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AUG 13 1996

Mr. Joseph J. Holonich, Chief
Uranium Recovery Branch
Office of Nuclear Materials Safety and Safeguards
Mail Stop T7J9
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Mr. Holonich:

In response to comments received from the Nuclear Regulatory Commission (NRC) on May 9, 1996, enclosed are two copies each of the following:

- Page changes to the *Completion Report for the UMTRA Project Vitro Processing Site, Salt Lake City, Utah*, dated August 1996. Please replace these pages with the ones that are currently in the March 1995 version of the Vitro Completion Report.

- Response to Comments, Vitro Completion Report

- Vitro Processing Site, Post-Remedial Action Status

Along with responding to the NRC comments, the Vitro Completion Report was modified to eliminate information specific only to the remediation of the Central Valley Water Reclamation Facility (CVWRF) Vicinity Property (VP). In addition, some grammatical errors were corrected. The completion report for the CVWRF VP is in the process of being updated based on NRC comments. This document will be forwarded to your office in the next few days.

This information is provided for your review and approval. Should you have comments or questions regarding this information, please contact me at (505) 845-5668.

Sincerely,

Sharon J. Arp
Site Manager
Uranium Mill Tailings Remedial Action Team
Environmental Restoration Division

3 Enclosures

cc w/o enclosures:
M. Fliegel, NRC
S. Hamp, ERD
E. Artiglia, TAC
S. Wright, TAC

NL04
WM-41

9610040099 960813
PDR WASTE
WM-41 PDR

VITRO PROCESSING SITE
POST-REMEDIAL ACTION STATUS

During the cleanup of the Vitro processing site in Salt Lake City, Utah, residual radioactive materials were not completely removed from various locations. Where thorium-230 (Th-230) had differentially migrated relative to radium-226 (Ra-226), the Th-230 was not cleaned-up. Supplemental standards were applied for residual Ra-226 along 3300 South Street. In addition, after the site had been backfilled, anomalous grids were identified where the Ra-226 levels were found to be elevated above the Environmental Protection Agency's (EPA) cleanup criteria. This document provides a discussion of these areas, including an estimate of the amount of contamination left, the approximate location of the contaminants, and a health risk assessment due to exposure to the contaminants. This information should be considered when evaluating future use of the property. For additional information see the *Completion Report for the UMTRA Project Vitro Processing Site, Salt Lake City, Utah*, dated August 1996.

Thorium-230 Supplemental Standards

Any Th-230 concentration that is less than 35 pCi/g is considered to meet the EPA cleanup standard for Ra-226. This limit was determined by estimating how much Th-230 would produce 16.5 pCi/g (15 pCi/g plus background) Ra-226 in 1000 years, when the current Ra-226 concentration is less than or equal to 6.5 pCi/g. Figure 1 identifies the Th-230 grids that are elevated above the 35 pCi/g limit. Because only a fraction of the site was sampled for Th-230, the location of any Th-230 that might remain on the site can only be hypothesized. In all areas of the site where Th-230 has been identified, the extent of Th-230 contamination may extend beyond the specific grids for which data have been collected. Future users of the site should note that any areas in the vicinity of known Th-230 contamination grids should be considered potentially contaminated.

The verification sample grids that have elevated Th-230 are grouped into 4 general areas. These areas are shaded on Figure 1. Evaluation of the areas where elevated Th-230 was found shows that the Th-230 generally migrated deeper than the Ra-226 in areas that were used as evaporation ponds or where ditches crossed the property. In these areas, Th-230 would be expected to have a relatively higher mobility than radium due to the chemical conditions that existed. The Th-230 found in Area 1 is the only elevated Th-230 grid not associated with a known evaporation pond or ditch. It is not known why elevated Th-230 exists in this area. In addition, because only one verification sample was analyzed it is very difficult to determine the extent of the Th-230 contamination on this part of the site. However, since most of the Th-230 was found in evaporation ponds and ditches, it is thought that only a small amount of Th-230 remains in this area.

