

Table 1
Chronology of Site Events
Homestake Mining Company Site, New Mexico

Date	Event
1958	Uranium mining mill operations began at the HMC site.
1961	Groundwater contamination first observed at the site.
1974	The State of New Mexico signed an agreement with the NRC authorizing the state to regulate uranium milling activities under the Atomic Energy Act.
1974 - 1975	The NMEID and the EPA conducted study to of the impacts of mining activities in the Grants Mineral Belt on area groundwater and surface water.
1977	Groundwater remediation activities at the site began.
1981	The NMEID approved discharge plan DP-200 for the HMC site.
August 1983	A study of Radon levels in the area was released.
September 1983	The HMC site was placed on the NPL.
November 1983	EPA and HMC signed a Consent Decree that required HMC to provide an alternate water supply to homes in four subdivisions south of the site.
April 1985	HMC completed hook-ups for the alternate water supply.
June 1986	The State of New Mexico returned regulatory authority for uranium mills to the NRC.
June 1986	The Phase II Feasibility Study was completed.
June 30, 1987	EPA issued an Administrative Order on Consent (AOC) to HMC to conduct an RI/FS for the radon operable unit.
October 1987 - January 1989	HMC conducted RI/FS for the radon operable unit.
July 1989	RI/FS reports issued for the radon operable unit.
September 15, 1989	HMC submitted Corrective Action Plan for groundwater remediation to the NRC.
September 27, 1989	EPA signed ROD for the radon operable unit that determined no further action was necessary.
November 1989	All activities required under 1983 Consent Decree were completed.
1990	Uranium milling operations at the site ceased.

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Date	Event
September 1993	Reclamation activities to clean-up soils and decommission the mill began.
October 1993	Reclamation Plan submitted to NRC.
December 14, 1993	Memorandum of Understanding signed by EPA Region 6 and NRC Region IV detailing each agency's responsibilities and authority at the HMC site.
July 1994	EPA released HMC from 1983 Consent Decree.
December 1995	Demolition of the mill and surface reclamation activities at the site were completed.
January 1999	NRC approved the soil cleanup and mill reclamation.

Table 2
Background Concentrations and Water Quality Standards
Homestake Mining Company Site, New Mexico

Constituent	NRC Standard ¹	NMED/WQCC ²	95% Upper Tolerance Limit ³
Uranium	0.04	5	0.15
Selenium	0.1	0.12	0.27
Molybdenum	0.03	1.0*	0.05
Vanadium	0.02		
Chromium	0.06		
Radium-226 + Radium-	5	30	
Thorium-230	0.3		
Sulfate		976	1870
Chloride		250	112
Nitrate		12.4	23
Total Dissolved Solids		1770	112
All values are in milligrams per liter (mg/l), except for Radium-226 + Radium-228 and Thorium-230,			
1. Requirement stipulated in the NRC Corrective Action Plan.			
2. Requirement stipulated in NMED DP-200			
3. Background concentration calculated by HMC in their background study dated 1999.			
* - Irrigation Standard			

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Table 3
Total Effective Dose Equivalent to the Nearest Resident, Monitoring Point HMC #4, 2000
Homestake Mining Company Site, New Mexico

CEDE - Inhalation of Radiocludes	CEDE - Rn-222	Dose Equivalent - Direct Radiation	TEDE
1.2 mrem/yr	71 mrem/yr	15 mrem/yr	87 mrem/yr

Table 4
Rn-222 and Gamma Exposure Rate Air Monitoring Results, 2000
Homestake Mining Company Site, New Mexico

Monitoring Point	Rn-222 Concentration (uCi/ml)		Gamma Exposure Rate (mrem/qtr)		
	Jan-June	June-Dec	Jan-Jul	Jul-Oct	Oct-Dec
HMC #1	1.4E-09	2.2E-09	23.0	20.9	33
HMC #2	1.5E-09	1.6E-09	28.2	22.6	37
HMC #3	1.2E-09	1.2E-09	22.8	19.5	37
HMC #4	1.9E-09	2.0E-09	33.7	22.8	40
HMC #5	1.2E-09	1.8E-09	30.9	20.3	42
HMC #6	1.1E-09	1.1E-09	30.9	20.3	40
HMC #7	1.0E-09	1.2E-09			
HMC #16	9.0E-10	1.1E-09	26.0	23.9	34
units of measure: uCi/ml - microCuries per milliliter; mrem/qtr - millirems per quarter					
HMC #16 is the background monitoring station					

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Table 5
U-nat, Th-230, and Ra-226 Air Monitoring Results, 2000
Homestake Mining Company Site, New Mexico

Monitoring Point	Quarter	U-nat (uCi/ml)	Th-230 (uCi/ml)	Ra-226 (uCi/ml)
HMC #1	1st	<1.00E-16	<1.00E-16	<1.00E-16
	2nd	1.79E-15	<1.00E-16	<1.00E-16
	3rd	1.73E-15	<1.00E-16	<1.00E-16
	4th	6.35E-16	<1.00E-16	<1.00E-16
HMC #2	1st	<1.00E-16	1.39E-16	<1.00E-16
	2nd	1.74E-15	<1.00E-16	<1.00E-16
	3rd	7.74E-16	<1.00E-16	<1.00E-16
	4th	3.71E-16	<1.00E-16	<1.00E-16
HMC #3	1st	1.24E-16	<1.00E-16	<1.00E-16
	2nd	6.02E-16	<1.00E-16	<1.00E-16
	3rd	2.34E-15	<1.00E-16	<1.00E-16
	4th	9.77E-16	<1.00E-16	<1.00E-16
HMC #4	1st	2.42E-16	<1.00E-16	<1.00E-16
	2nd	1.05E-14	<1.00E-16	<1.00E-16
	3rd	3.83E-15	<1.00E-16	<1.00E-16
	4th	8.96E-16	<1.00E-16	<1.00E-16
HMC #5	1st	5.33E-16	<1.00E-16	<1.00E-16
	2nd	6.21E-14	<1.00E-16	<1.00E-16
	3rd	1.24E-14	<1.00E-16	<1.00E-16
	4th	1.64E-15	<1.00E-16	<1.00E-16
HMC #6	1st	<1.00E-16	<1.00E-16	<1.00E-16
	2nd	6.15E-15	<1.00E-16	<1.00E-16
	3rd	1.74E-15	<1.00E-16	<1.00E-16
	4th	2.51E-16	<1.00E-16	<1.00E-16
HMC #6 is the background monitoring station				

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Attachment 1
Documents Reviewed

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Documents Reviewed

- AK Geoconsult, Inc. (AKG), 1996. *Completion Report, Mill Decommissioning, Homestake Mining Company, Grants Uranium Mill*. February 29, 1996.
- AK Geoconsult, Inc. (AKG), 1993. *Reclamation Plan, Revision 10/93, Homestake Mining Company of California, Grants Operation*. October 1993.
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- Environmental Restoration Group, Inc. (ERG), 1995a. *Completion Report for Reclamation of Off-Pile Areas at the Homestake Mining Company of California Uranium Mill, Grants Operation, License No. SUA-1471*. November 1995.
- Environmental Restoration Group, Inc. (ERG), 1995b. *Final Radon Barrier Design for the Large Tailings Pile, Homestake Mining Company of California, Grants Operations*. June 1995.
- Homestake Mining Company (HMC), undated. Letter from Ronald A. Waterland, HMC, Environmental Project Supervisor, to Mary Heather Nobel, NMED, Ground Water Section. Regarding In-Situ Biological Pilot Tests. Undated.
- Homestake Mining Company (HMC), 2001a. Letter from Roy Cellan, Homestake Mining Company, to Mary Heather Noble, NMED, Ground Water Pollution Prevention Section. Regarding Report for Discharge Plan DP-725. July 9, 2001.
- Homestake Mining Company (HMC), 2001b. *Semi-Annual Environmental Report, January-June 2001*. August 2001.
- Homestake Mining Company (HMC), 2001c. *Semi-Annual Environmental Report, July-December 2000*. 2001.
- Homestake Mining Company (HMC), 2000a. *Semi-Annual Environmental Report, January - June 2000*. 2000.

Homestake Mining Company (HMC), 2000b. Letter from Roy R. Cellan, HMC, to Philip Ting, NRC, Branch Chief, Fuel Cycle Licensing Branch, Division of Fuel Cycle Safety and Safeguards. Regarding Docket No. 40-8903, License No. SUA-1471, Semi-Annual Environmental Monitoring Report, Period - January through June 2000. August 8, 2000.

Homestake Mining Company (HMC), 2000c. *Grants Reclamation Project Discharge Plan Renewal Application, DP-200*. July 2000.

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Homestake Mining Company (HMC), 1998a. *Response to Comments on Completion Reports for Off-Pile Cleanup and Mill Decommissioning*. October 1998.

Homestake Mining Company (HMC), 1998b. Letter from Roy Cellan, Homestake Mining Company, to Joseph J. Holonich, NRC, Chief, High-Level Waste and Uranium Recovery Projects Branch. Regarding Response to Comments to NRC Letter dated April 23, 1998. May 21, 1998.

Homestake Mining Company (HMC), 1997a. Letter from Roy Cellan, Homestake Mining Company, to Joseph L. Holonich, NRC, Chief, High-Level Waste and Uranium Recovery Projects Branch. Regarding Re-submittal of Response to Comments to Draft TER. July 23, 1997.

Homestake Mining Company (HMC), 1997b. Letter from Roy Cellan, Homestake Mining Company, to Joseph J. Holonich, NRC, Chief, High-Level Waste and Uranium Recovery Projects Branch. Regarding Response to NRC Comments from the Draft Technical Evaluation of the Completion Report for Reclamation of Off-Pile Areas and the Mill Decommissioning Completion Report. March 27, 1997.

Homestake Mining Company (HMC), 1996. Letter from Roy Cellan, Homestake Mining Company, to Joseph J. Holonich, NRC, Chief, High-Level Waste and Uranium Recovery Projects Branch. Regarding Submittal of Map for 1988 Radium Background Information. December 18, 1996.

Hydro-Engineering, LLC, March 2001. *Ground-Water Monitoring and Performance Review for Homestake's Grants Project, NRC License SUA-1471 and Discharge Plan DP-200, 2000.* March, 2001.

New Mexico Environment Department (NMED), 2000a. Letter from Mary Heather Noble, NMED, Groundwater Quality Bureau, Pollution Prevention Section, to Roy Cellan, HMC, Corporate Reclamation Manager. Regarding Request for Additional Information, DP-200, Homestake Mining Company. September 12, 2000.

New Mexico Environment Department (NMED), 2000b. Letter from George Schuman, NMED, Acting Program Manager, Superfund Oversight Section, to Petra Sanchez, U. S. EPA Region 6, Remedial Project Manager, and Ken Hooks, U. S. NRC Division of Waste Management. Regarding Homestake Mining Company Site Deletion Issues. July 13, 2000.

New Mexico Environment Department (NMED), 2000c. E-mail from Birgit Landin, NMED, to Petra Sanchez, U. S. EPA Region 6, Remedial Project Manager, et. al. Regarding draft letter from NMED to EPA discussing issues involved with deleting the site from the NPL. June 22, 2000.

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New Mexico Environment Department (NMED), 1999b. Letter from Katherine Yuhas, NMED, Ground Water Pollution Prevention Section, to Roy Cellan, Homestake Mining Company. Regarding Reduction of Ground Water Monitoring, DP-200. October 13, 1999.

New Mexico Environment Department (NMED), 1999c. Letter from Marcy Leavitt, NMED, Chief, Ground Water Quality Bureau, to Ron Waterland, Homestake Mining Company. Regarding Discharge Plan Amendment Approval, DP-200. February 4, 1999.

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- New Mexico Environment Department (NMED), 1996a. Discharge Plan DP-200. Issued to Homestake Mining Company on November 15, 1996.
- New Mexico Environment Department (NMED), 1996b. Letter from Marcy Leavitt, NMED, Chief, Ground Water Quality Bureau, to Fred Craft, Resident Manager, Homestake Mining Company. Regarding Discharge Plan Amendment Approval, DP-725. May 7, 1996.
- New Mexico Environment Department (NMED), 1996c. Discharge Plan DP-725. Issued to Homestake Mining Company on March 25, 1996.
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- U. S. Department of Justice (DOJ), 1983. Letter from William Lutz, U. S. Attorney, and Herbert A. Becker, Asst. U. S. Attorney, to Barbara Greenfield, EPA, Office of Regional Council. Regarding USA v. Homestake Mining Company, with enclosed Agreement and Stipulation. December 12, 1983.
- U. S. Environmental Protection Agency (EPA), 2001a. Fact Sheet: *Homestake Mining Company*. June 22, 2001.
- U. S. Environmental Protection Agency (EPA), 2001b. *Comprehensive Five-Year Review Guidance*. OSWER No. 9355.7-03B-P. June 2001.
- U. S. Environmental Protection Agency (EPA), 2000a. Memorandum Regarding Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criteria in 10 CFR Part 40 Appendix A, I, Criterion 6 (6). From Stephen D. Luftig, Director, OERR, and Stephen D. Page, Director, ORIA. OSWER No. 9200.4-35P, April, 2000.
- U. S. Environmental Protection Agency (EPA), 2000b. Memorandum Regarding Interim Final Evaluation of Facilities Currently or Previously Licensed NRC Sites under CERCLA. From Timothy Fields, Jr., U. S. EPA. OSWER No. 9272.0-15P. February 2000.
- U. S. Environmental Protection Agency (EPA), 1999. *Radiation Risk Assessment at CERCLA Sites: Q & A*. OSWER No. 9200.4-31P. December 1999.

- U. S. Environmental Protection Agency (EPA), 1998. Memorandum Regarding Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA Sites. From Stephen D. Luftig, Director, OERR, and Larry Weinstock, Acting Director, ORIA. OSWER No. 9200.4-25, February 1998.
- U. S. Environmental Protection Agency (EPA), 1997. Memorandum Regarding Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination. From Stephen D. Luftig, Director, OERR, and Larry Weinstock, Acting Director, ORIA. OSWER No. 9200.4-18, August 1997.
- U. S. Environmental Protection Agency (EPA) Region 6, and U. S. Nuclear Regulatory Commission (NRC) Region IV, 1993. *Memorandum of Understanding Between Region 6 of the U. S. Environmental Protection Agency and Region IV of the U. S. Nuclear Regulatory Commission for Remedial Action at the Homestake Mining Company Uranium Mill in Cibola County, New Mexico.* December, 1993.
- U. S. Environmental Protection Agency (EPA), 1989. *Record of Decision, Homestake Mining Company, Radon Operable Unit, Cibola County, New Mexico.* September 27, 1989.
- U. S. Nuclear Regulatory Commission (NRC), 2000a. Letter from Philip Ting, NRC, Chief, Fuel Cycle Licensing Branch, to George Schuman, NMED, Acting Program Manager, Superfund Oversight Section, Groundwater Quality Bureau. Regarding Deletion of Homestake Mill Site From National Priorities List. November 2, 2000.
- U. S. Nuclear Regulatory Commission (NRC), 2000b. Letter from Philip Ting, NRC, Chief, Fuel Cycle Licensing Branch, to Roy Cellan, HMC. Regarding Homestake Mining Company - Amendment No. 33 - Revised Groundwater Monitoring Program. September 28, 2000.
- U. S. Nuclear Regulatory Commission (NRC), 1999. Letter From N. King Stablein, NRC, Acting Chief, Uranium Recovery Branch, to Roy Cellan, Homestake Mining Company. Regarding Cleanup of Mill and Windblown Contamination, Amendment No. 32. January 28, 1999.
- U. S. Nuclear Regulatory Commission (NRC), 1998a. Letter from Joseph J. Holonich, NRC, Chief, Uranium Recovery Branch, to Roy Cellan, Homestake Mining Company. Regarding Inspection Report 40-8903/98201 For Homestake Grants Mill Site. November 9, 1998.

- U. S. Nuclear Regulatory Commission (NRC), 1998b. Letter from Joseph J. Holonich, NRC, Chief, Uranium Recovery Branch, to Roy Cellan, Homestake Mining Company. Regarding Amendment No. 31 to Revise License Conditions 14, 15, 35, and 39.
- U. S. Nuclear Regulatory Commission (NRC), 1998c. Letter from Joseph J. Holonich, NRC, Chief, Uranium Recovery Branch, to Roy Cellan, Homestake Mining Company. Regarding Comments on Completion Reports for Reclamation of Off-Pile Areas and Mill Decommissioning. April 23, 1998.
- U. S. Nuclear Regulatory Commission (NRC), 1998d. Letter from Joseph J. Holonich, NRC, Chief, Uranium Recovery Branch, to Roy Cellan, Homestake Mining Company. Regarding Incorporation of Reverse Osmosis Unit into Groundwater Corrective Action Program, Amendment 30 to License SUA-1471. March 5, 1998.
- U. S. Nuclear Regulatory Commission (NRC), 1995a. Letter from Joseph J. Holonich, NRC, Chief, High-Level Waste and Uranium Recovery Projects Branch, to Fred Craft, Homestake Mining Company. Regarding Revision to Radon Barrier Thickness, Amendment 22 to License SUA-1471. October 10, 1995.
- U. S. Nuclear Regulatory Commission (NRC), 1995b. Letter from Joseph J. Holonich, NRC, Chief, High-Level Waste and Uranium Recovery Projects Branch, to Fred Craft, Homestake Mining Company. Regarding Incorporation of Soil Cleanup Verification Survey and Sampling Plan, Amendment 20 to License SUA-1471. March 1, 1995.
- U. S. Nuclear Regulatory Commission (NRC), 1993a. Letter from Ramon E. Hall, NRC, Director, to Harold Barnes, Homestake Mining Company. Regarding Incorporation of Mill Decommissioning Plan, Amendment 15 to License SUA-1471. August 25, 1993.
- U. S. Nuclear Regulatory Commission (NRC), 1993b. Letter from Ramon E. Hall, NRC, Director, to Harold Barnes, Homestake Mining Company. Regarding Incorporation of Reclamation Plan for the Tailings Disposal Area, Amendment 14 to License SUA-1471. July 23, 1993.
- U. S. Nuclear Regulatory Commission (NRC), 1993c. Memorandum to Docket File No. 40-8903, from Dawn L. Jacoby, NRC, and Raymond O. Gonzales, NRC. Regarding Proposed Amendment to Source Materials License SUA-1471 For Reclamation of Homestake Mining Company's Grants Mill Disposal Area Near Grants, New Mexico. July 14, 1993.

