LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

March 29, 1994

Mr. John H. Austin, Chief
Decommissioning and Regulatory Issues Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS
Mail Stop 5E2
Office of Nuclear Materials Safety and Safeguards
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Whittaker Corporation Greenville Site
Byproduct Materials License No. SMA-1018
Docket No. 40-7455

Dear Mr. Austin:

In accordance with your letter of February 16 and my telephone conversation with Mr. Louis Bykoski on March 23, please find attached responses to additional questions from the Nuclear Regulatory Commission regarding Whittaker Corporations proposed Characterization Plan for the Greenville, PA site submitted May 14, 1993.

If you should have any questions, comments or need additional information, please do not hesitate to contact us.

Sincerely,

W. Kenneth Waller
Program Manager, Whittaker Corporation
Technical Director, Environmental Restoration
and Radiation Services

cc: Louis M. Bykoski, Project Manager
United States Nuclear Regulatory Commission
Decommissioning and Regulatory Issues Branch
Division of Low-Level Waste Management and Decommissioning
Office of Nuclear Material Safety and Safeguards
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RESPONSES TO NRC ADDITIONAL COMMENTS

WHITTAKER METALS - GREENVILLE, PA

General Comments

1. Revisions to the Site Health & Safety Plan have been completed to incorporate the revised 10 CFR Part 20. Procedures have been reviewed and changes necessary to incorporate the revised 10 CFR Part 20 have been completed. Those procedures affected include the following:

   - Procedure 1.4 - Respiratory Protection Program
   - Procedure 1.7 - Exposure Control
   - Procedure 2.5 - Air Sample Analysis

   Copies of these procedures and the revised Site Health & Safety Plan are attached.

2. The procedure control process has been added to procedure 1.1, Maintenance of Procedures, Logs and Records. A copy of this procedure is attached.

3. Procedures 1.8 - Posting & Control of Areas, and 1.9 - ALARA Policy are attached for your review.

Specific Comments

1. The basis for using <15 pCi/gm as the criteria is found in **40 CFR Part 192 - HEALTH AND ENVIRONMENTAL PROTECTION STANDARDS FOR URANIUM AND THORIUM MILL TAILINGS, Subpart B - Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites, 192.12, Standards, Subpart D - Standards for Management of Uranium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended and Subpart E - Standards for Management of Thorium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended.** 40 CFR 192 establishes the 5 pCi/gm in the first 15 cm soil layer and 15 pCi/gm in subsequent 15 cm thick soil layers for Radium, Thorium and Uranium.

   Also, the U.S. Department of Energy's Formerly Utilized Sites Remedial Action Program, FUSRAP, uses as its Soil Guidelines for Radium-226, Radium 228, Thorium-230 and Thorium-232 the 5/15 rule as we call it, i.e., 5 pCi/gm averaged over the first 15 cm of soil below the surface; 15 pCi/gm when averaged over any 15 cm thick soil layer below the surface layer.

2. The equation for calculating the well volume in Section 9.4.1 has been modified as follows:

   Case 1 - **STATIC WATER LEVEL IS LOWER THAN TOP OF SCREEN**:

Volume Water in Well = $h_1 \pi (7.48) [(R_1^2 - R_2^2)(\phi) + R_2^2]$

Where:	V	=	volume of water in well
	H_1	=	height of water in well screen and sand pack
	R_1	=	radius of borehole
	R_2	=	inner radius of PVC casing
	7.48	=	volume of water in one cubic foot
	ϕ	=	porosity of sand pack

(See attached Case 1 diagram)