It is estimated that at least 1480 m^3 (52,300 ft^3) of Th-230 remains on the site. This quantity is calculated by multiplying the 24 grids by the area of the grid and the thickness of the contamination. Each grid is 101 m^2 (33 ft x 33 ft) with an assumed contaminated layer thickness of 0.61 m (2 ft). The thickness of the Th-230 may or may not be accurate since this assumption was based on data obtained from an adjacent vicinity property and was not confirmed by any measurements on the Vitro site. The Th-230 contamination is covered by an average clean backfill thickness of 1.4 m (4.7 ft).

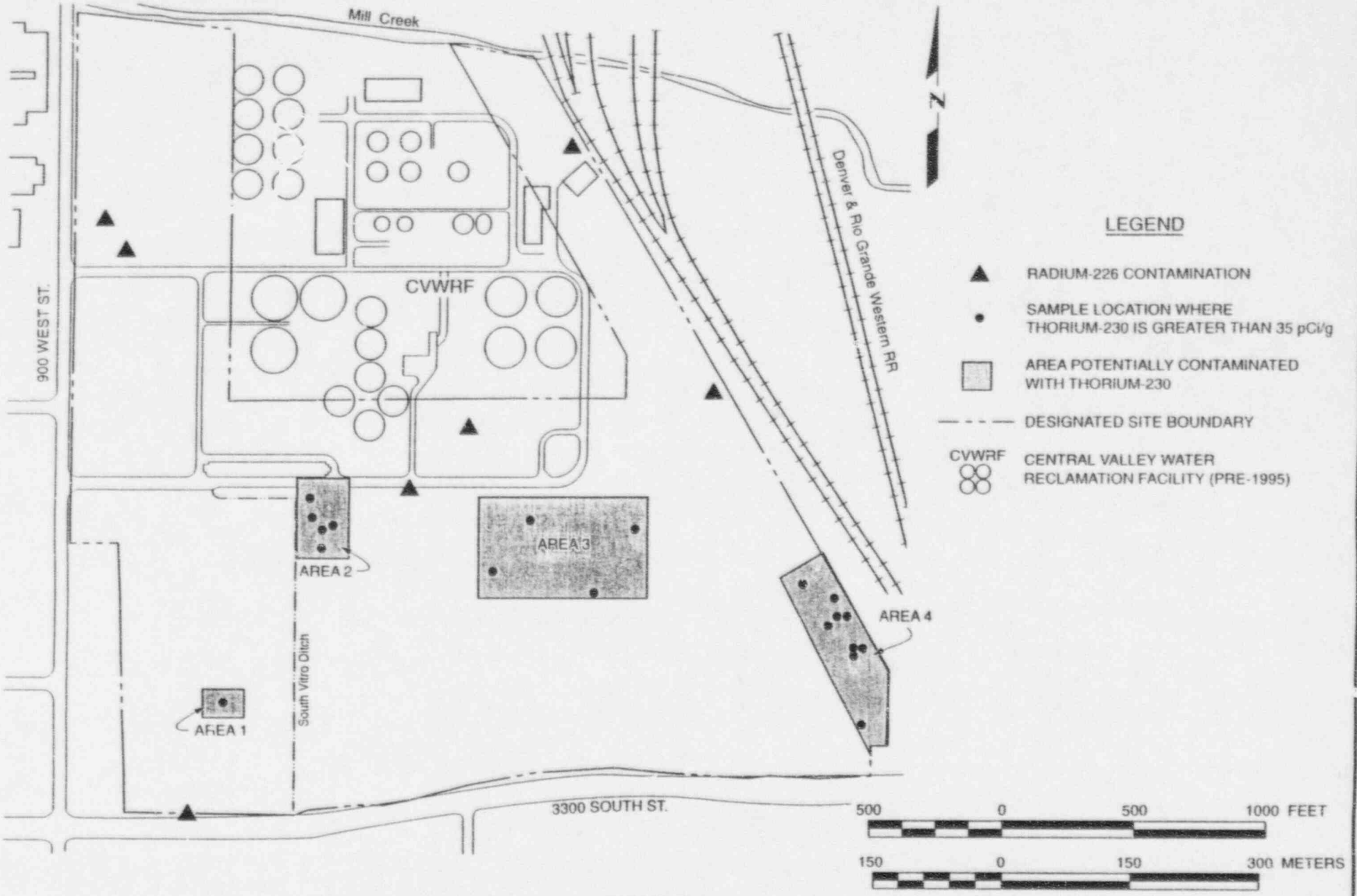

FIGURE 1
POST-REMEDIATION RADIOACTIVE CONTAMINATION AREAS
SALT LAKE CITY, UTAH, VITRO PROCESSING SITE

MAC: SITE/SLC/LETTER-CVWRF/POSTREM

Table 1
Grids exceeding 35 pCi per gram Th-230

Grid location		Th-230	Ra-226	Ra-226 in 1000 years	Fill depth	Rn-222 flux
North	East	(pCi /g)	(pCi/g)	(pCi/g)	(ft)	($pCi/m^2/s$)
Area 1 - southwest corner						
429	429[a]	650.0	3.1	229. 4	6.1	24.9
Area 2 - Vitro ditch						
1089	099	60.2	5.4	24.6	5.0	3.6
990	066	90.3	5.3	35.0	5.9	3.8
1056	066	166.0	11.0	65.1	4.9	7.3
1122	066	213.0	9.0	80.4	3.8	12.4
1188	066	361.0	5.8	130.1	2.1	37.3
Area 3 - north-central evaporation pond						
1353[b]	132	380.0	3.4	135.1	4.9	14.8
1353[b]	297	330.0	5.1	118.8	5.5	10.9
990	693	85.0	1.7	30.8	4.7	4.5
1122	858	400.0	5.1	143.3	0.5	56.9
1320	1023	51.0	2.1	19.2	2.2	5.5
1386	924	390.0	5.5	140.0	3.6	22.0
Area 4 - evaporation pond						
891	1089	84.0	2.2	30.8	3.8	5.5
1122	1221	240.0	6.4	88.1	1.4	27.0
363	2178	60.0	1.7	22.1	2.9	5.2
627[b]	2178	44.0	3.0	17.3	5.0	2.8
627	2145	320.0	4.3	113.7	7.0	7.2
660	2145	410.0	5.4	147.0	7.0	8.9
660	2178	200.0	2.2	71.4	6.9	5.1
726	2046	129.0	2.9	47.0	3.0	9.6
759[b]	2145	300.0	4.3	107.8	6.7	7.3
759[b]	2112	360.0	4.4	128.8	8.5	5.5
825[b]	2079	228.0	5.4	83.3	7.4	5.1
924	1947	52.5	2.3	19.9	4.8	3.3

