At the discretion of the RSO, some samples may be sent offsite for conventional Ra-226 analysis as indicated in Table 4 (Section 4.2). For example, this could occur when gamma survey data and onsite sample analysis results indicate that surface soils in a given area have Ra-226 concentrations that are just below the 6.8 pCi/g release criterion and conventional quantitative laboratory data are needed to determine with a higher degree of confidence whether further excavation is warranted. With respect to the locations and number of soil samples to be collected for RSS purposes, this will be a dynamic process rather than a prescriptive one as the consequences of an incorrect decision to perform the FSS on a survey unit that doesn't meet the soil release criteria would be borne by the operator in the form of higher costs associated with additional excavation and repeating the FSS in impacted areas.

As previously noted, in general, subsurface soils that are impacted in excess of the release criteria for surface soils will be excavated until gamma readings in the area meet the gamma cutoff and/or PRRL, and where applicable, until confirmation composite soil sampling across a 100 m^2 area, centered on the location of interest, demonstrates compliance with the Ra-226 soil release criterion.

6. FINAL STATUS SURVEYS

All areas identified in the RSS phase of the project as Class 1, 2, or 3 survey units will require a FSS based on MARSSIM principles (USNRC, 2000). Respective procedures will vary by survey unit classification as assigned based on the criteria specified in Section 4.1.3 of this Work Plan. Areas identified as non-impacted will not require further scanning or sampling to qualify from release from the mine permit to the PMLU. At minimum, the FSS for potentially impacted land areas will include gamma surveys on

10-meter scan transects for consistency with the 100-m^2 areal specification across which the 6.8 pCi/g average Ra-226 soil release criterion applies (see Section 2).

6.1 FSS Statistical Design and Compliance Evaluation

Given that a single background soil Ra-226 concentration has been approved for the Site, and the approved Site Closeout/Closure Plan (RGR, 2013) specifies a gross Ra-226 soil release criterion of 6.8 pCi/g in accordance with MMD/NMED Joint Guidance (MMD/NMED, 2016) specifications, the appropriate MARSSIM-based statistical hypothesis test for this scenario is a one-sample non-parametric Sign test. The Closeout/Closure Plan (RGR, 2013) indicates that "*As allowed by MARSSIM, the release criteria of 6.8 pCi/g Ra-226 will be used in lieu of a derived concentration guideline limit (DCGL).*" For the purposes of describing the MARSSIM-based approach to the FSS statistical design and compliance evaluation, the term "DCGL" denotes reference to the 6.8 pCi/g Ra-226 soil release criterion as specified in the Site Closeout/Closure Plan and equivalent specifications found in the MMD/NMED Joint Guidance (MMD/NMED, 2016).

The Sign test compares the distribution of a set of FSS soil sampling results from the survey unit to a fixed DCGL value. The analytical result for each sample collected in the survey unit is subtracted from the DCGL, and the resulting adjusted distribution is tested to determine if the center of the distribution (in this case the median value) is greater than zero. If the adjusted median value is statistically significantly greater than zero, the survey unit demonstrates compliance with the release criterion.

While this statistical approach is appropriate for Site circumstances, there is a technical inconsistency between the 100 m^2 areal basis for the Ra-226 soil release criterion (Section 2) and the discrete soil sampling approach used for the statistical tests described in MARSSIM. A fundamental assumption underlying a MARSSIM-based statistical sampling design is that soil concentrations will be relatively uniform after remediation, and the DCGL applies broadly across wide areas (commonly denoted as the "$DCGL_W$"). MARSSIM does not recommend survey unit sizes as small as 100 m^2 under any survey area classification (Class 1, 2 or 3). There is an implicit recognition that it would be unrealistic to perform a separate FSS for each individual 100 m^2 area across hundreds of acres of potentially impacted lands in order to maintain consistency with the 100 m^2 areal basis for the Ra-226 soil release criterion specified in the MMD/NMED Joint Guidance (MMD/NMED, 2016). MARSSIM recommends much larger survey units that vary in size depending on survey area classification (Class 1, 2 or 3).

Given the assumption of relatively uniform radionuclide concentrations, MARSSIM-based final status survey units are evaluated based on discrete soil sampling across a randomized systematic grid design. If post-remediation Ra-226 soil concentrations across the survey unit are consistent with MARSSIM's uniformity assumption, each discrete sample should yield a Ra-226 result approximately equivalent to the average value across a corresponding 100 m^2 area. Based on previous experience with cleanup efforts at other uranium mines and milling sites, the uniformity assumption may be violated in some cases by the presence of small hotspots not detected during remediation.