Case 2 - **STATIC WATER LEVEL IS HIGHER THAN TOP OF SCREEN**

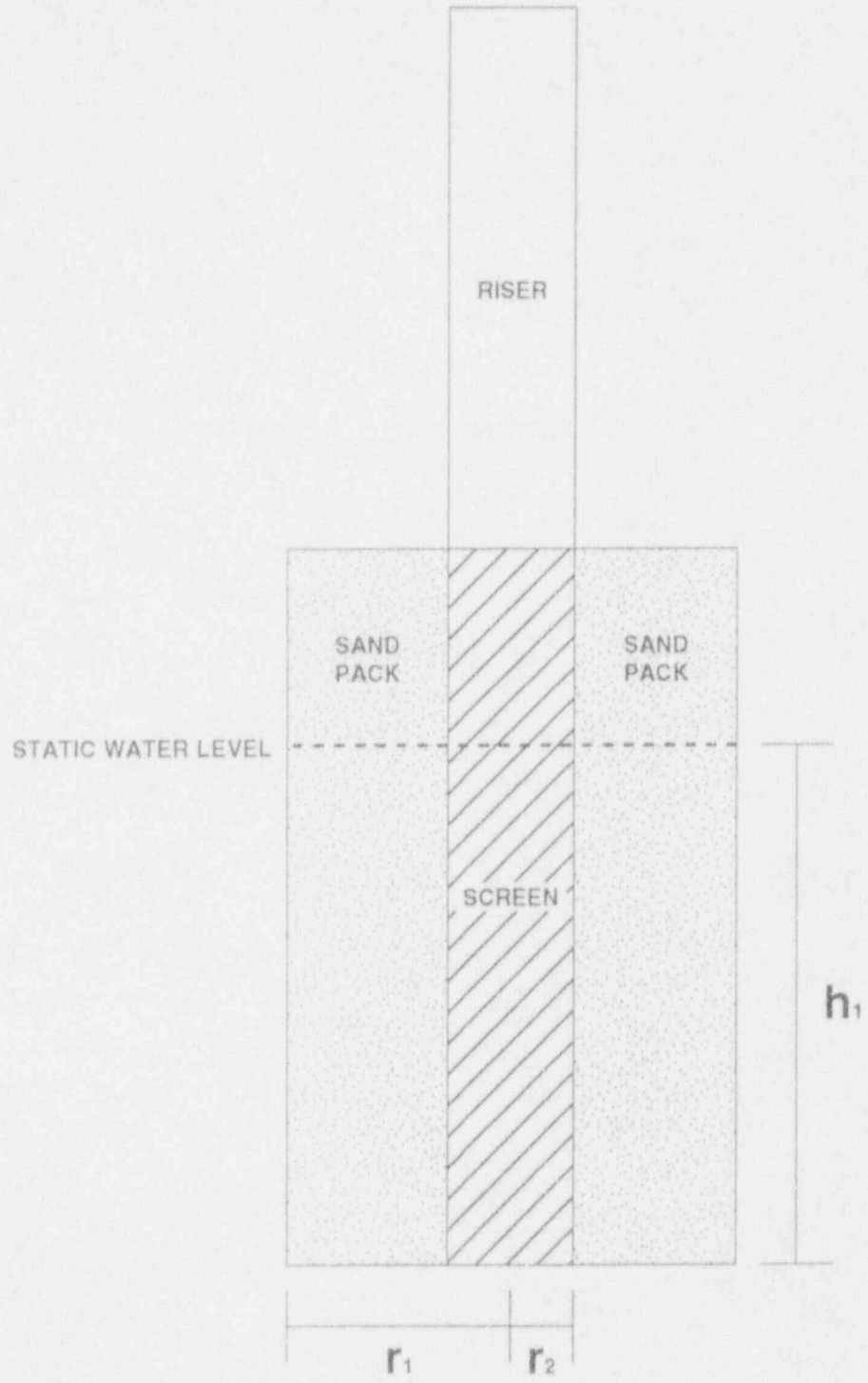
Volume Water in Well = $h_1 \pi (7.48) [(R_1^2 - R_2^2)(\phi) + R_2^2] + h_2 \pi 7.48 R_2^2$

Where:	V	=	volume of water in well
	H_1	=	height of water in well screen and sand pack
	R_1	=	radius of borehole
	R_2	=	inner radius of PVC casing
	7.48	=	volume of water in one cubic foot
	ϕ	=	porosity of sand pack
	H^2	=	height of water above sand pack

(See attached Case 2 diagram)

CASE 1

STATIC WATER LEVEL IS LOWER THAN TOP OF SCREEN



$$V = h_1 \pi (7.48) [(r_1^2 - r_2^2)(\phi) + r_2^2]$$

volume of hole with sand pack

volume inside PVC in sand pack

- V - volume of water in well
- h_1 - height of water in well screen and sand pack
- 7.48 - volume of water in 1 cubic ft.
- r_1 - radius of borehole
- r_2 - inner radius of PVC casing
- ϕ - porosity of sand pack