[a]This point represents a westing coordinate; all others represent an easting coordinate as indicated by the column heading.

[b]Thorium data for these grids were collected after the initial verification sampling.

The average concentration of the Th-230 is 234 pCi per gram with a low value of 44 pCi/g and a high value of 650 pCi/g. The average radon flux of the Th-230 as calculated by the RAECOM model is 11.8 $pCi/m^2/sec$, with a low value of 2.8 $pCi/m^2/sec$ and a high value of 56.9 $pCi/m^2/sec$. These radon flux values equate to an average indoor working level of 0.06 with a low value of 0.014 and a high value of 0.29. The working levels were determined assuming a slab-on-grade structure and 50 percent equilibrium between radon and its short-lived decay products. The right-hand column of Table 1 provides the estimated 1000-year radon flux for each grid. For estimation purposes, the radon working level in a slab-on-grade structure built on a contaminated grid is proportional to the relationship: a radon flux of 3.9 $pCi/m^2/sec$ produces a 0.02 working level.

Since the entire site was backfilled, on average, with 0.9 m (3 ft) of clean fill material, direct exposure to the material is not likely unless the clean fill material is removed. A scenario for possible health impacts is one where future construction activities bring the contaminated material to the ground surface. The Th-230 contaminated material would then be available for dispersion by both natural and human forces. Possible pathways for human exposure would be inhalation of airborne radioactive particulates and radon daughters and direct gamma radiation. If the material were excavated after being backfilled, the contaminated material would be diluted by mixing with the volume of clean fill covering the deposit. Mixing the contaminated material with clean fill would lower the projected Ra-226 concentration, lowering the potential health impacts.