To address hotspots, MARSSIM recommends an "elevated measurements comparison" (EMC) approach where a special hotspot DCGL (denoted "$DCGL_{EMC}$") is calculated for a range of hotspot sizes based on the use of area factors (AFs) (USNRC, 2000). $DCGL_{EMC}$ values for hotspots are typically significantly higher than $DCGL_W$ criteria as the potential radiological dose from soil radionuclide contamination decreases as the size of the contaminated area decreases. To simplify FSS requirements for the Mt. Taylor Site, and to do so in a manner that is conservative, all identified hotspots will be remediated such that the average Ra-226 concentration across any corresponding 100 m^2 area will meet the 6.8 pCi/g soil release criterion (i.e. ≤ $DCGL_W$).[5] This approach is more conservative than the $DCGL_{EMC}$ approach described in MARSSIM, and is appropriate with respect to hotspots as it is consistent with the 100 m^2 spatial criterion specified in the MMD/NMED Joint Guidance (MMD/NMED, 2016).

Visual Sample Plan (VSP, 2020) software was used to determine the number of samples needed for the statistical Sign test under MARSSIM protocols. Based on previous experience with remediation of soils at similar uranium recovery sites, the standard deviations for Ra-226 concentrations in surface soils across a survey unit after remediation are typically on the order of 2 pCi/g. Setting the lower bound on the gray region (LBGR) at a MARSSIM default of 50% of the $DCGL_W$, and specifying decision error rates of 5% for Type I errors (α = 0.05) and Type II errors (β = 0.05), results in a prospectively estimated number of FSS samples for each survey unit of 17 samples (Figure 11). This analysis is believed to provide a reasonable estimate of the number of samples needed for the FSS in each survey unit.

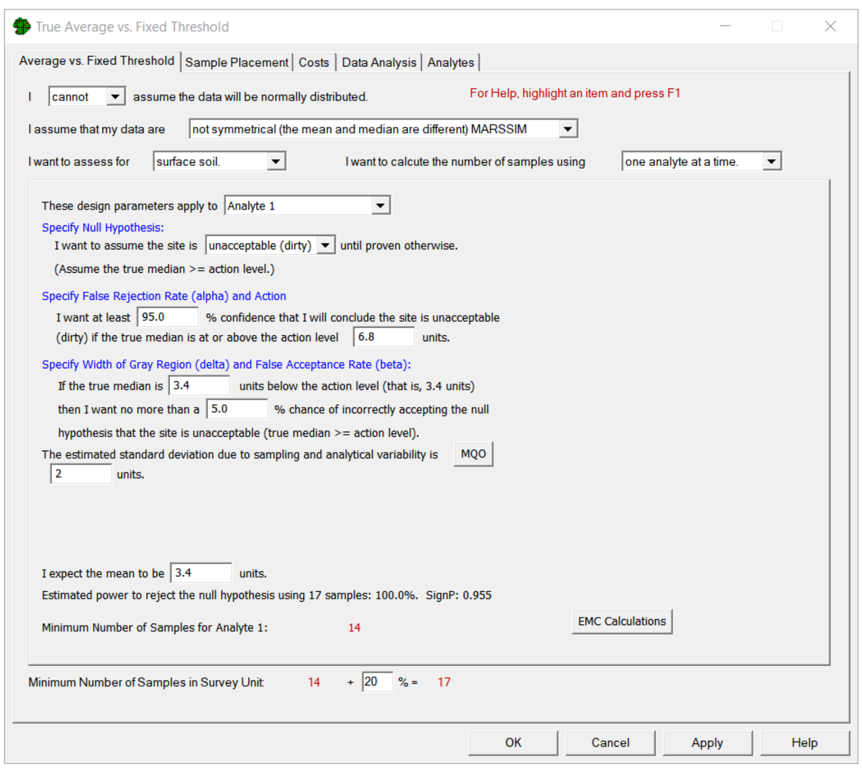

Figure 11: Calculation of the number of samples to be collected in each FSS survey unit.

[5] If any single discrete FSS sampling location exceeds the $DCGL_W$, a composite surface soil sample (0-15 cm) will be collected from a 100 m^2 area, with the original discrete sample location situated at the center of the 100 m^2 area. The composite sample will be analyzed to determine whether average concentrations of these constituents across the 100 m^2 area meet the $DCGL_W$. If not, more remediation will be required until compliance with the $DCGL_W$ is achieved.