- U. S. Nuclear Regulatory Commission (NRC), 1993d. *Environmental Assessment for the Decommissioning and Reclamation of the Grants Mill and Tailings Ponds*. May 1993.
- U. S. Nuclear Regulatory Commission (NRC), 1989. Corrective Action Plan for the Homestake Mining Company Uranium Mill, License No. SUA-1471. Issued to Homestake Mining Company in 1989.

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Attachment 2
Interview Record Forms

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Five-Year Review Interview Record Homestake Mining Company Cibola County, New Mexico		Interviewee: Birgit Landin Organization: NMED, Groundwater Quality Bureau, Superfund Oversight Section Phone: 505-827-2918 Email: birgit_landin@nmenv.state.nm.us			
Site Name		EPA ID No.		Date of Interview	Interview Method
Homestake Mining Company Superfund Site		NMD007860935		08-31-2001	telephone
Interview Contacts	Organization	Phone	Email	Address	
Mark Purcell	US EPA Region 6	214-665-6707	purcell.mark@epa.gov	1445 Ross Avenue Dallas, Texas 75202	
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Interview Questions (please address the time since DP-200 was approved by NMED in 1984).					
1. What is your overall impression of the work conducted at the site since May 1984 (the time DP-200 was approved by NMED)? Response: Ms. Landin's overall impression of the work at the site since was that the work has been very good. She stated that Homestake Mining Company has been very proactive, and they seem to care about cleaning up the site. For example, they are doing things that aren't required to speed up the remediation of the site.					
2. From your perspective, what effect have remedial operations at the site had on the surrounding community? Response: Ms. Landin indicated that she receives complaints from a few of the citizens living near the site. The complaints generally are due to odors during the summer, mist from the evaporation ponds that leaves a film on cars, and noise. She stated that people are unhappy because they cannot use their wells. She stated that the actual effect of the site on the surrounding community is minimal except for the odor in the summer.					

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: Ms. Landin stated that the people who do complain about the site are worried about the smell. Also, some of the citizens are concerned about health risks related to the films left by the mist, and some people feel that the site will not be completely cleaned up. She also stated that Homestake Mining Company has mitigated the odor and mist problems as best as they can, and there are no known health risks associated with either.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: Ms. Landin stated that she is not aware of any of the above having occurred at the site.

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Response: Ms. Landin stated that she does an annual site visit and reviews the annual reports submitted by Homestake Mining Company.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and results of the responses.

Response: No. Ms. Landin stated that Homestake Mining Company has been very proactive.

7. Are you aware of any problems or difficulties encountered which have impacted construction progress and implementability of the components of remedial actions? Please briefly summarize the problems/difficulties.

Response: Ms. Landin stated that Homestake Mining Company is dealing with some water rights issues that have slowed down their efforts to use the irrigation system for remediation. She stated that some people have protested their water rights, and the issue is currently being resolved in court.

8. Are you aware of opportunities to optimize the operation, maintenance, or sampling efforts at the site?

Response: Ms. Landin indicated that Homestake Mining Company might benefit from evaluating their operation to determine if they will achieve their cleanup objectives by 2010. She stated that based on the level of decrease in contamination over time, the cleanup objectives will not be met in the projected time frame. However, she stated that she does not think there is much more that Homestake could do to optimize their operation.

9. From NMED's perspective, have any of the changes in site operation or maintenance requirements implemented since DP-200 was approved had an affect on the protectiveness or effectiveness of the remedial approach? Please describe changes and impacts.

Response: Ms. Landin stated that the things that have been done at the site are improving the performance of the groundwater remediation system. She stated that the addition of the reverse osmosis plant was an example of something that has been done that has improved the overall performance of the remedy.

10. Have there been any changes in state environmental standards since the time the remedial approach was delineated which may call into question the protectiveness or effectiveness of the remedial approach?

Response: No.

11. Is the groundwater remediation progressing in accordance with NMED's expectations for the site? Does NMED have any concerns about the status of the groundwater remediation being conducted for the site?

Response: Ms. Landin indicated that Homestake Mining Company is doing what they can, but she feels that the concentrations are not decreasing fast enough for them to attain the cleanup goals by 2010. Her concerns were that the cleanup would take much longer than expected, and she was concerned that the NRC would grant Homestake Mining Company a technical waiver and release them from the site in 2010 if the cleanup goals have not been achieved.

12. Do you feel well-informed about the site's activities and progress?

Response: Yes.

13. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: Ms. Landin stated that Homestake Mining Company might benefit by putting together a groundwater model for the site. The model could be used to determine what effects the remediation system is having on contaminant concentrations and truly determine what is happening with the groundwater contaminant concentrations. She also suggested putting together a team of experts to evaluate the overall system performance to see if there are any options for optimizing the system further.

Five-Year Review Interview Record Homestake Mining Company Milan, New Mexico		Interviewee: Mary Heather Noble Organization: NMED, Ground Water Quality Bureau, Mining Environmental Compliance Section Phone: 505-827-2782 Email: mary_heather@nmenv.state.nm.us			
Site Name		EPA ID No.		Date of Interview	Interview Method
Homestake Mining Company Superfund Site		NMD007860935		08-21-2001	telephone
Interview Contacts	Organization	Phone	Email	Address	
Mark Purcell	US EPA Region 6	214-665-6707	purcell.mark@epa.gov	1445 Ross Avenue Dallas, Texas 75202	
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Interview Questions (please address the time since DP-200 was approved by NMED in 1984).					
1. What is your overall impression of the work conducted at the site since May 1984 (the time DP-200 was approved by NMED)?					
Response: Ms. Noble's involvement with this site has only been for the past 1.5 years. Her perspective regarding that period of time, combined with historical perspective gained from review of the site-related files, is that HMC has done a lot of work at the site, and the data provided have shown progress in terms of decreasing pollutant concentrations. HMC has been able to move the injection system closer to the source as concentrations have decreased. The initial response was containment only; now the system is geared more toward treatment (reclamation). However, the system modifications appear to have been reactive rather than proactive using goals set forth and documented in a remedial design. Also, the completion projections seem to be based more on a water balance rather than achievement of certain contaminant concentration goals. Actions have had positive effect on contaminant distribution, but Ms. Noble would like to see more proactive documentation of goals and expectations regarding future contaminant distribution. Ms. Noble also has reservations about the effectiveness of HMC's plan to "flush" the vadose zone immediately underlying the tailings impoundment with clean water (delivered through the toe drains when dewatering of the tailings is complete) to remove contaminants from this area. Ms. Noble is not aware of any other uranium mill tailings recovery projects that employ this method, and is concerned that the introduction of fresh water back into the system may re-saturate the slimes and resume leaching of contaminants from the impoundment.					

2. From your perspective, what effect have remedial operations at the site had on the surrounding community?

Response: Ms. Noble indicated she does not have interaction with the community, so cannot specifically comment on this issue. She has heard of complaints regarding noise and odors that are handled through the NMED Superfund Oversight section.

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: See response to item 2.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: Ms. Noble is not aware of any incidents, other than occasional power outages.

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Response: NMED Discharge Permit 200 (DP-200) covers corrective action activities and incorporates the Corrective Action Plan originally prepared by the facility (recovery wells, injection wells, reverse osmosis treatment facility). NMED DP-725 covers the evaporation ponds. There are monitoring requirements in place for both discharge permits, and HMC has always been on time and responsive with their monitoring reports. NMED conducts an annual site visit to discuss the status of the remediation and the site, at which HMC provides a site update presentation and discusses changes to the system that might affect the discharge permit requirements.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and results of the responses.

Response: Ms. Noble indicated she is not aware of any violations of the Discharge Permits or the NRC license, although there have been complaints made to the Superfund Oversight Section regarding air quality concerns (from mist generated during spraying of the lagoons) and nuisance problems (noise and/or odor -- there are no requirements regarding these items under the discharge permits).

7. Are you aware of any problems or difficulties encountered which have impacted construction progress and implementability of the components of remedial actions? Please briefly summarize the problems/difficulties.

Response: Ms. Noble indicated she is not aware of any significant difficulties that have substantially impacted progress or implementability; however, some of the problems that HMC has encountered include: 1) difficulties in dewatering the large tailings impoundment due to the physical characteristics of the slimes; 2) insufficient evaporative capacity in the synthetically lined impoundments caused by precipitation events; 3) initial difficulties with the pretreatment component of the Reverse Osmosis (RO) facility; and 4) recent legal issues regarding a neighbor's opposition to HMC's application to transfer existing water rights to their proposed irrigation project (to address off-site contamination).

8. Are you aware of opportunities to optimize the operation, maintenance, or sampling efforts at the site?

Response: Ms. Noble indicated that HMC has been optimizing injection locations with time, bringing them closer to the source. The addition of the RO facility in 1999 to supply high-quality injection water to the remediation project appears to have a significant impact on the contaminant concentrations in nearby monitoring wells. The data generated from injection of RO product water has prompted HMC to expand the RO facility (doubling the treatment capacity). Increasing the pumping rates of recovery wells could expedite corrective actions; however, other limiting factors (such as the capacity of RO facility and evaporative lagoons) may make this option prohibitive. Ms. Noble also mentioned that HMC recently initiated a pilot project to employ *in situ* bioremediation techniques at the site. Although initial results seemed promising, HMC is not convinced that the use of bioremediation will significantly enhance current remediation efforts.

9. From NMED's perspective, have any of the changes in site operation or maintenance requirements implemented since DP-200 was approved had an affect on the protectiveness or effectiveness of the remedial approach? Please describe changes and impacts.

Response: Ms. Noble indicated that the adjustments that HMC has made to the system have been appropriate, particularly the attention that HMC is currently paying to impacted areas located outside of the license boundary. Ms. Noble anticipates that revision of the background concentrations to which HMC must abate will be the change most likely to impact the protectiveness of the corrective actions.

10. Have there been any changes in state environmental standards since the time the remedial approach was delineated which may call into question the protectiveness or effectiveness of the remedial approach?

Response: The original discharge permit (DP-200) referred to attaining background concentrations as the standard, based on average background values obtained from a few up-gradient wells. In their July 2000 renewal application for DP-200, HMC proposed revisions to the background concentrations cited in DP-200, based on a statistical analysis of historical data collected from several up-gradient monitoring wells. These proposed revisions are being reviewed as part of the DP-200 renewal. Ms. Noble believes that HMC also intends to submit an alternative concentration limit (ACL) application with NRC in the relatively near future to revise the site standards for constituents regulated under the NRC license.

11. What is the status of each of the NMED discharge permits prepared for the site (DP-200, DP-339, and DP-725)?

Response: DP-339 was originally approved in January 1986 for discharges of contaminated ground water and waste salt solutions from mill operations to two synthetically lined ponds (east and west evaporation ponds). When DP-200 (originally approved in May 1984 for ground water remediation, including an injection well inventory) was renewed in November 1995, the NMED incorporated the requirements of DP-339 for the east and west evaporation ponds into DP-200. The NMED is currently reviewing HMC's renewal application for DP-200. DP-725 covers discharges to evaporation ponds #1 and #2 (constructed over the small inactive tailings pile), and is also being reviewed for renewal. Renewal of DP-200 will focus on the corrective action plan and injection wells; renewal of DP-725 will address discharges to all four ponds (east and west ponds originally from DP-339 and evaporation ponds #1 and #2). Both DP-200 and DP-725 are currently in effect and enforceable; renewal applications are currently in the review stage, during which time the DPs remain in effect under the latest approved versions.

12. Is the groundwater remediation progressing in accordance with NMED's expectations for the site? Does NMED have any concerns about the status of the groundwater remediation being conducted for the site?

Response: Ms. Noble indicated that, yes, the plan in place will be approvable under NMED regulations. Issues are the appropriateness of the background concentrations and dealing with offsite elevated concentrations that are not specifically incorporated into the NRC license. Renewal of DP-200 will need to address these issues. Ms. Noble also indicated she would like to see a model or a yardstick to measure progress in terms of concentrations (e.g., projected completion dates based on pollutant concentrations - not just a water balance from the tailings impoundment and evaporation ponds).

13. Do you feel well-informed about the site's activities and progress?

Response: Ms. Noble indicated that she feels like she has a good grasp on the general nature of progress, but her knowledge of specifics could be better. She is not kept current on detailed changes at the site as they occur, if, for example, HMC makes changes to injection/recovery well lines.

14. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: Ms. Noble indicated that some of the concerns regarding offsite contamination are being taken care of under the NMED groundwater quality bureau. DP-200 regulates the non-radiological constituents and the NRC license addresses metals and radiological constituents. Ms. Noble indicated that HMC is in the process of revising the Corrective Action Plan (CAP) for the NRC to address off-site contamination and provide site standards for *all* constituents of concern (both radiological and non-radiological). Ms. Noble will be pleased to see the NRC license amended to address these deficiencies; however, the NMED still has concerns/questions about HMC's pending revisions to background concentrations and future requests for alternative concentration limits (ACLs).

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Five-Year Review Interview Record Homestake Mining Company Cibola County, New Mexico		Interviewee: Kenneth Hooks Organization: US Nuclear Regulatory Commission, Fuels Cycle Licensing Branch, Division of Fuel Cycle Safety and Safeguards Phone: 301-415-7777 Email: krh1@nrc.gov			
Site Name		EPA ID No.		Date of Interview	Interview Method
Homestake Mining Company Superfund Site		NMD007860935		08-30-2001	telephone
Interview Contacts	Organization	Phone	Email	Address	
Mark Purcell	US EPA Region 6	214-665-6707	purcell.mark@epa.gov	1445 Ross Avenue Dallas, Texas 75202	
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Interview Questions (please address the time since DP-200 was approved by NMED in 1984).					
1. What is your overall impression of the work conducted at the site since May 1984 (the time DP-200 was approved by NMED)? Response: Mr. Hooks indicated he was assigned to the site in mid-1994, and his impression since that time (and historically based on review of records) is that HMC has worked hard to know what is expected by NRC, NMED, and EPA, and has consistently met or exceeded those expectations.					
2. From your perspective, what effect have remedial operations at the site had on the surrounding community? Response: Mr. Hooks indicated the surrounding community is nearby (within 1-1.5 miles), and that a settlement between HMC and the community was made prior to Mr. Hooks involvement for supply of water to the community, to address ground water contamination issues. Since then, the only problem with the community has been odor associated with the evaporation ponds, which HMC has attempted to address with the copper sulfate addition.					

3. Are you aware of any community concerns regarding the site or its operation and administration?

Response: Mr. Hooks indicated that he is not directly aware of any community-wide concerns, although there are some individuals who have made complaints regarding nuisance issues such as odor.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: Mr. Hooks indicated that he is not aware of any incidents.

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Response: Mr. Hooks responded that the NRC Region 4 office in Dallas performs an inspection once every two years related to health physics (these inspections were annual when the mill was operating, but have been reduced now that the tailings piles are covered). Mr. Hooks' office is responsible for the NRC license which addresses the reclamation, and he talks by phone with the site about once every two weeks or more frequently depending on activities, and visits the site 1-2 times per year.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and results of the responses.

Response: Mr. Hooks indicated that earlier this year he was called by EPA/NMED regarding a resident complaint about a white precipitate observed on a parked vehicle in the community adjacent to the site. Mr. Hooks spoke directly to the resident to allay concerns about associated radioactivity (perimeter monitoring has not shown any detections); Mr. Hooks' understanding is that NMED is providing a formal written response to the resident.

7. Are you aware of any problems or difficulties encountered which have impacted construction progress and implementability of the components of remedial actions? Please briefly summarize the problems/difficulties.

Response: Mr. Hooks indicated that about 4 or 5 years ago, NRC requested HMC rework the riprap on the sides of the main tailings pile, because it didn't meet NRC requirements. Mr. Hooks also noted the reverse osmosis plant was added to the system when the volumes being treated weren't high enough to meet that required in the Corrective Action Plan.

8. Are you aware of opportunities to optimize the operation, maintenance, or sampling efforts at the site?

Response: Mr. Hooks indicated the reverse osmosis plant is a good example of an improvement made to the site; he also indicated that minor improvements are made routinely as a course of daily operations.