To "bracket" potential health impacts from the various Th-230-contaminated areas, five RESRAD scenario computer calculations were performed. These calculations were performed to estimate radiation doses that a worker or shopkeeper in a light industrial shop constructed over the areas might receive 1000 years from today. At that time, some Ra-226 will have grown in from decaying Th-230. Values of Th-230 from Table 1 were selected as possible inputs; Table 2 presents the results of those calculations. Two additional scenarios were run to estimate the potential exposure that a future construction worker might receive while building a structure on the property. They were assumed to work for a period of 3 months on either the "average" grid, or the highest Th-230 concentration grid (429N-429W). The projected exposures were 26 (mrem)/3 months for the "average" grid and 71 mrem/3 months for the highest grid.

Table 2
1000-year radiation dose projections from selected Th-230 grids

Grid	Th-230 (pCi/g)	Ra-226 (pCi/g)	Backfill depth (ft)	mrem/year @1000 years
627N-2178E	44.0	3.0	5.0	83
"avg. of 24"	233.5	4.4	4.6	390
429N-429W	650.	3.1	6.1	544
1122N-858E	400.	5.1	0.5	1206
429N-429W	650	3.1	0.0	2119

The National Council on Radiation Projection and Measurements in Report No. 93, "Ionizing Radiation Exposure of the Population of the United States", estimates the total average dose to United States residents is about 300 mrem/year. This dose is made up of contributions from cosmic radiation, terrestrial radiation, radon gas, and medical radiation exposures. The average dose to an individual at a higher altitude location such as Salt Lake City is higher because there is less atmospheric shielding from cosmic rays at higher altitudes. Therefore, the likely background radiation dose to an individual in Salt Lake City is about 400 mrem/year. The "potential" dose that might result from exposure to residual radioactive contamination on the Vitro site (whether from occupying a structure built on a contaminated grid, or being exposed to contaminated materials during construction) should be considered with respect to this existing background condition. By taking appropriate radiological measurements during excavation and construction, the actual lateral and vertical extent and concentration of the contaminants can be determined and appropriate mitigative measures (if necessary) can be taken.

Effects on ground water quality are expected to be negligible because the Th-230 appears to be in the insoluble hydroxide form, which is not mobile. Available water quality analyses indicate the Th-230 and chemical-contaminant concentrations do not exceed proposed EPA ground water standards. Under the UMTRA Ground Water Project, the DOE will further evaluate ground water conditions at the Vitro site and take any action required to ensure compliance with the appropriate standards.

3300 South Street Interface Supplemental Standards

As shown in Figure 1, Ra-226 contamination was left on the southwest corner of the Vitro processing site. The contamination was left under an old 1.2 m (48 in) nonreinforced concrete storm drain and around a 0.25 m (10 in) high-pressure gas line. In this area, both pipes are parallel to 3300 South Street and are located at the interface of the Vitro processing site and the 3300 South Street right-of-way. The tailings that were left along the right-of-way are not evenly distributed but were found in isolated pockets. This indicates that the tailings are from random spillovers from the main pile on the site. The contaminated material is mixed with road base, gravel, and native soils and has an average Ra-226 concentration of 30 pCi/g, with a high value of 150 pCi/g.

The tailings material was removed from the top and both sides of the storm drainpipe. The materials that the pipe is resting on were left in place and are approximately 0.02 to 0.055 m (1 to 2 in) thick. The tailings material was removed to within 0.46 m (18 in) of the high-pressure gas line. Contaminated material also extends under 3300 South Street for up to 0.6 to 0.9 m (2 to 3 ft). All contaminated materials along 3300 South Street are at least 0.3 m (1 ft) below the surface of the road and in some cases at least 1.2 m (4 ft) under final grade. The contaminated material is dispersed along a 190 m (620 ft) long excavation face and the total quantity left in place is estimated at less than 150 m^3 (200 yd^3).

Since the contamination in the right-of-way is covered with at least 0.3 m (1 ft) of clean material, direct exposure to the material is not likely unless the clean cover material is removed. As outlined for the Th-230, one scenario for possible health impacts is where future construction activities bring the contaminated material to the ground surface. The exposure pathways would be the same as that for the Th-230 contaminated material. Excavation of the contaminated material would further dilute the Ra-226 concentration, lowering the potential health impacts.