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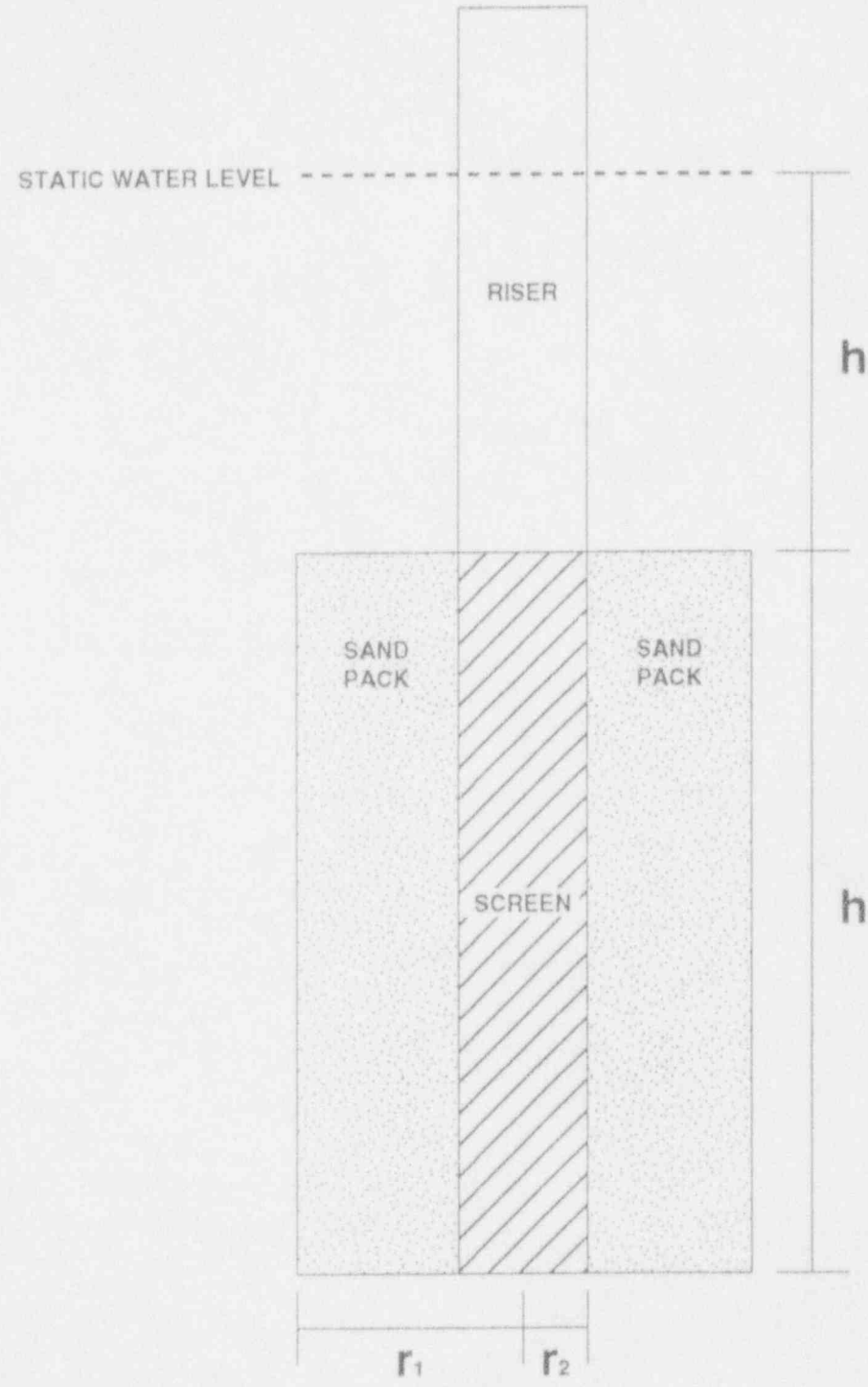
CASE 2

STATIC WATER LEVEL IS HIGHER THAN TOP OF SCREEN



V - volume of water in well

h_1 - height of water in well screen and sand pack

7.48 - volume of water in 1 cubic ft.

r_1 - radius of borehole

r_2 - inner radius of PVC casing

ø - porosity of sand pack

h_2 - height of water above sand pack

$$V = h_1 \pi (7.48) [\underbrace{(r_1^2 - r_2^2)(ø)}_{\text{volume of hole with sand pack}} + \underbrace{r_2^2}_{\text{volume inside PVC in sand pack}}] + \underbrace{h_2 \pi 7.48 r_2^2}_{\text{volume of water above sand pack}}$$

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