9. From NRC's perspective, have any of the changes in site operation or maintenance requirements implemented since the NRC license was set forth had an affect on the protectiveness or effectiveness of the remedial approach? Please describe changes and impacts.

Response: Mr. Hooks indicated that he is not aware of any negative affect on the protectiveness or effectiveness of the remedial approach.

10. Have there been any changes in NRC standards since the time the remedial approach was delineated which may call into question the protectiveness or effectiveness of the remedial approach?

Response: Mr. Hooks indicated that there have been no changes in NRC standards, although there was a decision made late last year to regulate both radiological and non-radiological constituents. The NRC had been sharing jurisdiction on the non-radiological constituents, but the National Mining Association brought NRC's attention to the issue of double-licensing redundancy. NRC's review of the law led to the conclusion that NRC has responsibility for both radiological and non-radiological constituents. Mr. Hooks also indicated that because the license provides for meeting of EPA standards, dual jurisdiction is not necessary.

11. What is the status of the NRC license for the site?

Response: The license, which current addresses reclamation of the site, was initially issued in 1986. The first amendment was in November 1986, and there have been 33 amendments total (the last one is dated September 28, 2000).

12. Is the groundwater remediation progressing in accordance with NRC's expectations for the site? Does NRC have any concerns about the status of the groundwater remediation being conducted for the site?

Response: Mr. Hooks indicated that yes, the groundwater remediation is progressing in accordance with NRC's expectations. HMC's latest prediction is that with the reverse osmosis plant, the cleanup may be done in 7 years, although NRC is not sure they yet have enough data to document that. NRC's hydrogeologists have been involved in review of the remediation and its progress, and they have concurred with the appropriateness of the actions taken. The licenses already addresses several of the non-radiological constituents, and the rest currently addressed by DP-200 will be incorporated into the Corrective Action Plan currently being revised by HMC.

13. What is the NRC's position regarding the status of the offsite groundwater contamination remediation and the NMED Discharge Permits?

Response: Mr. Hooks stated that the NRC license, once it is updated to address all non-radiological constituents, will provide for reclamation of the site and the offsite groundwater. HMC will soon be submitting an AC application to revised the original background numbers described by DP-200, and review of that package will be in accordance with NRC standards, which mirror EPA's.

14. Do you feel well-informed about the site's activities and progress?

Response: Mr. Hooks indicated that yes, he feels generally well-informed about the site's activities and progress.

15. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: Mr. Hooks is satisfied that the site is being effectively addressed under the NRC license, and that the pending revisions will ensure that all constituents of concern are addressed.

Five-Year Review Interview Record Homestake Mining Company Site Cibola County, New Mexico		Interviewee: Roy Cellan Homestake Mining Company email: rccellan@7cities.net or rccellan@montana.com			
Site Name		EPA ID No.		Date of Interview	Interview Method
Homestake Mining Company Superfund Site		NMD007860935		8-16-2001	in person
Interview Contacts	Organization	Phone	Email	Address	
Mark Purcell	US EPA Region 6	214-665-6707	purcell.mark@epa.gov	1445 Ross Avenue Dallas, Texas 75202	
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240	
Interview Questions					
1. What is your overall impression of the work being conducted at the site (since remediation began)? Response: Mr. Cellan indicated the work done for the site has been excellent, an aggressive program that meets and exceeds NMED's and NRC's requirements under the NMED discharge permits and the NRC license, respectively.					
2. From your perspective, what effect have continued remedial operations at the site had on the surrounding community? Response: Mr. Cellan indicated the majority of the effect on the community is in the past. There was a settlement, a mitigation agreement for a suit filed by the community regarding the groundwater (in late 1980's). Mr. Cellan also indicated that the current effect is mixed: some residents are pleased; some have complaints. HMC held annual meetings for the public through 1995; no community members participated in the last two meetings, held in 1994 and 1995.					

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: Mr. Cellan indicated that current community concerns reported to them by NMED are generally related to odors associated with the evaporation ponds, a nuisance issue. In response to the concerns, HMC has begun treating the evaporation ponds to reduce algae. Recently there was a concern about a white precipitate seen on the surface of a parked vehicle, possibly air-deposited. HMC would have sampled the precipitate but the vehicle had already been cleaned. The residents are generally happy with the irrigation systems added; provides beneficial use.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: Mr. Cellan recalled that there was a break-in during the mill closure, but onsite security was added and they have not had any problems since. There is a security fence around the whole of the property, and a chain link fence around the office buildings.

5. Have any problems occurred that have resulted in significant changes in the operations and maintenance requirements, maintenance schedules, or sampling routines at this site? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

Response: Mr. Cellan indicated there have been several adjustments made to the system to improve operations. As one example, the evaporation ponds did not evaporate as quickly as originally planned, and addition of the reverse osmosis plant and an additional pond improved the rate of treatment. As a result of odor problems, HMC added copper sulfate treatment and the algal growth has been reduced, although there are still odor problems associated with the sulfate). Also, originally the sprayers were online 24 hours/day from March to October, but now they are only operated during the day, and when conditions are favorable to minimize odors in the community (based on wind direction, humidity, temperature).

6. Have there been opportunities to optimize the operation, maintenance, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

Response: See response to item 5.

7. Is there a continuous on-site O&M presence? If so, please describe staff and activities. If not, describe staff and frequency of site inspections.

Response: Mr. Cellan indicated the operating staff is onsite five days per week from 7:30 am until 4 pm. After hours (nights and weekends), plant operator(s) are on-call. Under certain alarm conditions after hours, the treatment plant will call a cell phone number to report problems to the on-call plant operator. After hours problems have recently usually been associated with power outages from lightning strikes. Whatever the problem is, it is communicated to the operator over the cell phone, and the operator then decides if the problem warrants an immediate visit to the site. Over the weekend, the site, specifically pipe lines for leaks, injection flows to wells, the evaporation ponds/pumping systems, and the RO plant systems, are checked daily by an operator (a 2-3 hour visit).

8. Where are operations-related documents maintained (including Health and Safety Plans, Operations and Maintenance Plans, and other waste management/contingency plans)? What procedures are in place to ensure compliance with these plans?

Response: The documents are maintained onsite. Mr. Cellan indicated the site staff is very experienced, and there have been no loss-time accidents at the site in 22 years. The last recordable incident was four years ago.

9. Please describe the monitoring requirements and how/to whom the results are reported.

Response: The Corrective Action Plan Table 2.8-99 describes the groundwater samples required by the NRC license. DP-200 groundwater monitoring requirements mirror the CAP requirements, with a few additional constituents. The data collected to meet these requirements (both CAP and DP-200) is reported in the annual groundwater monitoring report. The 4065 requirements are met in a semiannual report describing air and water monitoring at the point of compliance. DP-725 requirements are met in a quarterly report. Settlement on the large tailings pile is monitored monthly in accordance with the NRC license. Soil samples are collected periodically in the irrigation areas, but this is not required.

There is a new CAP in preparation which will address both onsite and offsite and incorporate DP-200 requirements. DP-200 and DP-725 are currently in renewal process, but are still in effect.

10. Are there any planned activities that would accelerate and/or enhance the remediation of the groundwater contamination at the site?

Response: The main addition to accelerate the remediation has been the installation and operation of the reverse osmosis plant. The treatment rate increased from 300 gpm to 600 gpm, and injection increased from ~250 to ~500 gpm. HMC has engaged a consultant to review on an annual basis potential treatment systems that may enhance the project schedule. There is an in-situ bioremediation test ongoing that may help with treatment in the tailings pile, and there are ongoing lab tests involving iron filings (chemical reduction). The goal is to get the site remediated and transferred to DOE as soon as possible.

11. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: HMC would like to see the site managed under one regulatory authority. They would like to see the site taken off the NPL and be managed under the NRC, and the NRC and NMED position regarding the site be resolved.

12. What is HMC's position regarding deletion of the site from the NPL?

Response: As stated in the previous response, Mr. Cellan indicated HMC would like to see the site managed under one regulatory authority. They would like to see the site taken off the NPL and be managed under the NRC, and the NRC and NMED positions regarding control of the site be resolved. Mr. Cellan also indicated that HMC's position is that meeting WQCC requirements would not be necessary as long as the CAP is in place.

13. What is the current schedule and the expected future use of the property?

Response: Mr. Cellan indicated that HMC's current projections have them done with active remediation by 2008, decommissioning during 2009-2010, with turnover to DOE by 2013.

Attachment 3
Site Inspection Checklist

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Homestake Mining Company, New Mexico Five-Year Review Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program. N/A means "not applicable."

I. SITE INFORMATION	
Site Name: Homestake Mining Company	EPA ID: NMD007860935
City/State: Cibola County, New Mexico	Date of Inspection: August 16, 2001
Agency Completing 5 Year Review: EPA	Weather/temperature: Sunny, 70 degrees
Remedy Includes: (Check all that apply) <ul style="list-style-type: none"> <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input checked="" type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other: Radon barrier placed over tailings piles 	
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager: Name: Roy Cellan Title: Corporate Manager - Reclamation Date: 8/16/01 Interviewed: <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone Number: <u>Problems, suggestions:</u> <input checked="" type="checkbox"/> Additional report attached (if additional space required).	
2. O&M staff: Name: Title: Date: Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone Number: <u>Problems, suggestions:</u> <input type="checkbox"/> Additional report attached (if additional space required).	

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: NMED/Ground Water Quality Bureau

Contact:

Name: Mary Heather Noble

Title:

Date: 8/21/01

Phone Number: 505-827-2782

Problems, suggestions:

☒ Additional report attached (if additional space required).

Agency: NMED/Superfund Oversight Section

Contact:

Name: Birgit Landin

Title:

Date: 8/31/01

Phone Number: 505-827-2918

Problems, suggestions:

☒ Additional report attached (if additional space required).

Agency: NRC

Contact:

Name: Ken Hooks

Title:

Date: 8/31/01

Phone Number: 301-415-7777

Problems, suggestions:

☒ Additional report attached (if additional space required).

Agency:

Contact:

Name:

Title:

Date:

Phone Number:

Problems, suggestions:

☐ Additional report attached (if additional space required).

4. **Other interviews** (optional) ☐ N/A ☐ Additional report attached (if additional space required).

Interview Record Forms are provided in Attachment 2 to the Five-Year Review Report.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents			
<input checked="" type="checkbox"/> O&M Manuals	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> As-Built Drawings	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Maintenance Logs	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u> All documents related to the site, its operation, maintenance, and history are kept at the site. Due to the complex nature of the systems operating at the site, there is not a single operations and maintenance manual. Regulatory oversight is handled by the U S Nuclear Regulatory Commission, and no requirement for a single O&M manual is in place.			
2. Health and Safety Plan Documents			
<input checked="" type="checkbox"/> Site-Specific Health and Safety Plan	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input type="checkbox"/> Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u>			
3. O&M and OSHA Training Records			
	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u>			
4. Permits and Service Agreements			
<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Effluent discharge	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Other permits	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u>			
5. Gas Generation Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			
6. Settlement Monument Records			
	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u>			
7. Groundwater Monitoring Records			
	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u>			
8. Leachate Extraction Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			
9. Discharge Compliance Records			
	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<u>Remarks:</u>			

10. Daily Access/Security Logs <u>Remarks:</u>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
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IV. O&M Costs	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
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1. O&M Organization

☐ State in-house ☐ Contractor for State
☒ PRP in-house ☐ Contractor for PRP
☐ Other: O&M is handled through the NRC license, and costs are not reported as with typical Superfund sites. However, HMC personnel did state that it costs about \$3 million a year to operate the site. Actual costs could vary though, because HMC has been actively seeking alternatives to speed up final closure of the site and transfer to the Department of Energy.

2. O&M Cost Records

☐ Readily available ☐ Up to date ☐ Funding mechanism/agreement in place
Original O&M cost estimate: ☐ Breakdown attached

Total annual cost by year for review period if available

<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period ☒ N/A

Describe costs and reasons:

V. ACCESS AND INSTITUTIONAL CONTROLS	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
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A. Fencing

1. Fencing damaged ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The site office is surrounded by a chain link fence, and the rest of the site is surrounded by a barbed wire fence.

B. Other Access Restrictions			
1. Signs and other security measures <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A Remarks: "No Trespassing" signs were observed along all fences that were observed during the inspection.			
C. Institutional Controls			
1. Implementation and enforcement Site conditions imply ICs not properly implemented: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Site conditions imply ICs not being fully enforced: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Type of monitoring (e.g, self-reporting, drive by): Frequency: Responsible party/agency: Contact: Name: Title: Date: Phone Number: Reporting is up-to-date: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Reports are verified by the lead agency: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Specific requirements in deed or decision documents have been met: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Violations have been reported: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Other problems or suggestions: <input type="checkbox"/> Additional report attached (if additional space required).			
2. Adequacy <input type="checkbox"/> ICs are adequate <input type="checkbox"/> ICs are inadequate <input checked="" type="checkbox"/> N/A Remarks: There are currently no institutional control requirements for this site.			
D. General			
1. Vandalism/trespassing <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident Remarks:			
2. Land use changes onsite <input checked="" type="checkbox"/> N/A Remarks:			
3. Land use changes offsite <input checked="" type="checkbox"/> N/A Remarks:			
VI. GENERAL SITE CONDITIONS			
A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1. Roads damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A Remarks:			

B. Other Site Conditions			
<u>Remarks:</u> Site appeared to be well maintained and operated. Areas where soil excavation had occurred to remove the mill site and wind-blown tailings have become revegetated with natural vegetation to the point that these areas are indistinguishable from the rest of the area.			
VII. LANDFILL COVERS			
		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
A. Landfill Surface			
1. Settlement (Low spots) Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Depth:	<input type="checkbox"/> Settlement not evident	
2. Cracks Lengths: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Widths: Depths:	<input type="checkbox"/> Cracking not evident	
3. Erosion Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Depth:	<input type="checkbox"/> Erosion not evident	
4. Holes Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Depth:	<input type="checkbox"/> Holes not evident	
5. Vegetative Cover <input type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input type="checkbox"/> Grass <input type="checkbox"/> Trees/Shrubs <u>Remarks:</u>			
6. Alternative Cover (armored rock, concrete, etc.) <u>Remarks:</u>	<input type="checkbox"/> N/A		
7. Bulges Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Height:	<input type="checkbox"/> Bulges not evident	
8. Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent: <input type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent: <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent: <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Wet areas/water damage not evident		

9. Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of slope instability Areal extent: Remarks:		
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1. Flows Bypass Bench <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay Remarks:		
2. Bench Breached <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay Remarks:		
3. Bench Overtopped <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay Remarks:		
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of settlement Areal extent: Depth: Remarks:		
2. Material Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of degradation Material type: Areal extent: Remarks:		
3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion Areal extent: Depth: Remarks:		
4. Undercutting <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting Areal extent: Depth: Remarks:		
5. Obstructions <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A Type: Height: Areal extent: Remarks:		

6. Excessive Vegetative Growth <input type="checkbox"/> Evidence of excessive growth <input type="checkbox"/> Location shown on site map <u>Remarks:</u>		<input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels but does not obstruct flow Areal extent:	
D. Cover Penetrations		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Gas Vents <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration <u>Remarks:</u>		<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Functioning <input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A <input type="checkbox"/> Good condition
2. Gas Monitoring Probes <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration <u>Remarks:</u>		<input type="checkbox"/> Functioning <input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A <input type="checkbox"/> Good condition
3. Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration <u>Remarks:</u>		<input type="checkbox"/> Functioning <input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A <input type="checkbox"/> Good condition
4. Leachate Extraction Wells <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration <u>Remarks:</u>		<input type="checkbox"/> Functioning <input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A <input type="checkbox"/> Good condition
5. Settlement Monuments <u>Remarks:</u>		<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A
E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Gas Treatment Facilities <input type="checkbox"/> Flaring <input type="checkbox"/> Good condition <u>Remarks:</u>		<input type="checkbox"/> Thermal destruction <input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A <input type="checkbox"/> Collection for reuse

2. Gas Collection Wells, Manifolds and Piping		<input type="checkbox"/> N/A
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O& M	
Remarks:		
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)		<input type="checkbox"/> N/A
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O& M	
Remarks:		
F. Cover Drainage Layer		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks:		
2. Outlet Rock Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks:		
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1. Siltation	<input type="checkbox"/> Siltation evident	<input type="checkbox"/> N/A
Areal extent:	Depth:	
Remarks:		
2. Erosion	<input type="checkbox"/> Erosion evident	<input type="checkbox"/> N/A
Areal extent:	Depth:	
Remarks:		
3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks:		
4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks:		
H. Retaining Walls		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement:	Vertical displacement:	Rotational displacement:
Remarks:		
2. Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks:		

I. Perimeter Ditches/Off-site discharge		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Siltation Areal extent: Depth: Remarks:	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident	
2. Vegetative Growth Areal extent: Type: Remarks:	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Vegetation does not impede flow	
3. Erosion Areal extent: Depth: Remarks:	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident	
4. Discharge Structure <input type="checkbox"/> Functioning Remarks:	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Good Condition	<input type="checkbox"/> N/A	
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Settlement Areal extent: Depth: Remarks:	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident	
2. Performance Monitoring <input type="checkbox"/> Performance not monitored <input type="checkbox"/> Performance monitored <input type="checkbox"/> Evidence of breaching Remarks:	Frequency: Head differential:	<input type="checkbox"/> N/A	
IX. GROUNDWATER/SURFACE WATER REMEDIES		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> All required wells located Remarks: The site contains over 600 wells, so not all could be examined during the inspection. Many wells were observed during the site inspection, and one of each type (injection, extraction, monitoring) of well was examined.		<input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> Needs O& M <input type="checkbox"/> N/A