Table 3
Grids that Fail Ra-226 Acceptance Criteria

Grid identification	Ra-226 (actual)	Ra-226 (calc.)**	Backfill (ft)
Drawing SLC-CL-0023			
5+28N - 0+99 "B"	28.1	4.8	2.3
3+96N - 1+32 "	17.9	1.7	4.2
Drawing SLC-CL-0029			
12+87 - 4+29E "	42.0	5.5	4.7
15+51 - 5+94E "	19.2	4.3	0
Drawing SLC-CL-0033			
25+74 - 10+56E "A"	17.6	3.0	5.5
Drawing SLC-CL-0034			
16+17 - 16+50E "	16.8	N/A	7.6

**Calculated Ra-226 concentrations were determined by averaging known concentrations from grids adjacent to the grid with the elevated reading. When adjacent grids did not provide the required information, data from the next closest grid was used. The calculated value is provided to show that the average Ra-226 concentration of the surrounding grids met the EPA cleanup criteria.

Radium-226

Six grids exceed the Ra-226 concentration limit of 15 pCi/g plus background. The reported values are 42.0, 28.1, 19.2, 17.9, 17.6 and 16.8 (see Figure 1). These elevated grids were identified after the site had been backfilled. Due to the geology of the site and the way excavation was performed it is believed that any contamination remaining on these grids would be confined to a very thin lens or randomly distributed spots. Locating and removing this contamination would be virtually impossible. An analysis of the projected radon flux from the grid with 42 pCi/g of Ra-226 was performed. This analysis projects a radon flux of 3.7 $pCi/m^2/sec$, which would produce 0.02 radon working levels if a hypothetical slab-on-grade house is built on the grid.

Conclusions

The contaminants that remain on the Vitro site are primarily radionuclides that decay by alpha particle emission. Alpha-decay radionuclides are not hazardous unless they are deposited inside the body, which can only happen by eating, drinking or breathing them. By taking precautions to keep them buried, the potential hazard can be virtually eliminated. Several very straightforward actions can be taken into consideration when planning future use and activities at the former Vitro site. These would include (but are not limited to):

- Check the location of future construction plans against locations identified as being contaminated. If there is a possibility of encountering contaminated material, contact the state of Utah Department of Environmental Quality for assistance in taking radiological measurements during construction to test for the presence of radioactivity.

- If there are construction plans for habitable structures over potentially contaminated areas, coordinate with the state of Utah Department of Environmental Quality to take radiological measurements during construction. Regardless of the outcome of these measurements, consider installing a passive sub-slab ventilation system that will vent any radon gas coming from the soil directly to the atmosphere. This ventilation system adds very little to the construction cost and will prevent any problems with radon gas in the structure.

- Attempt to replace soil taken from the bottom of any excavation back into the deepest part of the hole when it is backfilled. In this way, any deep buried contamination will be reburied and not left at the surface where it presents a higher potential for exposing someone.

RESPONSE TO COMMENTS
VITRO COMPLETION REPORT

ISSUE 1.C

1. **Comment:** Provide evidence that adequate gamma data was obtained for all grid areas on the site that do not currently have Ra-226 data in the CR (except the four under the influent collection box).

   Response: As stated on page 5-6 delta surveys were performed on every grid. These surveys were used to guide the excavation and to provide additional assurance that the grid was cleaned to the EPA standards. In most cases the Ra-226 concentration was then determined using the Opposed Crystal System (OCS). The results of the OCS count were documented for most remediated grids. Where no data is found for the Ra-226 concentration it is because the documentation has either been lost or the data was not obtainable. However, because of the geology of the site it was easy to determine when tailings ended and the clay earth began. In addition, within a specific area the depth of tailings to the clay earth was approximately the same. Review of the verification grid maps show that all of the grids surrounding the grids in question were excavated to approximately the same elevation. Based on review of the verification grid maps and the fact that delta measurements were performed during excavation it is reasonable to assume that the grids in question were remediated in the same fashion as those grids that surround them.

   Implementation: The last paragraph of page 5-6 will be modified to read: "Also note that delta measurements were generally used to guide the dig; soil samples were the primary verification method. However, if collection of a soil sample was not practical, the delta measurements were used for verification purposes as well."