Given the large extent of potentially impacted land areas associated with the Mt. Taylor Mine, Class 1 and Class 2 survey units are expected to be considerably larger than MARSSIM recommends. However, MARSSIM guidance is flexible to accommodate variable site circumstances, and given the tight gamma survey coverage specified for Class 1 or 2 survey units (Sections 6.2.1 and 6.3.1) relative to the 100-m^2 spatial requirement for the Ra-226 soil release criterion, RGR believes that larger survey units, along with composite FSS sampling of any "hotspots" that may be identified by FSS gamma scans after soil remediation, will be effective and reliable for achieving and demonstrating compliance with the release criteria across any 100-m^2 area within each survey unit. FSS procedures for each survey unit classification are detailed in the following Sections.

6.2 Class 1 Survey Units

6.2.1 FSS Gamma Scans for Class 1 Survey Units

Final status gamma surveys in Class 1 survey units will be conducted using methods described in Section 4.1 and SOP-7 from the RPP Manual (RGR, 2020). Gamma scanning will be performed along 3-meter transects to provide 100% ground coverage. Applicable quality assurance and quality control (QA/QC) measures will be followed as summarized in Section 7 and detailed in SOP-7 (RGR, 2020). Scan data will be evaluated relative to the gamma cutoff goal and/or PRRL. Any areas with spatially clustered values in excess of either criterion (i.e. a potential residual FSS hotspot) will have a composite FSS sample collected across a 100 m^2 area, with the highest gamma readings situated at the center of the plot. If the analytical results meet the Ra-226 soil release criterion, the location will qualify for release to the approved PMLU. Otherwise, additional soil excavation will be required.

6.2.2 FSS Soil Sampling for Class 1 Survey Units

The design for FSS soil sampling in Class 1 survey units will follow MARSSIM protocols as detailed in Section 4.2. Seventeen (17) discrete samples of surface soil (0-15 cm) will be collected in each survey unit. Sampling locations will be determined based on a systematic triangular grid with a randomized starting location as generated with VSP software (VSP, 2020). A statistical Sign test for compliance with the Ra-226 soil release criterion ($DCGL_W$) will be conducted (see Section 6.1). Any individual location where FSS sampling results exceed the $DCGL_W$ will have a follow-up composite sample collected across a 100 m^2 area, with the original sampling location situated at the center of the 100 m^2 area. If the analytical results meet the $DCGL_W$, the location will qualify for release to the approved PMLU. Otherwise, additional soil excavation will be required.

6.3 Class 2 Survey Units

6.3.1 FSS Gamma Scans for Class 2 Survey Units

Final status gamma surveys in Class 2 survey units will be conducted using methods described in Section 4.1 and SOP-7 from the RPP Manual (RGR, 2020). Gamma scanning will be performed along 6-meter transects to provide 50% ground coverage. Applicable quality assurance and quality control (QA/QC) measures will be followed as summarized in Section 7 and detailed in SOP-7 (RGR, 2020). Scan data will be evaluated relative to the gamma cutoff goal and/or PRRL. Any areas with spatially clustered values in excess of either criterion (i.e. a potential residual FSS hotspot) will have a composite FSS sample collected across a 100 m^2 area, with the highest gamma readings situated at the center of the plot. If the analytical results meet the Ra-226 soil release criterion, the location will qualify for release to the approved PMLU. Otherwise, additional soil excavation will be required.

6.3.2 FSS Soil Sampling for Class 2 Survey Units

The design for FSS soil sampling in Class 2 survey units will follow MARSSIM protocols as detailed in Section 4.2. Seventeen (17) discrete samples of surface soil (0-15 cm) will be collected in each survey unit. Sampling locations will be determined based on a systematic triangular grid with a randomized starting location as generated with VSP software (VSP, 2020). A statistical Sign test for compliance with the Ra-226 soil release criterion ($DCGL_W$) will be conducted (see Section 6.1). Any individual location where FSS sampling results exceed the $DCGL_W$ will have a follow-up composite sample collected across a 100 m^2 area, with the original sampling location situated at the center of the 100 m^2 area. If the analytical results meet the $DCGL_W$, the location will qualify for release to the approved PMLU. Otherwise, additional soil excavation will be required.