2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	<input type="checkbox"/> N/A
	<input type="checkbox"/> System located <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M <u>Remarks:</u> Complex system of groundwater extraction and injection. All parts of the system that were examined during the inspection appeared to be in good condition. Portions of the system have been buried to prevent freezing during the winter.	
3.	Spare Parts and Equipment	<input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Requires Upgrade <input type="checkbox"/> Needs to be provided <u>Remarks:</u>	
B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1.	Collection Structures, Pumps, and Electrical	<input type="checkbox"/> N/A
	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M <u>Remarks:</u>	
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances	<input type="checkbox"/> N/A
	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M <u>Remarks:</u>	
3.	Spare Parts and Equipment	<input type="checkbox"/> N/A
	<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires Upgrade <input type="checkbox"/> Needs to be provided <u>Remarks:</u>	
C. Treatment System <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
1.	Treatment Train (Check components that apply)	
	<input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters (list type): <input type="checkbox"/> Additive (list type, e.g., chelation agent, flocculent) <input checked="" type="checkbox"/> Others (list): Reverse Osmosis Plant <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input checked="" type="checkbox"/> Sampling ports properly marked and functional <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually (list volume): System treats approximately 300 gallons per minute, with plans to expand the system to 600 gallons per minute. <input type="checkbox"/> Quantity of surface water treated annually (list volume): <u>Remarks:</u>	

2. Electrical Enclosures and Panels (properly rated and functional) ☐ N/A

☒ Good condition

- Needs O&M

Remarks:

3. Tanks, Vaults, Storage Vessels ☐ N/A

☒ Good condition

☐ Proper secondary containment

☐ Needs O&M

Remarks:

4. Discharge Structure and Appurtenances □ N/A

☒ Good condition

☐ Needs O&M

Remarks: System discharges to either the brine ponds or is reinjected to enhance groundwater restoration efforts

5. Treatment Building(s) □ N/A

☒ Good condition (esp. roof and doorways)

☐ Needs Repair☒ Chemicals and equipment properly stored

Remarks:

6. Monitoring Wells (pump and treatment remedy) ☐ N/A

☐ All required wells located

☒ Properly secured/locked

☒ Functioning

☒ Routinely sampled☒ Good condition☐ Needs O&M

Remarks: Site contains over 600 wells, so not all were inspected up close. The wells that were observed appeared in good condition and were locked.

D. Monitored Natural Attenuation ☐ Applicable ☒ N/A

1. Monitoring Wells (natural attenuation remedy) ☐ N/A

☐ All required wells located☐ Properly secured/locked

- Functioning

☐ Routinely sampled☐ Good condition☐ Needs O&M

Remarks:

X. OTHER REMEDIES

☒ Applicable☐ N/A

The site contains two tailings piles. The large tailings pile has its final cover and radon barrier on the sides of the pile, while the top only contains an interim cover and barrier. This is due to the extensive operations still on-going at the site that includes the operation and maintenance of a groundwater injection and extraction system on top of the large tailings pile. The system is used to aid in the dewatering of the tailings pile. Also, the NRC has stipulated that settlement requirements must be met before the final cover and radon barrier can be placed on the large tailings pile. The final cover and radon barrier on the slopes of the large tailings pile are protected with a rock barrier to prevent erosion. There are currently large pipes along the slopes to collect runoff from the top of the pile, but these will be removed once the final cover and barrier are placed on top of the pile. No cracking, slumping, bulging, or signs of erosion were noticed in the cover of the slopes. Vegetation is starting to establish along the slopes. The cover on the slopes of the large tailings pile appeared to be in good condition. A spray evaporation pond is currently located on top of the small tailings pile. This pond is part of the groundwater restoration system at the site, and it is permitted by the State of New Mexico. Only an interim cover and radon barrier exists on the small pile. There is also another evaporation pond adjacent to and west of the pond on the small tailings pile. This pond is used to store

water for spray evaporation in the other pond. However, a spray system is installed in this pond, but due to design limitations, the system can only be used when weather conditions are optimal. Also, two brine ponds are located adjacent to and west of the second evaporation pond. All ponds are lined, and the dikes are inspected regularly. The plan is to reclaim these areas and install the final cover and radon barrier on the small tailings pile when the groundwater restoration program is complete.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

The purpose of the remedy is to dewater the tailings pile and restore groundwater quality. Also, a cover and radon barrier will be installed on the tailings piles to prevent exposure to the tailings and minimize radon emissions. The remedy appears to be functioning as intended by the NRC and Homestake. The groundwater gradients have been reversed away from the subdivisions, and contaminant concentrations are decreasing. Homestake has been actively seeking ways to enhance and speed up the rate of restoration of the contaminated groundwater. Other monitoring data is collected to verify that no airborne emissions are coming from the site. The monitoring program shows that the site is operating within the conditions of its NRC License and NMED permits, and the remedy appears to be effective at protecting human health and the environment.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The remedy has been well implemented. Homestake has taken actions not specifically required by the regulatory agencies to seek improvements in their design and operations. They have implemented on their own initiative several actions, such as the reverse osmosis plant and the irrigations systems that exist offsite, that are aimed at improving the remedy effectiveness and speed up the completion of site operations. It would appear that the remedy, once completed, will be fully protective as long as long-term site monitoring and care are conducted to maintain the integrity of the radon barriers and covers placed on the tailings piles and to ensure that the groundwater restoration has been effective. Currently, no threat appears to exist to human health or the environment at the site.

C. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

None.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Homestake appears to have aggressively sought opportunities to optimize their operation.

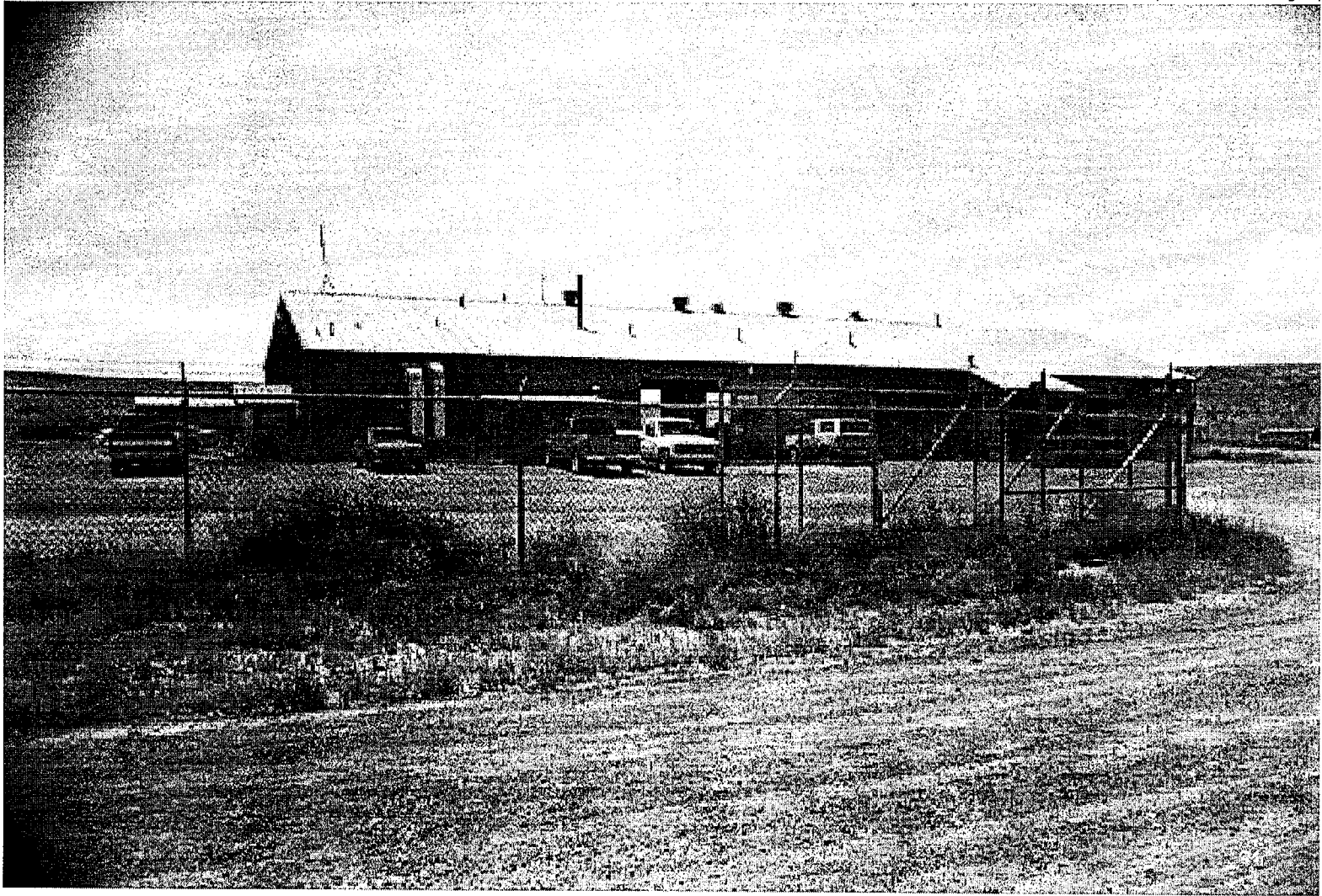
Attachment 3**Site Inspection Roster for Site Inspection Conducted August 16, 2001****Homestake Mining Company Superfund Site**

Name	Agency/Company	Phone Number	Email
Roy Cellan	Homestake Mining Company	415-981-8150	rrcellan@7cities.net
George Hoffman	Hydro-Engineering	307-266-3704	hydro@trib.com
Margaret O'Hare	CH2M HILL	972-980-2170	mohare@ch2m.com
Darren Davis	CH2M HILL	972-980-2170	ddavis9@ch2m.com

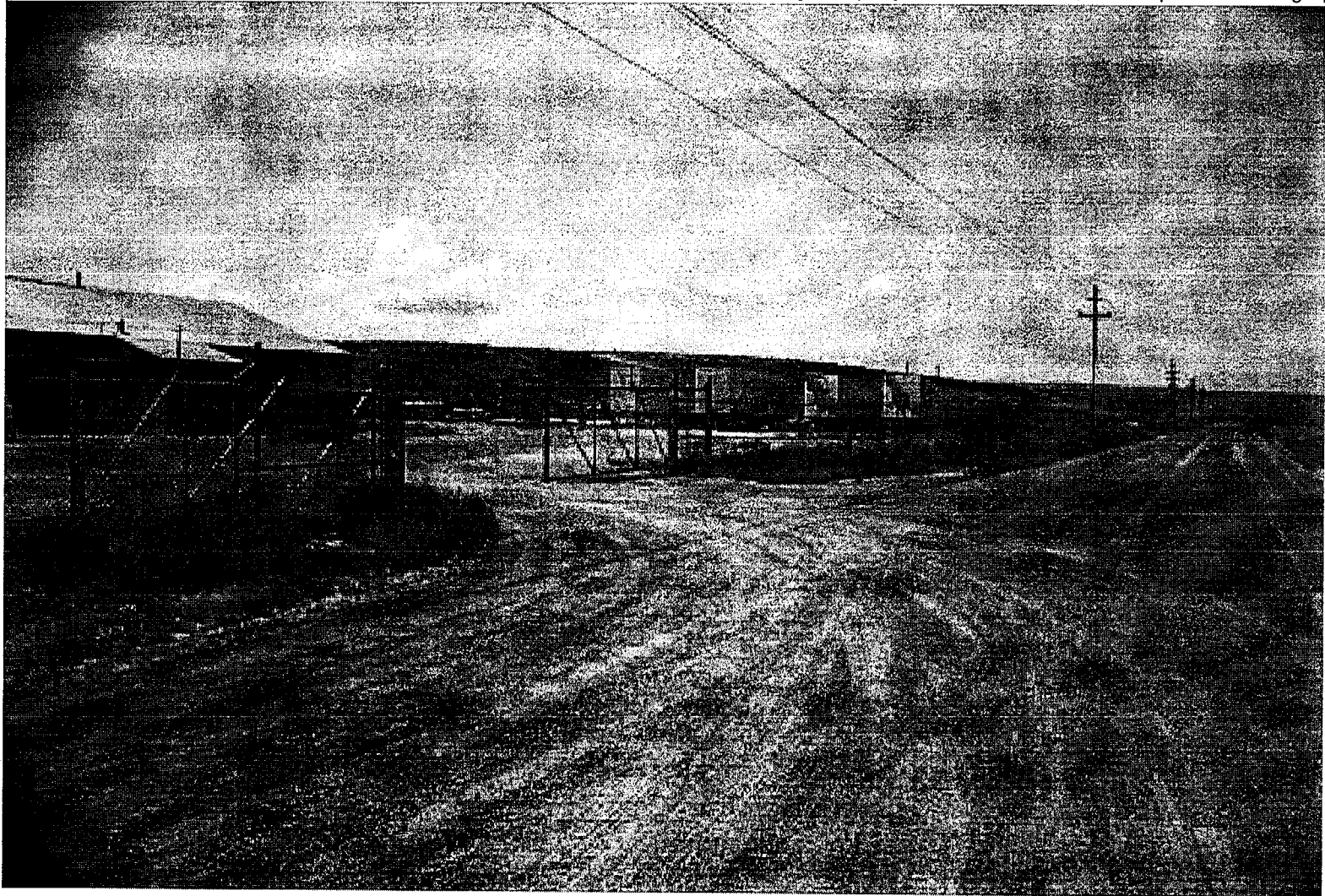
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Attachment 4
Site Inspection Photographs