2. **Comment:** Resolve the inconsistencies in data among Tables 7.1 to 7.17 and Appendix B in the CR (e.g., sheet 22 grid 1320N 000Rt, sheet 24 grid 1287N 693W, and sheet 30 grid 594N 792E).

   Response: Drawing SLC-CL-0022, grid 1320N 000RT, indicates that there was 7.9 pCi/g Ra-226 remaining after remediation. The drawing also indicates that the amount of backfill for that location would preclude leaving tailings in excess of 5 pCi/g above background Ra-226. It should be noted that the backfill elevations were documented for payment of the work performed by the State of Utah. Therefore, if the state of Utah did not perform the backfill activity the drawings will show that the area was not backfilled. In this particular area, the State of Utah had been informed by the Manager of the Central Valley Water Reclamation Facility (CVWRF) that the area in question would be covered with fill material being generated during the construction of their expanding facility. The area in question was backfilled within a month of the time it was remediated and has remained covered to the present time. Part of this grid has over 9 feet of soil covering it as part of the site landscaping scheme.

Drawing SLC-CL-0024, grid 1287N 693W, was cleaned to the EPA standards; therefore, this grid was removed from Table 7.3.

Drawing SLC-CL-0030, grid 594N 792E, indicates a 1 pCi/g Ra-226 concentration and the Table indicated 1.4 pCi/g calculated Ra-226 concentration. This grid was removed from Table 7.9 since it met the EPA standards.

Implementation: The tables in section 7 have been significantly revised.

3. **Comment:** Explain the difference between "backfill feet" and "backfill calculated feet" in the Section 7 table headings, and why some grids have values under both headings.

   Response: "Backfill feet" represents documented backfill depths determined by post-remedial-action surveillance. "Backfill calculated feet" represents values determined by averaging the backfill depths of the surrounding grids. "Backfill calculated feet" were used when surveillance documentation for the grid could not be found. In cases where "backfill feet" and "backfill calculated feet" are both indicated, it is because the "backfill feet" is felt to be in error and the "backfill calculated feet" is provided as a more likely value. Within a specific area on the site the tailings/clay earth interface occurred at approximately the same elevation. Backfill of the site was performed to provide a level surface with drainage to the north. Review of the verification grid maps show that all of the grids surrounding the grids that do not have backfill information were excavated to approximately the same elevation and backfilled to the same elevation. Therefore, it is reasonable to assume that the grids in question were backfilled in the same fashion as those grids that surround them.

   Implementation: None.

4. **Comment:** Explain why some grid areas in Section 7 tables have both "actual" and "calculated" Ra-226 values.

   Response: Both actual and calculated Ra-226 values were provided whenever a grid exceeded 5 pCi/g. The calculated value was provided as a comparison. Since grids with a Ra-226 value below 6.5 pCi/g (5 pCi/g + background) meet the EPA standard these grids were deleted from the tables in Section 7. In addition, any grid that exceeded 6.5 pCi/g but was less than 16.5 pCi/g and the documentation showed that it had been backfilled with more than six inches of material were also deleted from the tables. The only grids that remain on the tables are those that either exceed the EPA standard of 15 pCi/g + background or those that exceed the EPA standard of 5 pCi/g + background and the documented backfill levels are less than six inches. Both actual and calculated Ra-226 values will only be provided when the actual value is greater than 16.5 pCi/g. The calculated Ra-226 value is provided to show that the surrounding grids were remediated to the EPA standards. As stated in response to comment 1 above, excavation of the processing site was guided using delta surveys. Excavation of a grid proceeded until the delta measurement indicated the area was clean.

Based on the way remedial action was performed it is reasonable to assume that the calculated Ra-226 value is a valid number for the grids where the OCS value exceeded the EPA standards.

Implementation: The tables in Section 7 have been modified as described above.

ISSUE 2

Comment: The NRC identified six grid areas exceeding the Ra-226 concentration limit of 15 plus 1.5 pCi/g (background). The reported values in the CR are 42.0, 28.1, 19.2, 17.9, 17.6, and 16.8 pCi/g. Another grid area exceeds the limit based on a 28.3 pCi/g lab value, which is considered more accurate than the Opposed Crystal System field procedure used by DOE. Samples from two other grid areas were analyzed by two different labs and have widely varying results (23.1 and 3.9 pCi/g on Sheet 23 of the CR; 3.1 and 50.0 pCi/g on Sheet 27 of the CR), which makes the data difficult to assess.