6.4 Class 3 Survey Units

6.4.1 FSS Gamma Scans for Class 3 Survey Units

Final status gamma surveys in Class 3 survey units will be conducted using methods described in Section 4.1 and SOP-7 from the RPP Manual (RGR, 2020). Gamma scanning will be performed along 10-meter transects to provide 30% ground coverage. Applicable quality assurance and quality control (QA/QC) measures will be followed as summarized in Section 7 and detailed in SOP-7 (RGR, 2020). Scan data will be evaluated relative to the gamma cutoff goal and/or PRRL. Any areas with spatially clustered values in excess of either criterion (i.e. a potential residual FSS hotspot) will have a composite FSS sample collected across a 100 m^2 area, with the highest gamma readings situated at the center of the plot. If the analytical results meet the Ra-226 soil release criterion, the location will qualify for release to the approved PMLU. Otherwise, additional soil excavation will be required.

6.4.2 Soil Sampling for Class 3 Survey Units

The design for FSS soil sampling in Class 3 survey units will follow MARSSIM protocols as detailed in Section 4.2. Seventeen (17) discrete samples of surface soil (0-15 cm) will be collected in each survey unit. For Class 3 survey units, VSP software (VSP, 2020) will be used to generate random sampling locations. A statistical Sign test for compliance with the Ra-226 soil release criterion ($DCGL_W$) will be conducted (see Section 6.1). Any individual location where FSS sampling results exceed the $DCGL_W$ will have a follow-up composite sample collected across a 100 m^2 area, with the original sampling location situated at the center of the 100 m^2 area. If the analytical results meet the $DCGL_W$, the location will qualify for release to the approved PMLU. Otherwise, additional soil excavation will be required.

6.5 Non-Impacted Areas

Areas designated as "non-impacted" will not require any FSS scanning or soil sampling – the initial gamma survey used to characterize radiological conditions will provide adequate analytical evidence that the area is not measurably impacted in excess of background levels, and these data will be included in the FSS report.

6.6 Summary of FSS Design and Decision Criteria

A generalized summary of FSS survey protocols and decision criteria is provided in Table 5.

Table 5: Summary of FSS design and analytical protocols by survey unit classification.

Survey Unit Classification	FSS Gamma Scans	FSS Soil Sampling (0-15 cm)	FSS Hotspot Sampling (0-15 cm)	Release Decision Criteria
Class 1	3-m scan transects (100% coverage)	17 samples per survey unit (triangular grid with randomized start)	• Composite re-sampling if > gamma cutoff and/or PRRL • Composite re-sampling if sampling location > $DCGL_W$	• Sign test, median value ≤ $DCGL_W$ • Gamma levels ≤ PRRL
Class 2	6-m scan transects (50% coverage)	17 samples per survey unit (triangular grid with randomized start)	• Composite re-sampling if > gamma cutoff and/or PRRL • Composite re-sampling if sampling location > $DCGL_W$	• Sign test, median value ≤ $DCGL_W$ • Gamma levels ≤ PRRL
Class 3	10-m scan transects (30% coverage)	17 samples per survey unit (random locations)	• Composite re-sampling if > gamma cutoff and/or PRRL • Composite re-sampling if sampling location > $DCGL_W$	• Sign test, median value ≤ $DCGL_W$ • Gamma levels ≤ PRRL
Non-impacted	Use of RSS data (30% coverage)	N/A	N/A	• Gamma-based Ra-226 estimates ≤ 1.8 pCi/g background value

6.7 Documentation and Reporting

A FSS Report will be developed to present the radiological survey data used to demonstrate compliance with the PRRL and Ra-226 soil release criteria specified in Section 2. The FSS Report will be submitted to MMD for review. Once regulatory comments are resolved and the Report is accepted by MMD, all potentially impacted land areas will qualify for release to the PMLU.

7. QUALITY ASSURANCE

Radiological surveys will be performed by trained/experienced health physics technicians, overseen by the Site RSO (a certified health physicist). Quality control for radiological survey instruments will adhere to the specifications of applicable SOPs as found in the RPP Manual (RGR, 2020) (Table 6).

Table 6: Applicable SOPs for quality assurance / quality control requirements.

SOP Number	SOP Title
SOP-2	Instrument Testing and Calibration
SOP-3	Radiological Contamination Surveys
SOP-7	GPS-Based Gamma Radiation Surveys
SOP-8	Soil Sampling for Radiometric Analysis

8. OCCUPATIONAL RADIATION PROTECTION

All radiological field survey and sampling work described in this Work Plan will be subject to the occupational safety requirements of the Radiation Protection Program Manual and associated SOPs (RGR, 2020).

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