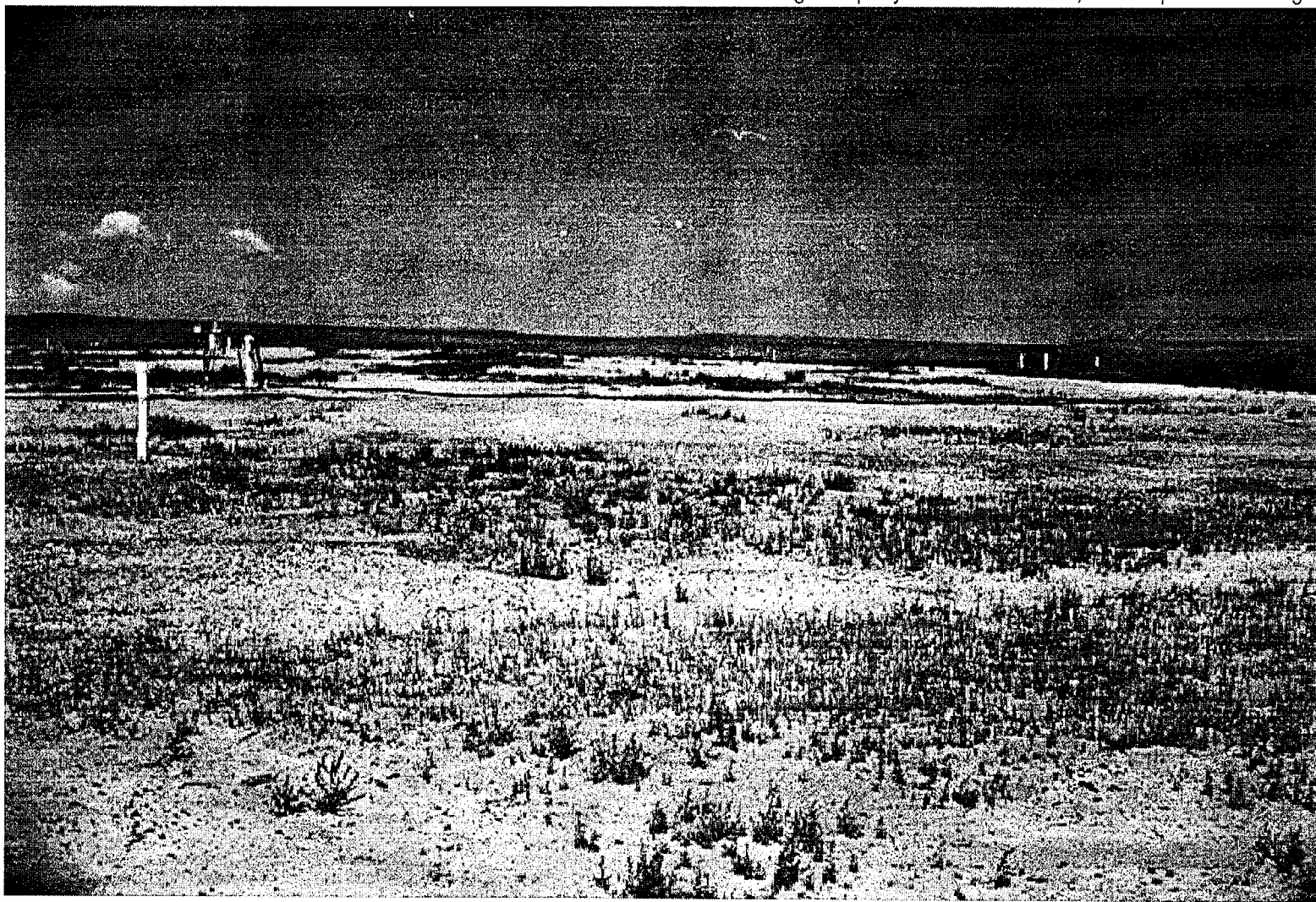
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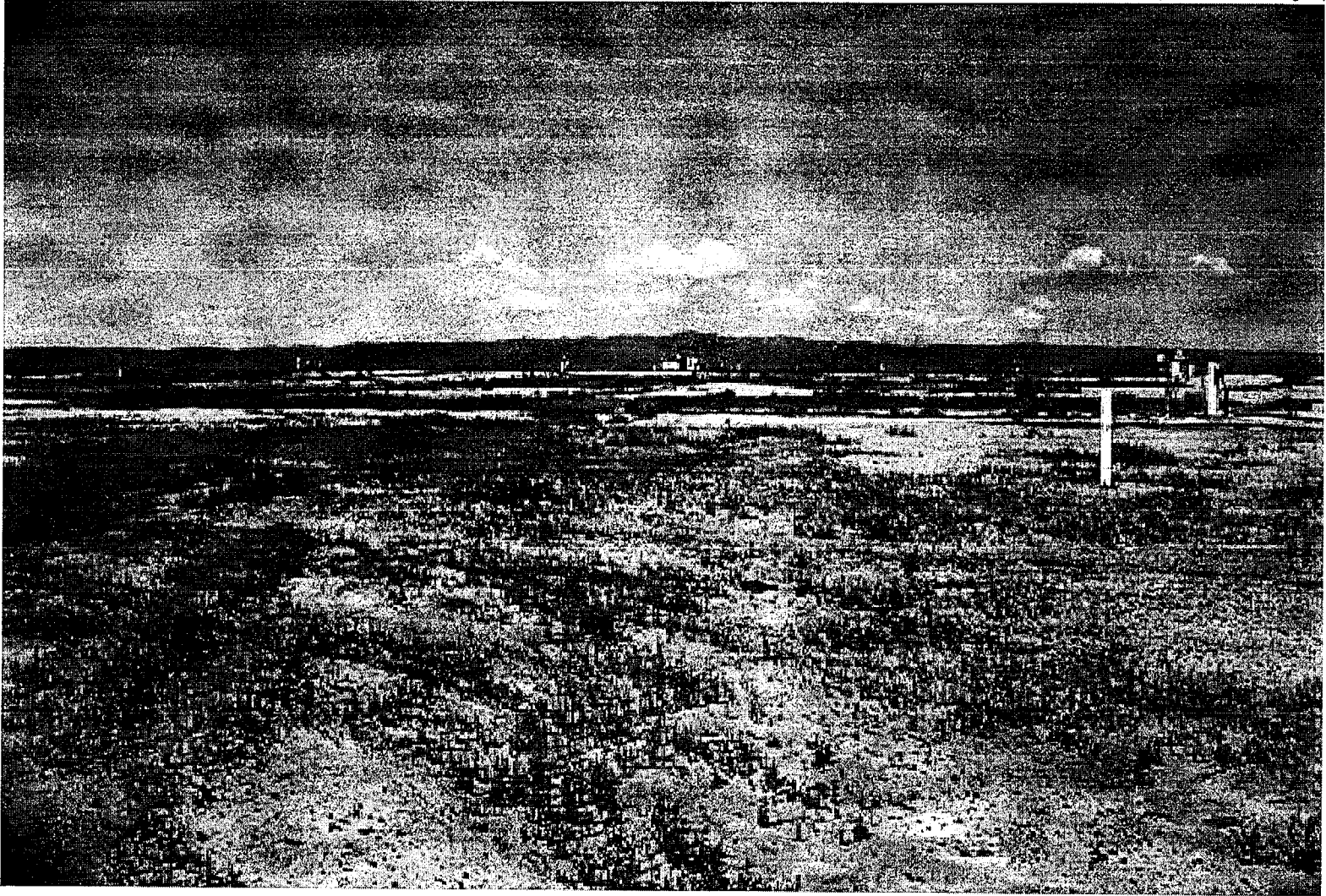
Main site building and entrance to site (gate is at right) along County Road 63.



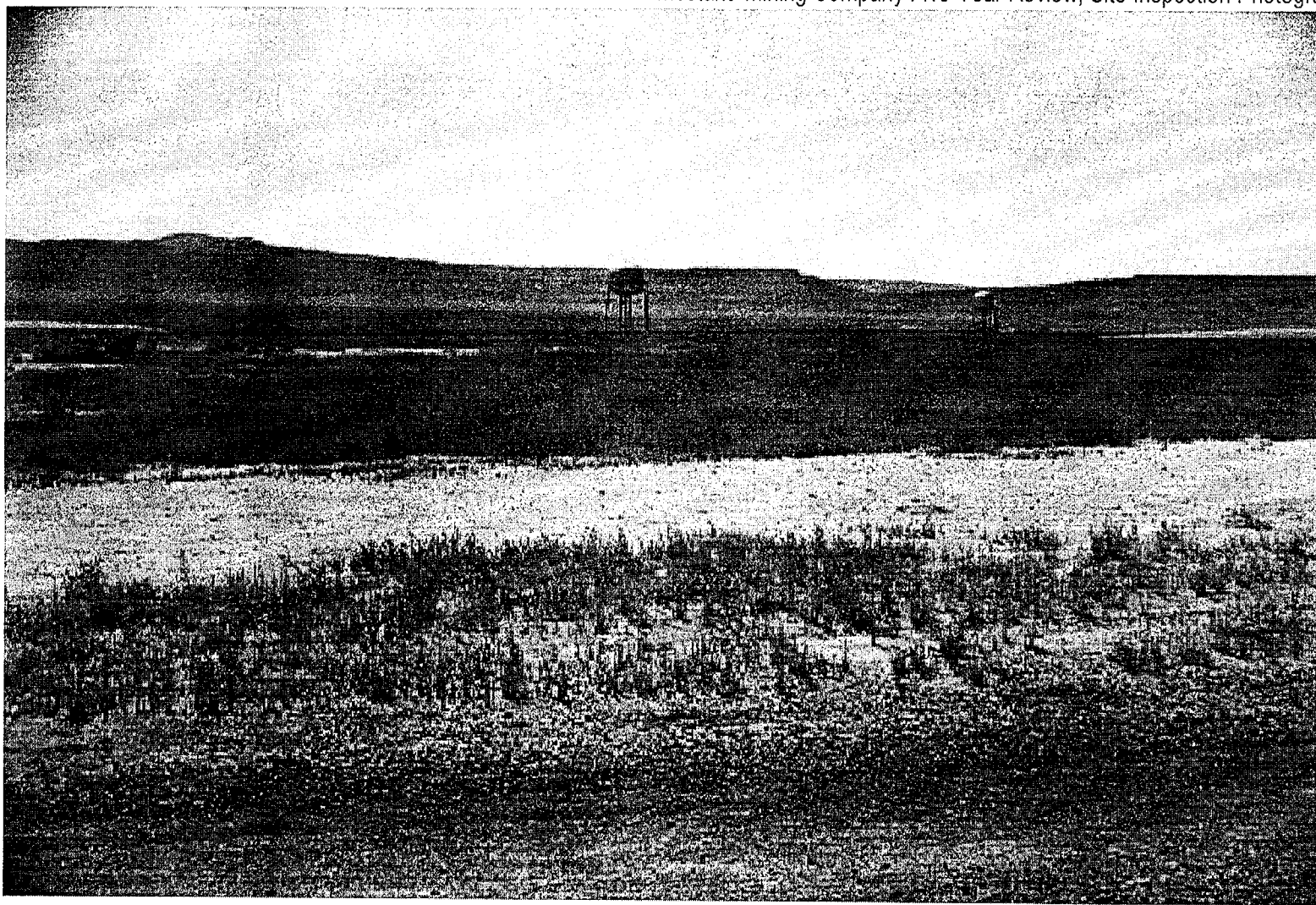
Slightly right of previous view, showing open site entrance gate, facing west-southwest along County Road 63. Large tailings pile is visible in background center.



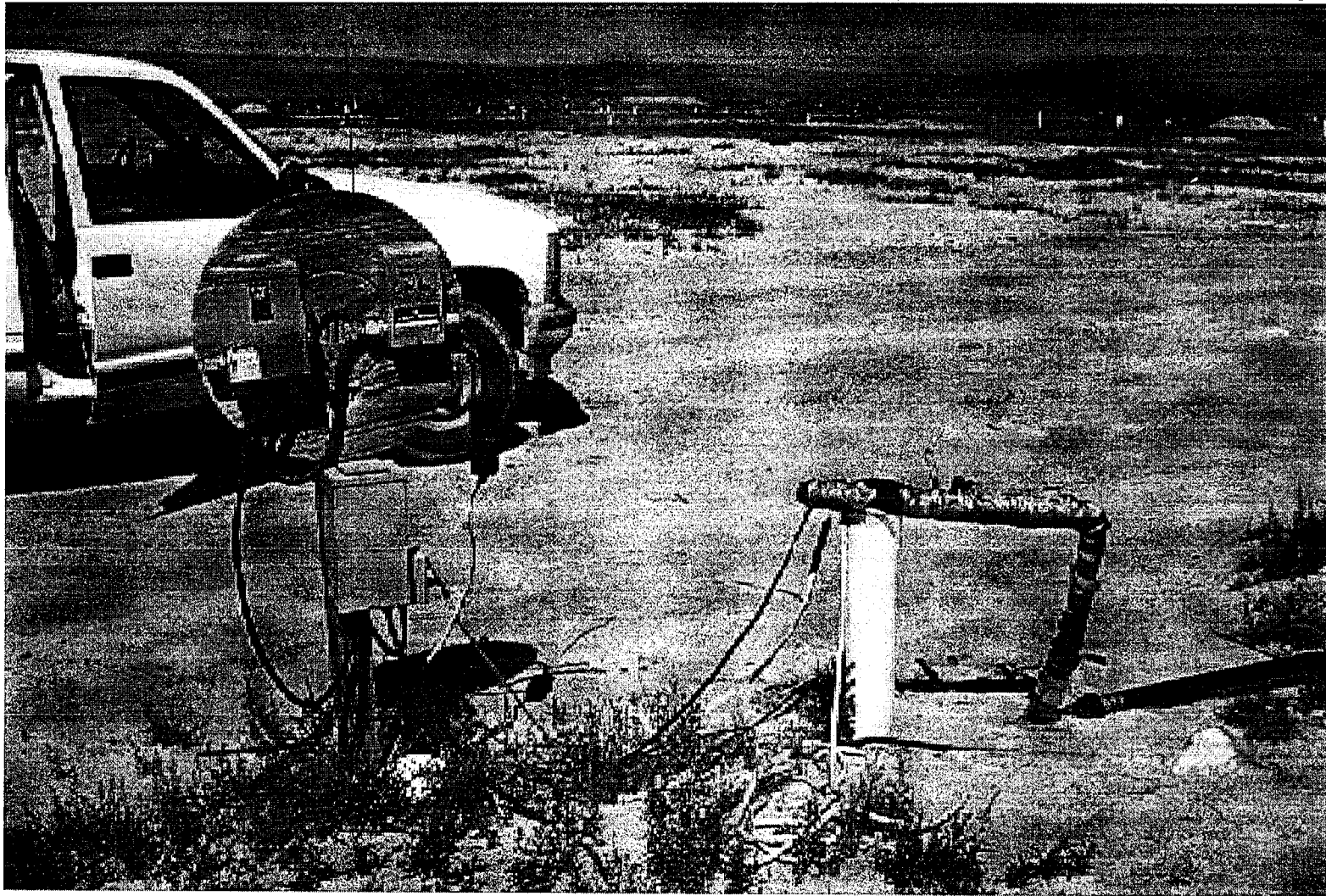
View across top of large tailing pile temporary cover, facing west.



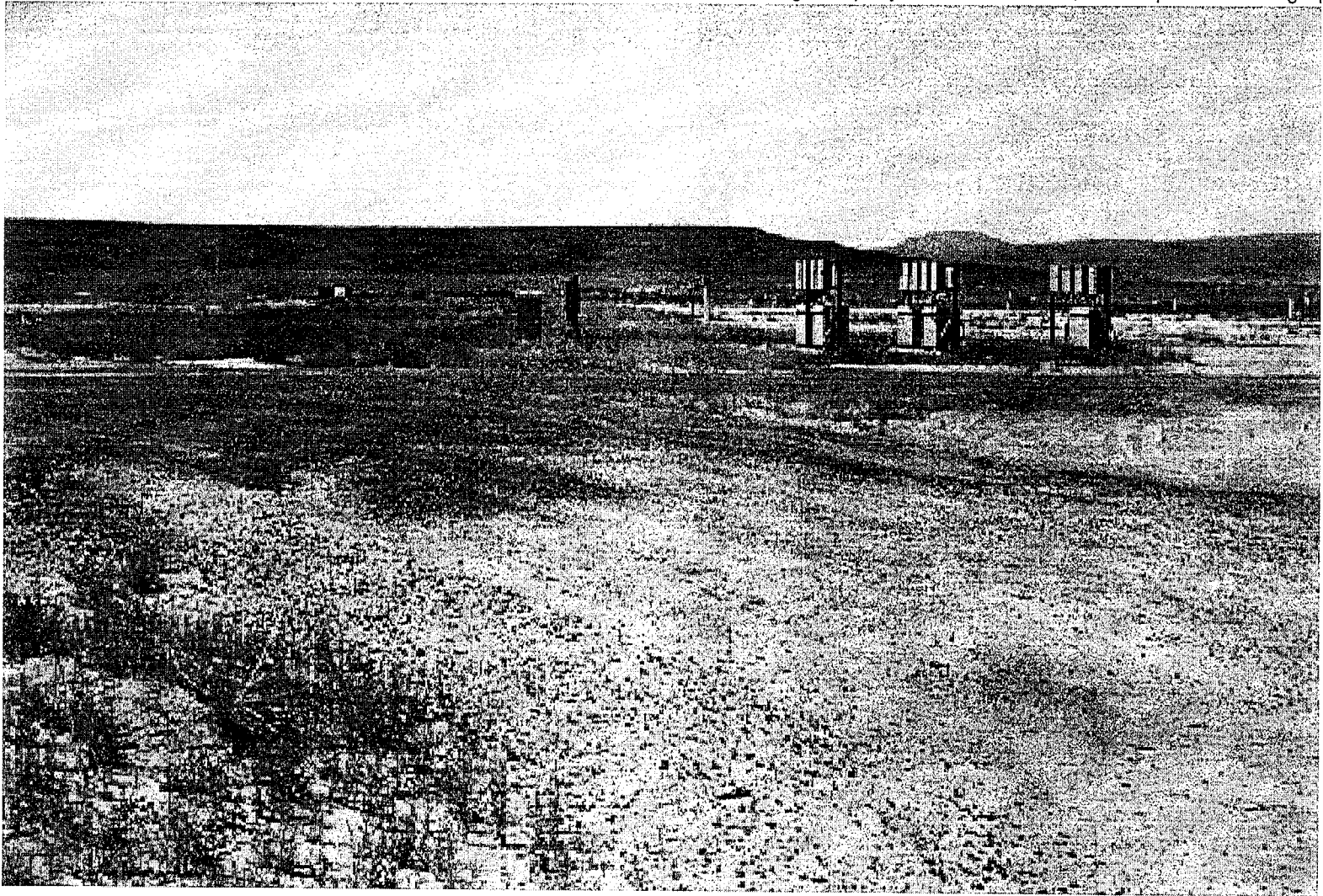
View across top of large tailing pile temporary cover, facing west-southwest (slightly left of view in previous photograph; wells at right are same wells at left in previous photograph).



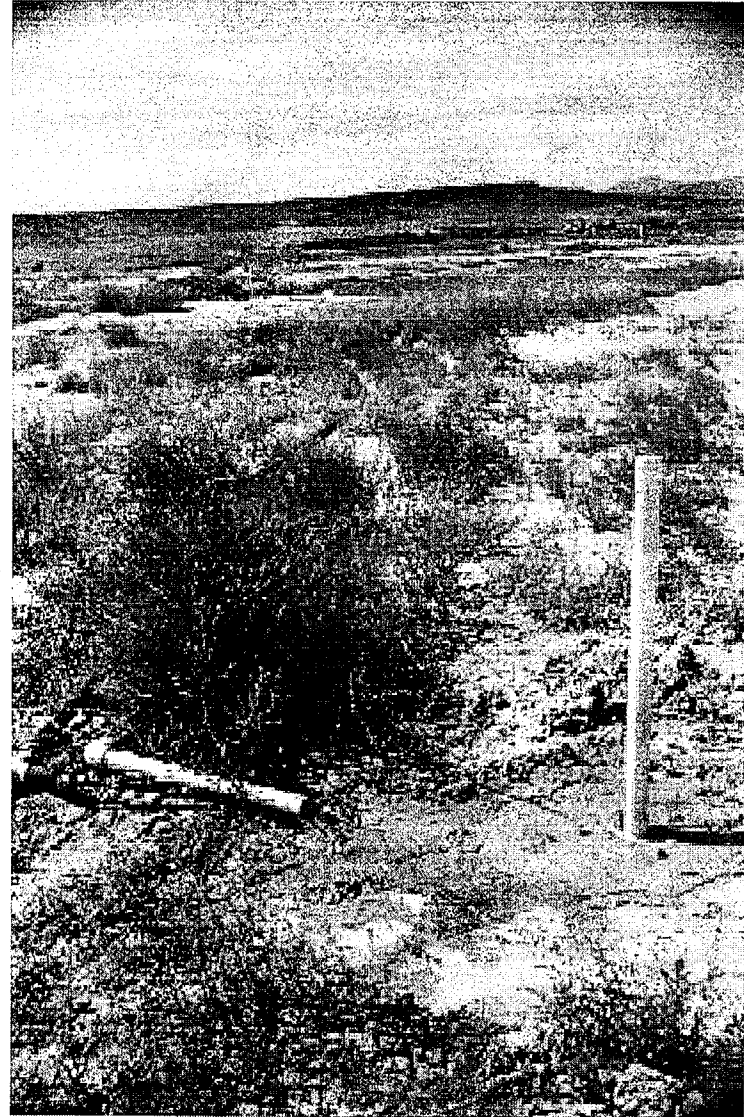
Facing east-southeast from top of large tailings pile toward fresh water supply towers.