If the missing final verification data cannot be located, one approach for closing this issue is implementing site clean-up of the two grid areas with the highest Ra-226 contamination levels. It is assumed that the other elevated grid areas should not present a potential health hazard based on similar radon flux modeling performed for other UMTRA Project sites. Alternative approaches for DOE, the State of Utah, and the CVWRF Authority are to either enact a land use restriction covenant, or ensure a land annotation policy is in effect that provides for documenting locations, quantities, and concentration levels of the remaining contamination. This information should be easily accessible to the public.

Response: The state of Utah advocates that any grid that fails to meet the Ra-226 release criteria is a bookkeeping anomaly that reflects a failure to update records to include the final verification sample analysis. Due to the large amount of paperwork generated, it is believed that the final cleanup soil sample analysis result was not recorded for these grids. As stated in the previous responses the method of remediation and verification, and the site geology preclude the possibility of not cleaning up a grid as required.

The DOE does not agree with the NRC's assertion that the OCS field method is generally less accurate than any other laboratory analysis. During radiological site audits of active remediation sites, the DOE has generally found that the disparity between the two readings has more to do with aliquot differences than analytical accuracy (off-site wet chemistry analyses typically involved a 5-10 gram sub-sample of the 500 gram sample that was previously analyzed on the OCS by gamma spectroscopy). The OCS method has consistently demonstrated the UMTRA Project accuracy requirement of plus or minus 30% at the 95% confidence limit.

It is believed that the disparity between the two readings from the two different laboratories is also a result of an aliquot difference rather than analytical accuracy.

Nevertheless, the DOE considers the OCS values as recorded in the completion report to be the record values. Therefore, the six grids that exceed the EPA standard of 15 pCi/g + background will be handled as grids that do not meet the EPA clean up criteria. To ensure that the current and future landowners are aware of the contamination that was left on the Vitro processing site the DOE has developed the following information: a map showing the location of the six elevated Ra-226 grids, an estimate of the approximate amount of contamination that was left, and a health risk analysis for exposure to the contamination (see attached information). This information will be sent to the state and current property owner.

Implementation: The discussion of the grids exceeding the standards will be removed from the Section 6 "Supplemental Standards" and inserted into Section 7.

ISSUE 3.c

Comment: "The issue of supplemental standards for CVWRF should be moved to the CVWRF VP Completion Report and additional data requested by NRC should appear there."

Response: The DOE is in agreement with the NRC comment.

Implementation: Section 6.2, "Central Valley Clarifier" will be deleted from the Vitro Completion Report and the subsequent subsections will be re-numbered accordingly. This information now appears in the Completion Report for the Central Valley Water Reclamation Facility Vicinity Property Completion Report along with the additional requested information.

ISSUE 3.d

Comment: DOE needs to provide:

1. Th-230 data in Table 6-1 that is consistent with the data that is presented in Appendix B. Specifically the DOE should discuss the Th-230 contamination as four distinct areas of known Th-230 contamination (DOE only identifies two distinct areas) and revise the Ra-226 values of grids 627-2178 and 759-2145.

2. revise the information in Section 6.4 to describe the elevated Th-230 as four distinct areas (rather than discussing 24 individual grids) and to provide a reason for and possible size of the Th-230 soil sample in the southwest corner of the site that has a Th-230 concentration of all 650 pCi/g.

3. a revised estimation of the volume of material containing elevated Th-230 (NRC estimated 1580 m^3 and DOE estimated 1507 m^3).

Response/Implementation:

1. Table 6.1 and Figure 6.1 has been revised to show the elevated Th-230 as four distinct areas on the Vitro site. The Ra-226 data has been revised in Table 6-1 for grids 1056N-066E, 1353N-297E, 627N-2178E and 759N-2145E.

2. Section 6.4 has been revised to discuss the elevated Th-230 as seven distinct areas rather than individual grids. In addition, a discussion has been added to outline possible reasons for the existence of each of the areas including an estimated quantity for each area.