Facing west on top of large tailings pile, dewatering well CN6.

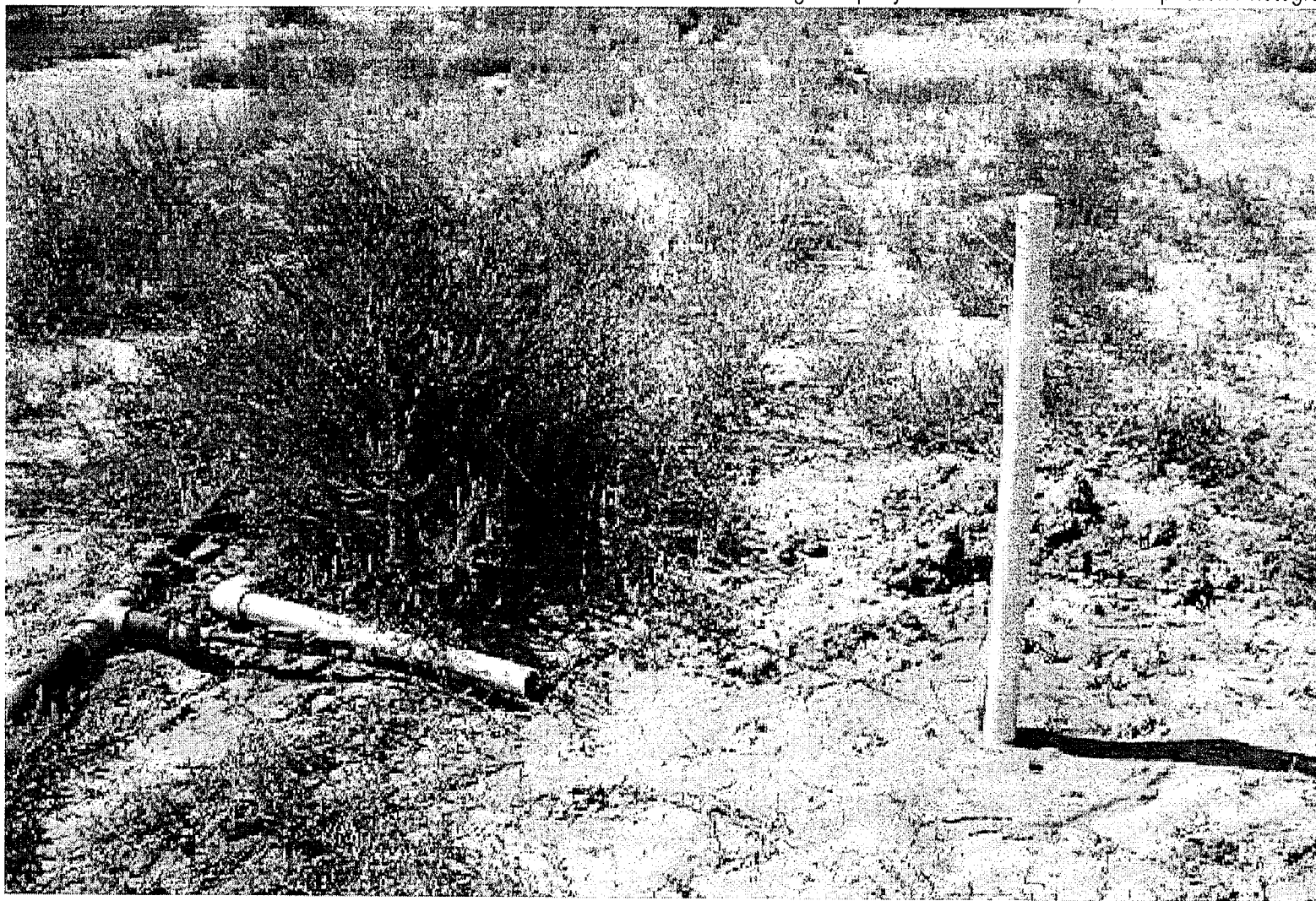


Facing south across large tailings pile temporary cover. Structures visible are the electrical boxes for the tailings pile dewatering well system.

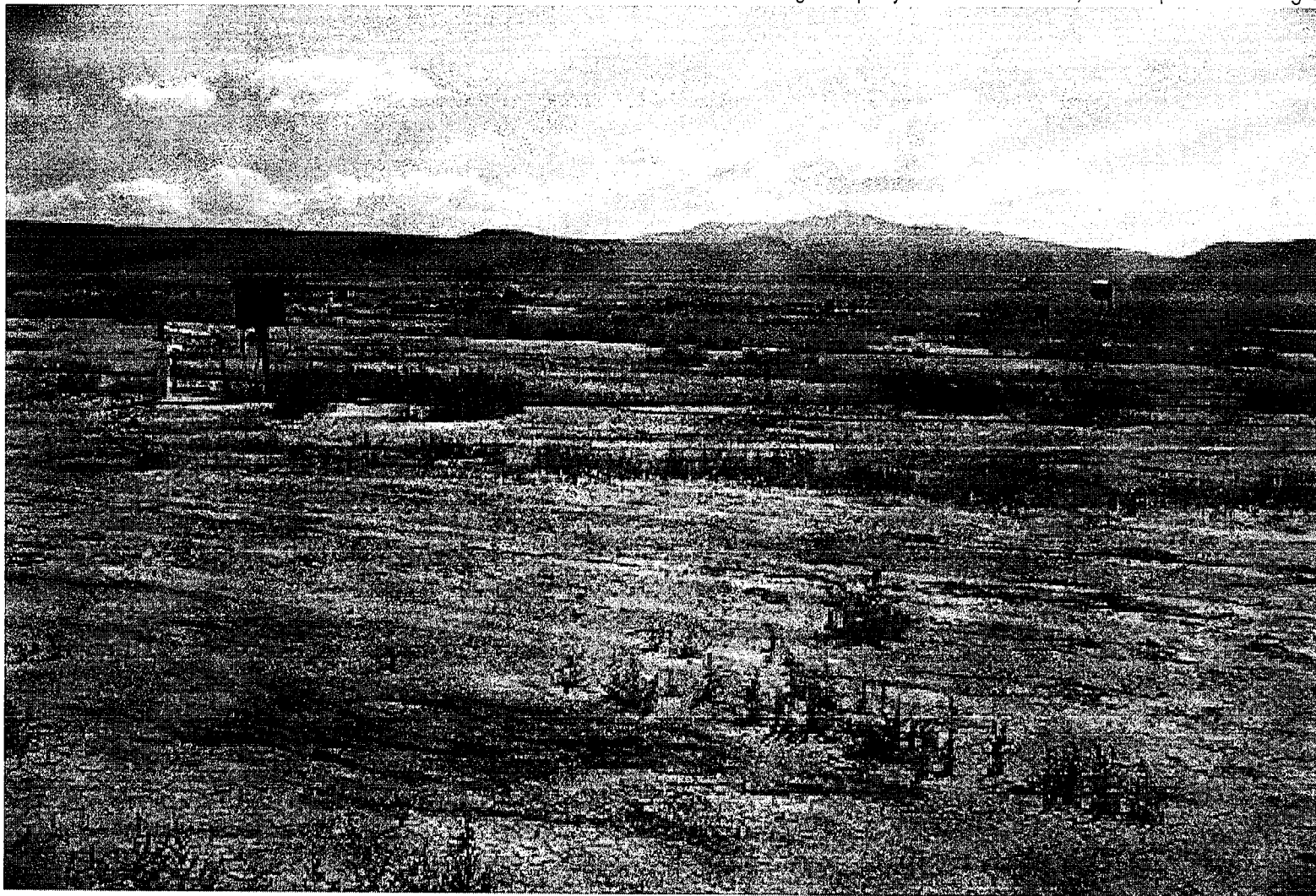


Test injection well EK-7, on top of large tailing pile temporary cover. Using gravity drainage of fresh water.

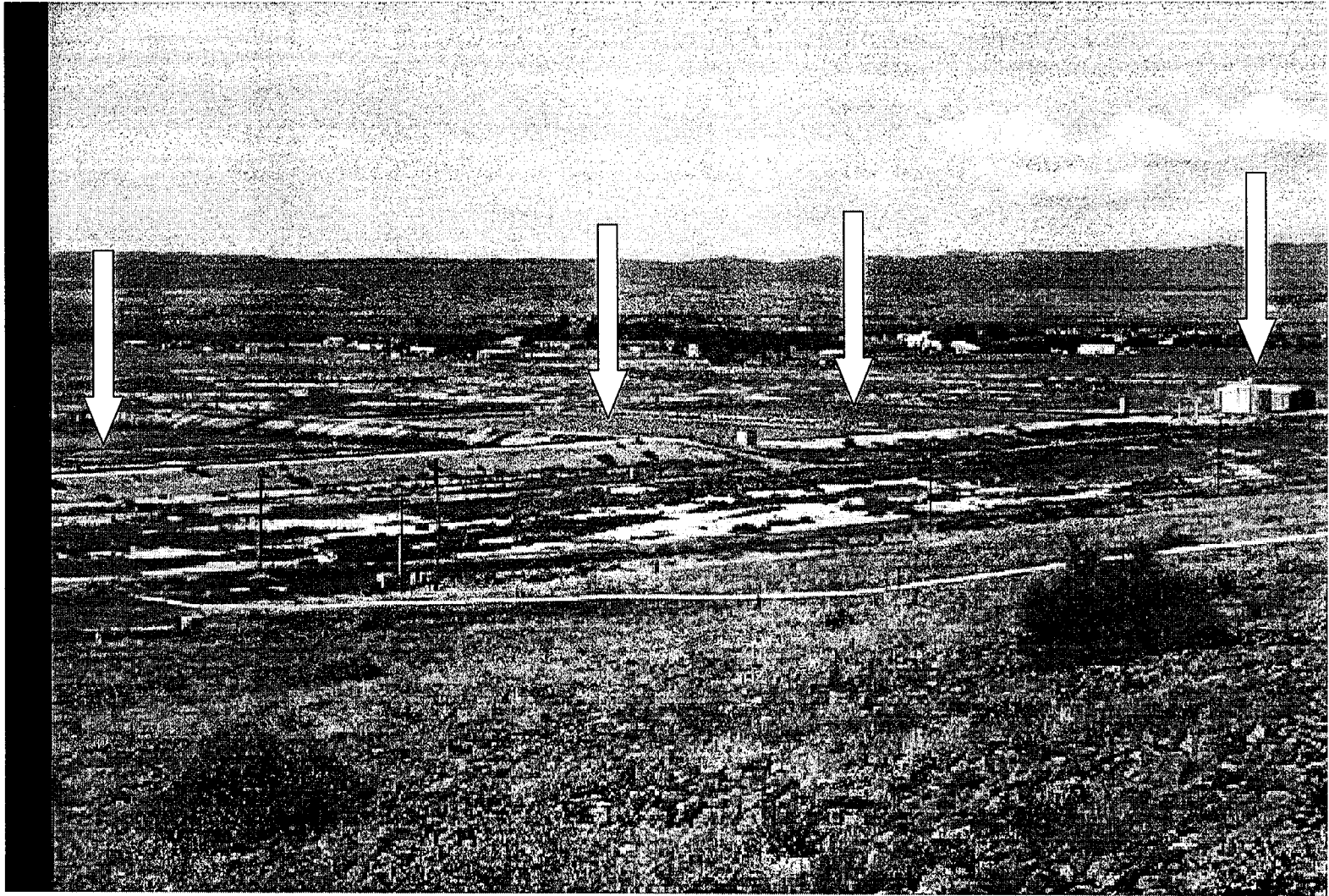
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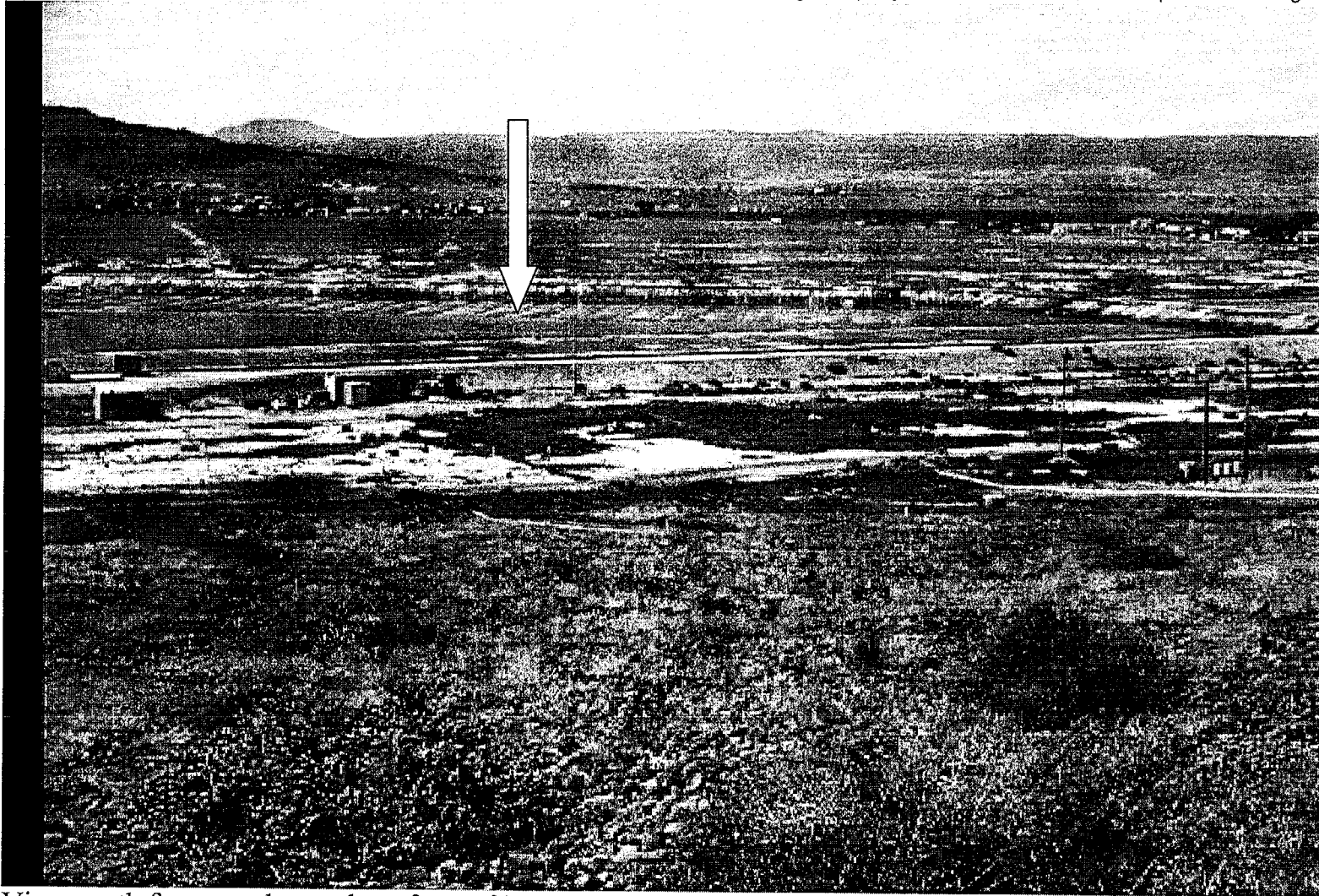
Closer view of injection well EK-7, seen in previous photograph.