3. The quantity of Th-230 has been re-estimated for each of the grids containing elevated Th-230 (see Table 6.1). DOE used a value of 1480 m^3. This number was determined by multiplying the 24 grids by the grid area of 101 m^2 (33 feet x 33 feet grids) and by the estimated thickness of 0.61 m (2 feet).

ISSUE 3.f

Comment: DOE in their application for supplemental standards for Th-230 must include sufficient justification to demonstrate that the potential long-term health risk due to the Th-230 in the saturated zone is acceptable.

Response/Implementation: DOE has calculated and tabulated in Table 6.1 the future potential elevated radon working levels in a slab-on-grade house built on the grids in question. In some instances, they exceed the target concentration of 0.02 WL. In order to ensure the current and any future landowners are aware of the Th-230 that was left on site specific information regarding this contamination will be forwarded to the state under separate cover (see attached information). This information will include a map outlining the approximate locations where Th-230 remains, an estimate of the amount of Th-230 that was left, and a health risk analysis to outline the risks due to exposure to the Th-230.

Minor Comments

1. Comment. The executive Summary and page 2-5 of the CR indicate that design changes are noted in the record drawings. However Appendix A, which is titled "Record Drawings" contains only the verification grid maps. The staff considers that a record drawing would indicate the final grade lines (i.e., elevations) and the location of structures, roads, or other landmarks affected by the project. DOE should provide as-built drawings for the processing site as found in other UMTRA Project CRs, if possible.

   Response. The only record drawings available for the Vitro processing site are those that are contained in Appendix A. After excavation of the contaminated material was completed the site was backfilled to produce a flat surface with drainage to the north. A ditch (called the South Vitro Ditch) runs north/south across the west side of the property and intercepts another ditch (called the Vitro Ditch) which runs east/west across the northern side of the property. The UMTRA Project did not build any other structures on this site as part of the remedial action.

   Implementation. None

2. Comment. Page 2-5 of the CR states that the site is vacant. If the proposed golf driving range (permission for construction was requested in 1994) was built, DOE should revise the CR accordingly.

   Response. The proposed golf driving range has been constructed on the Vitro processing site. In addition, over the last year a berm has been constructed on the northern portion of the site, additional backfill has been placed on portions of the site, and a sewer line is being installed parallel to the South Vitro Ditch. In various letters NRC has been made aware of these modifications. However, the DOE does not agree that this information should be contained in the Vitro Completion Report. These modifications to the processing site were not constructed under the UMTRA Project nor where they constructed by either the DOE or the state of Utah. The intent of the Vitro Completion Report is to discuss the remedial action that was performed to comply with UMTRCA.

   Implementation. None.

3. Comment. Page 4-3 of the CR states that the "Vitro site was free of all radiological contaminants . . ." DOE should delete this statement because all areas were not cleaned to background levels.

Response. The DOE agrees with the NRC's statement.

Implementation. The above referenced statement has been deleted from page 4-3.

4. Comment. Page 5-5 of the CR states that ". . . all of the areas were cleaned to levels below those established by the UMTRA Project." DOE should correct this statement because areas with elevated levels of Ra-226 are being considered for application of supplemental standards, and other areas may also exceed the standards (e.g., the Vitro ditch may have elevated Th-230 levels).

   Response. The DOE agrees with the NRC's statement.

   Implementation. Page 5-5 has been modified to take into account the NRC comment.

5. Comment. Page 6-6 of the CR states that the supplemental standards result in material with low-levels of Th-230 remaining in portions of the saturated zone. The staff does not consider Th-230 levels of 44 to 650 pCi/g low when soil background values are 1 to 2 pCi/g. DOE should revise the statement accordingly.

   Response. The DOE agrees with the NRC's statement.

   Implementation. The discussion on supplemental standards for Th-230 has been significantly revised and this statement has been omitted.

6. Comment. Page 6-7 of the CR indicates that NRC Regulatory Guide (Reg. Guide) 3.64 discusses the RAECOM computer code. However, Reg. Guide 3.64 discusses the RADON code, which is similar to the RAECOM code. DOE should correct the statement.

   Response. The DOE agrees with the NRC's statement.

   Implementation. This discussion on supplemental standards for Th-230 has been significantly revised and this reference was omitted.