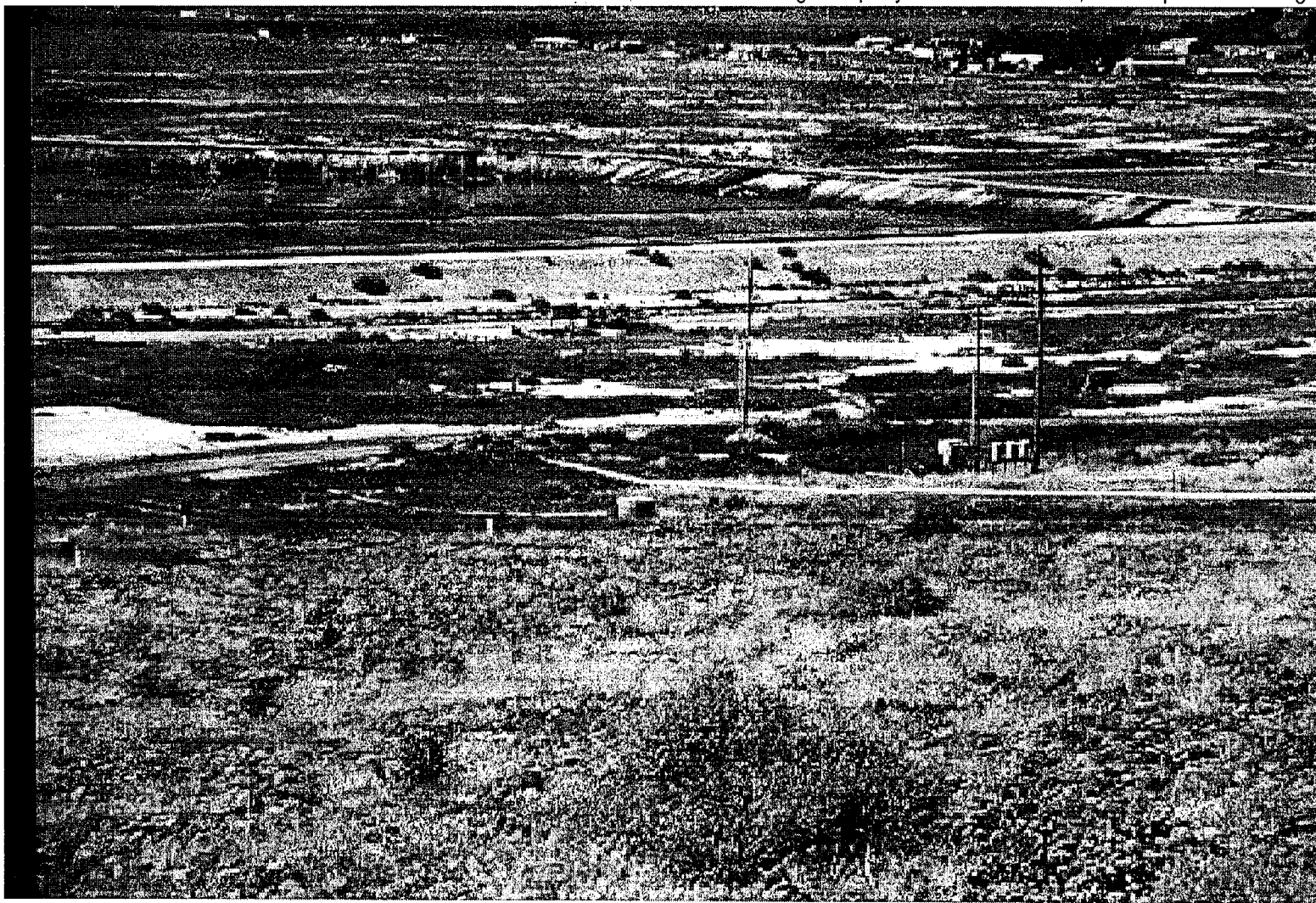
View southwest across top of large tailing pile temporary cover.



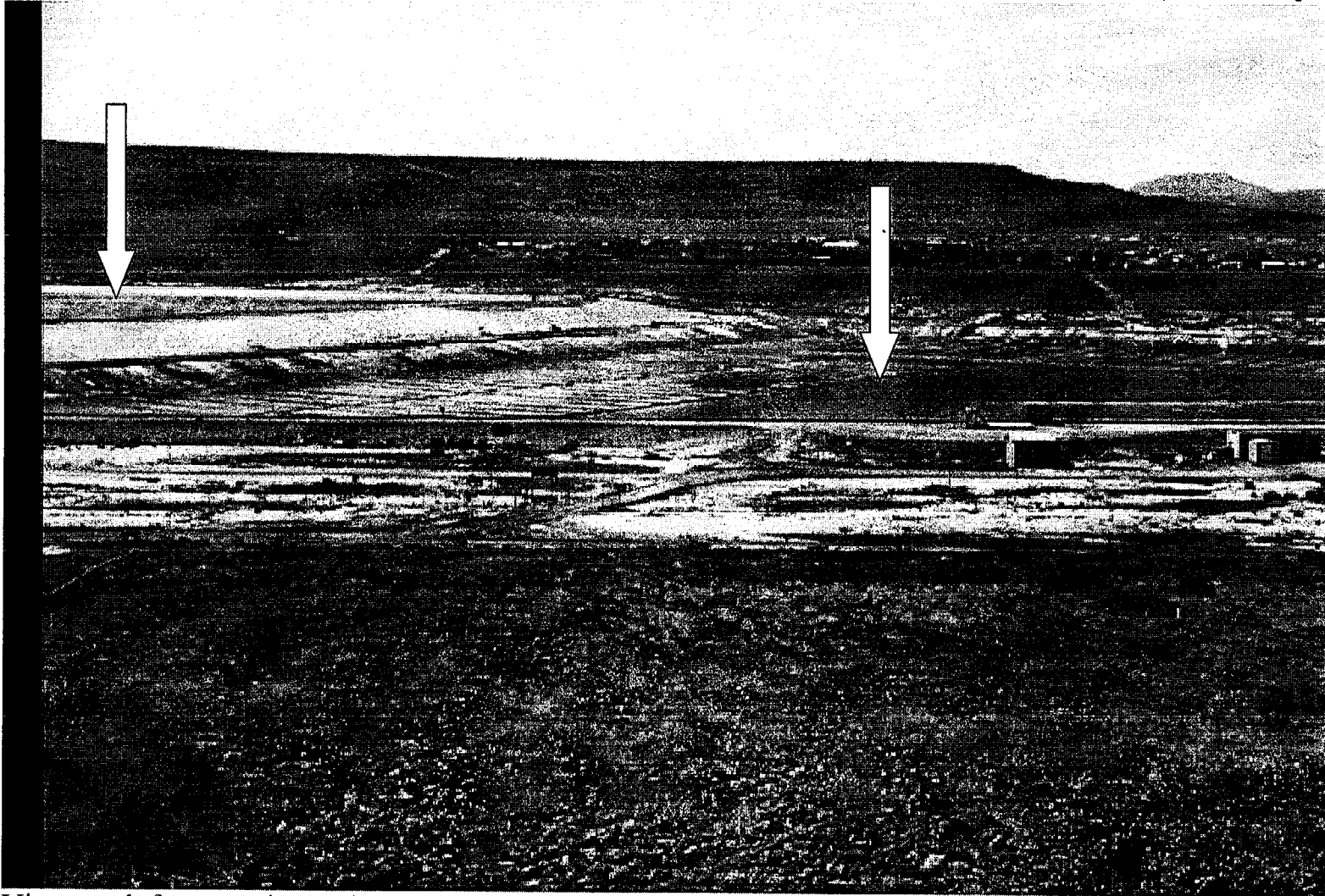
View south-southeast from southern edge of top of large tailing pile temporary cover, toward small lined evaporation pond (left white arrow), east-west collection ponds (two middle arrows) and reverse osmosis plant (right arrow). Residential community visible in background.



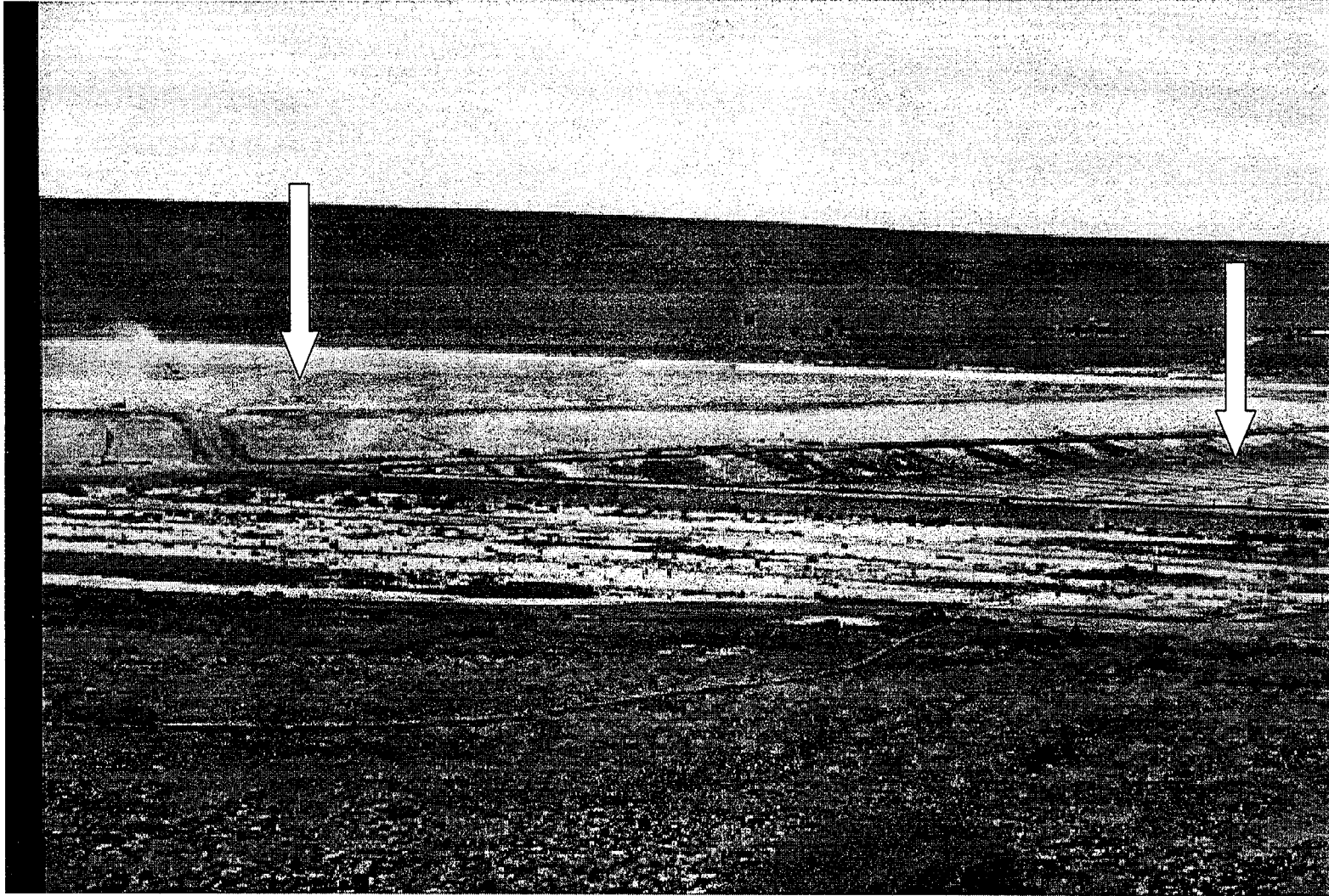
View south from southern edge of top of large tailing pile temporary cover, toward small lined evaporation pond (white arrow), Residential community visible in background; foreground is southern slope of large tailings pile.



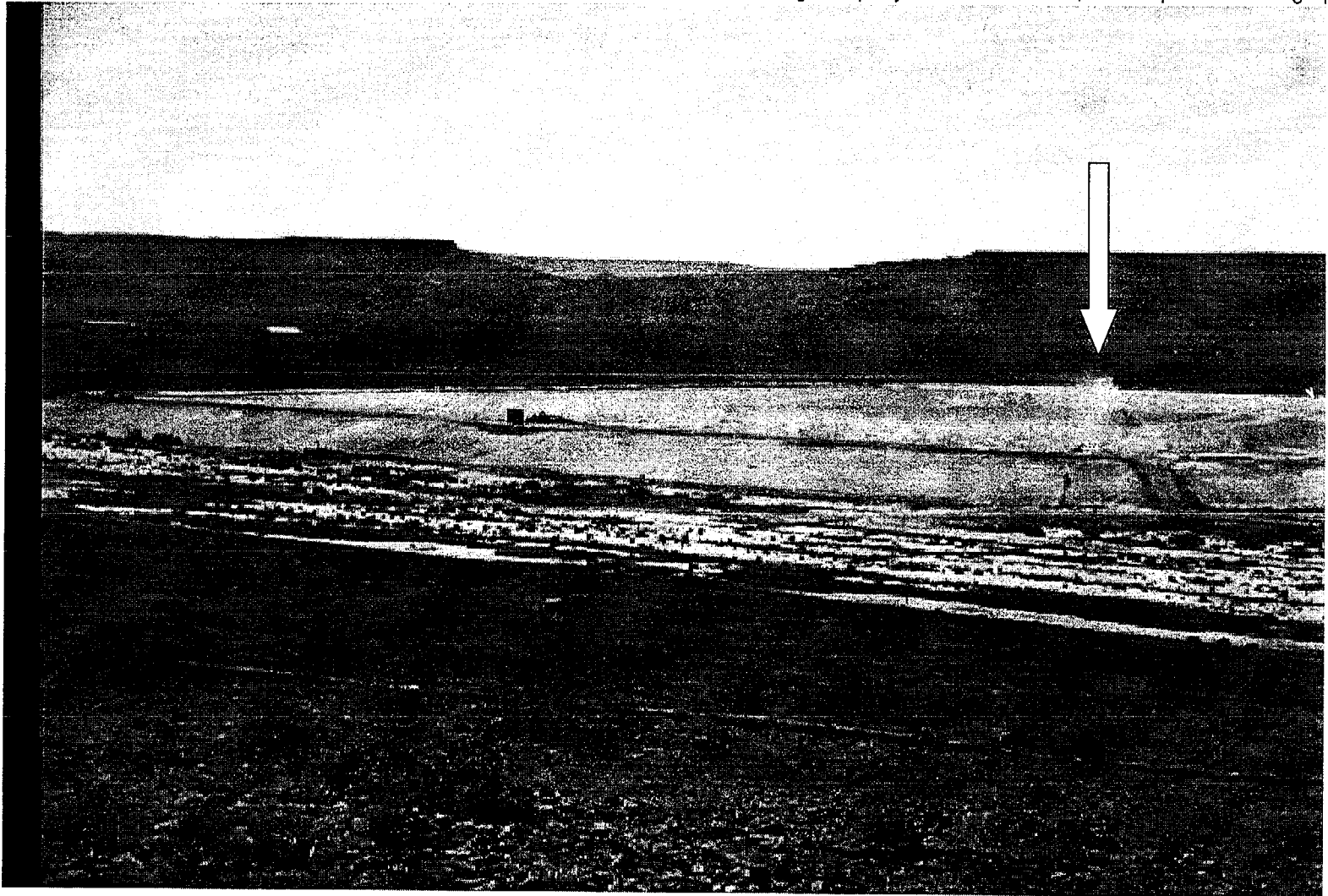
Closer view toward small lined evaporation pond (see previous photograph).



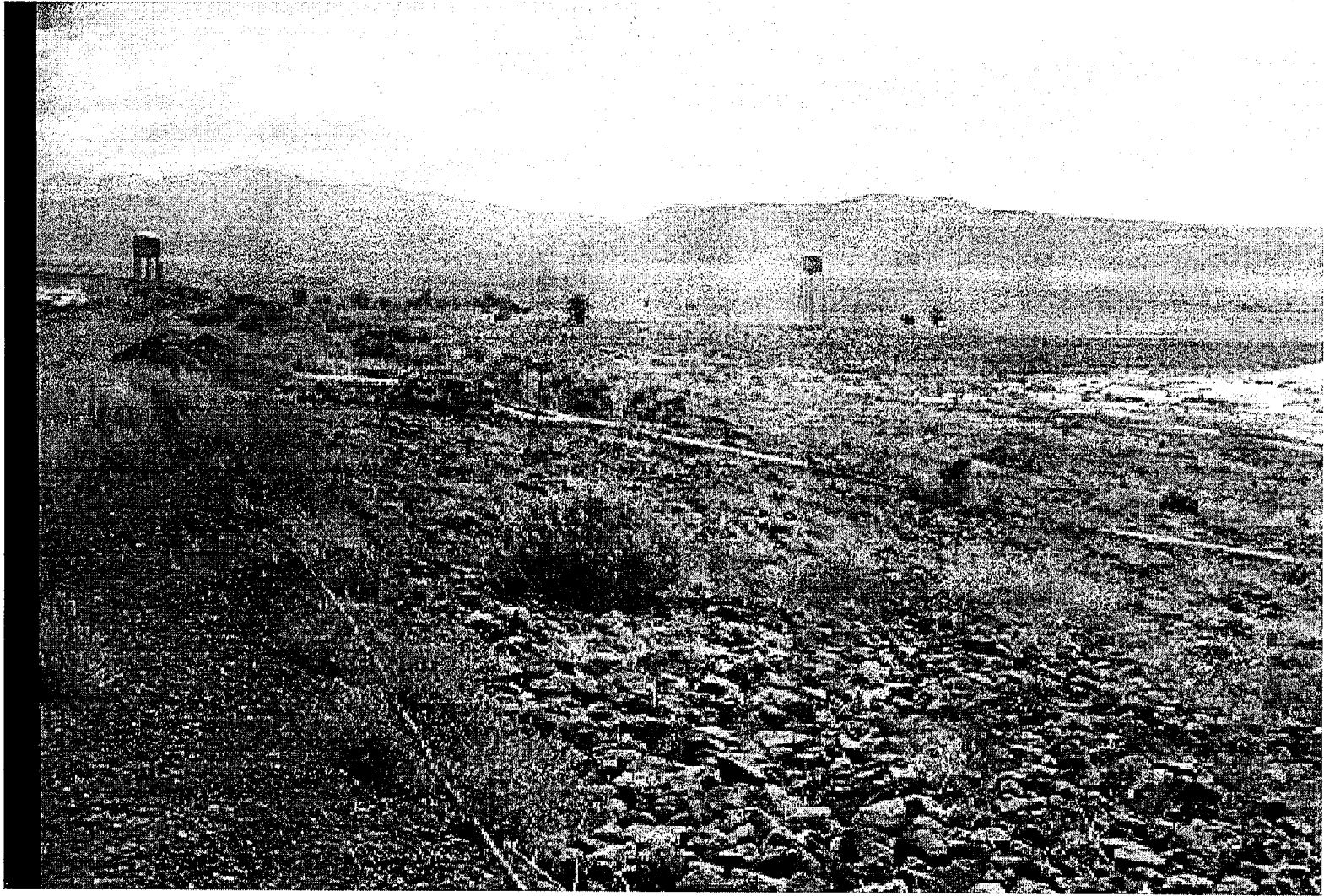
View south from southern edge of top of large tailing pile temporary cover, toward largelined evaporation pond (left arrow) and small lined evaporation pond (right arrow). Residential community visible in background; foreground is southern slope of largetailings pile.



View south from southern edge of top of large tailing pile temporary cover, toward largelined evaporation pond (left arrow) and small lined evaporation pond (right arrow). Foreground is southern slope of largetailings pile. Note spray blower in large pond.



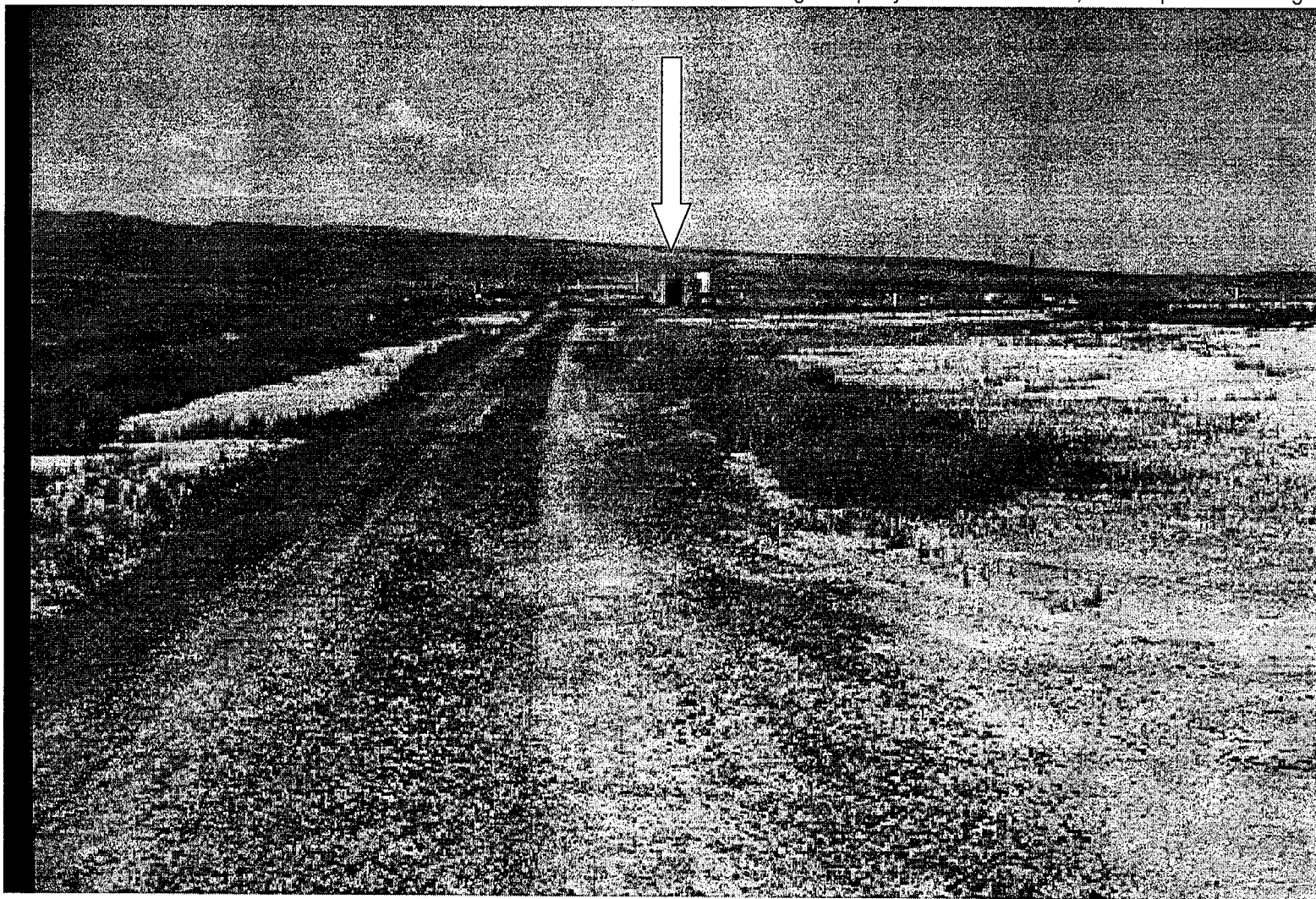
View south from southern edge of top of large tailing pile temporary cover, toward largelined evaporation pond. Foreground is southern slope of large tailings pile. Note spray blower in large pond (white arrow).



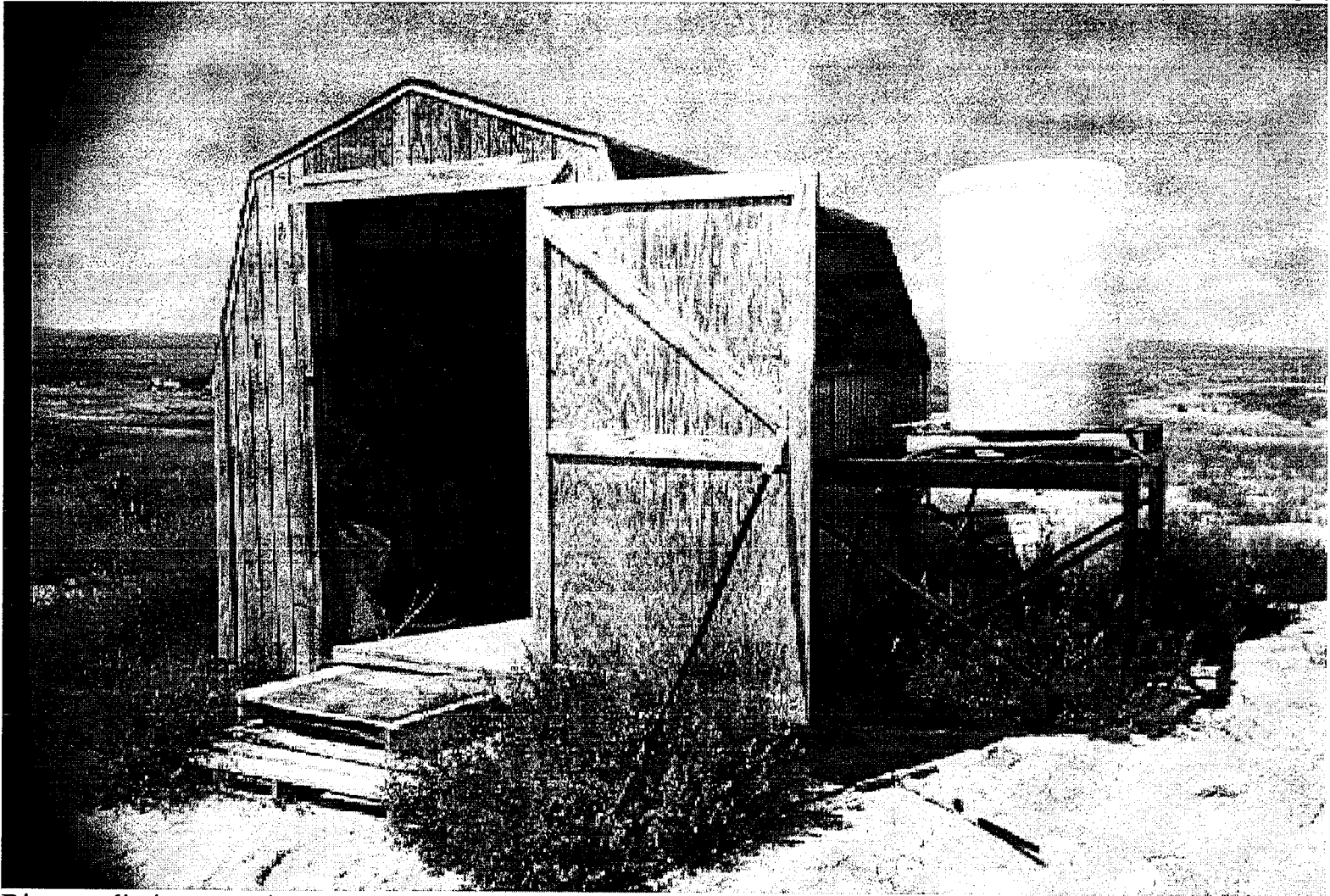
View east-southeast across southern slope of large tailings pile. Large lined evaporation pond is located to right of view.



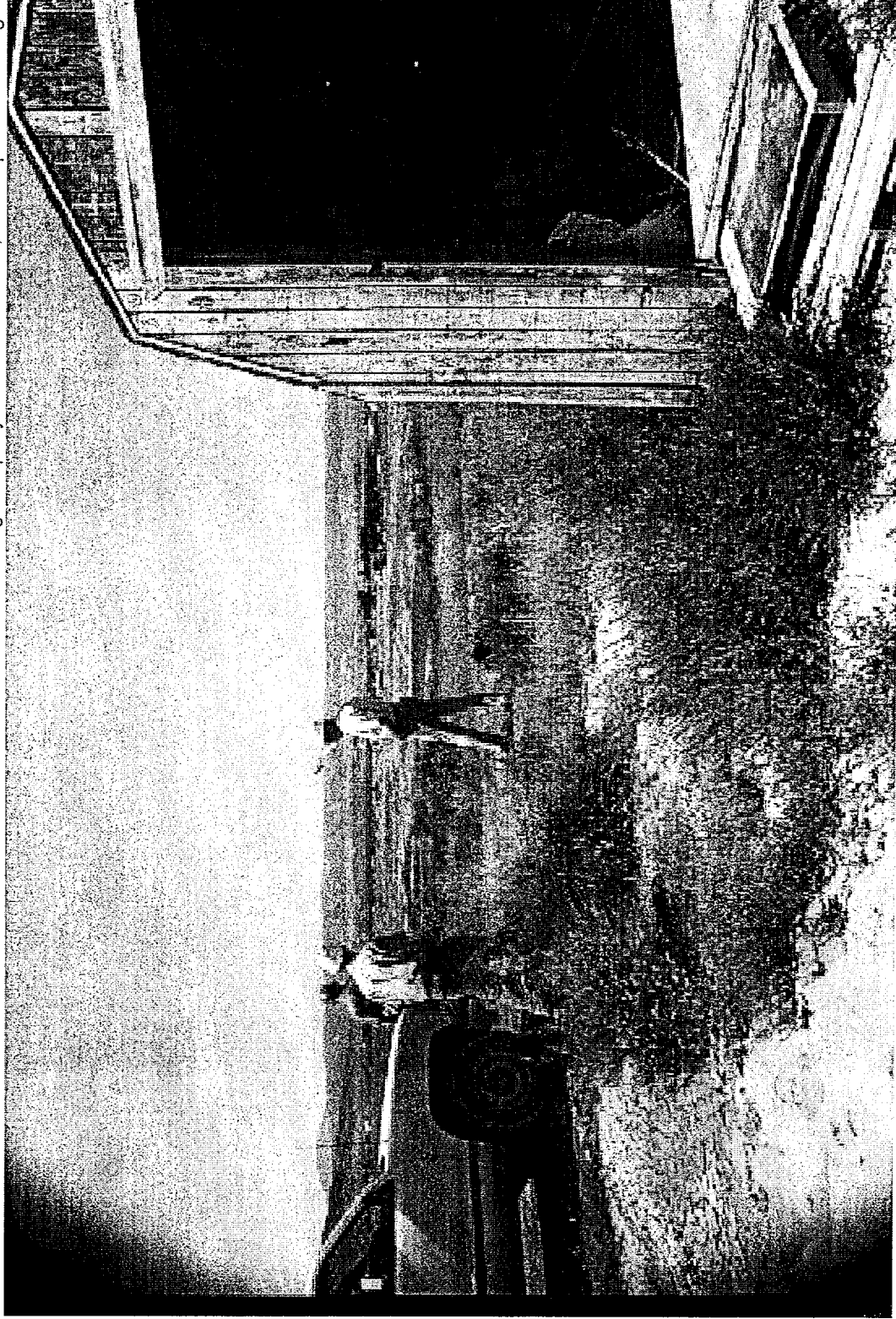
View east along top of south slope of large tailing pile.



View west along top of south slope of large tailing pile (slope is to left). Bioremediation experiment station in background (white arrow).



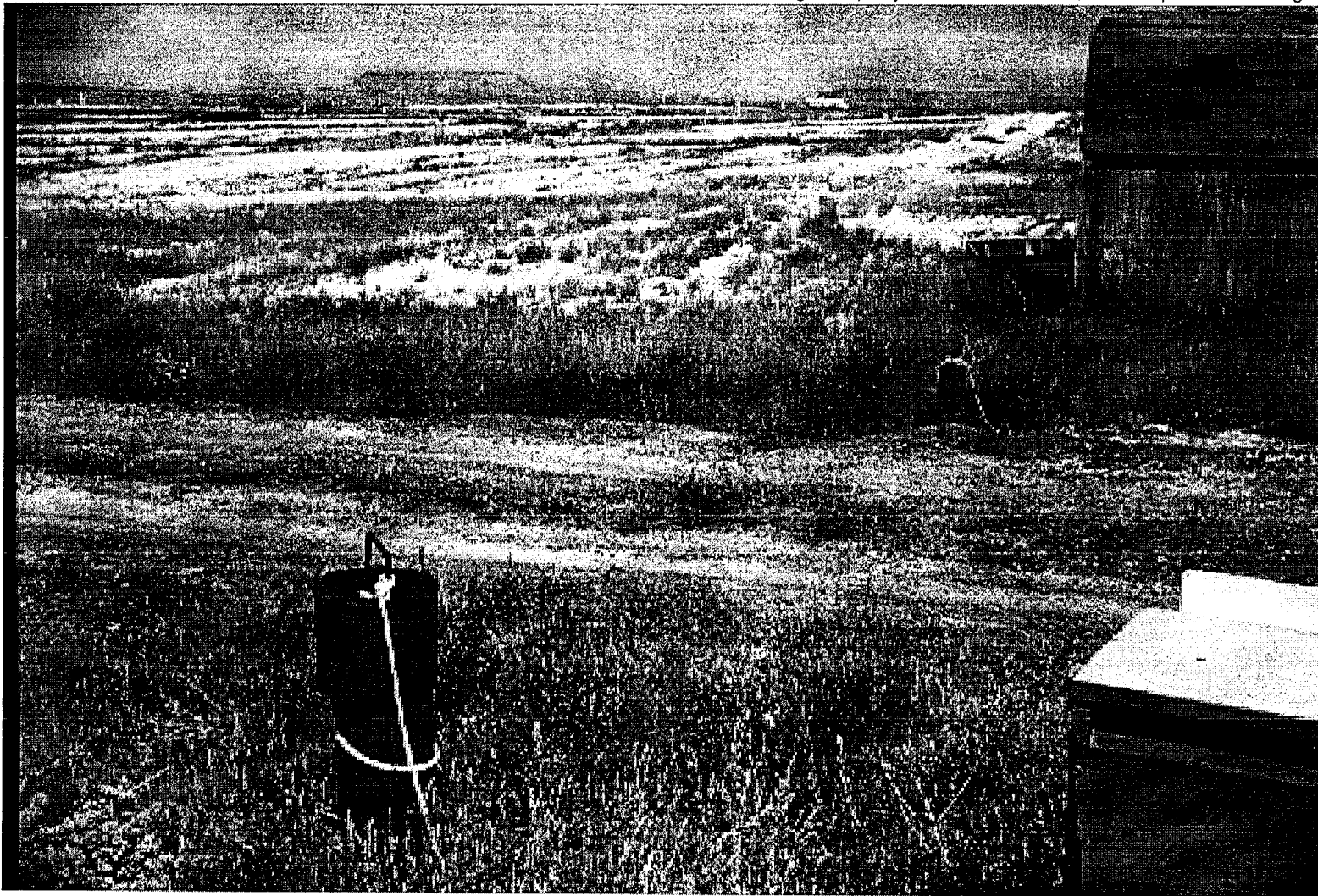
Bioremediation experiment station on top of large tailings pile (location visible in previous photograph). Injection well is located inside structure; molasses additive is in white tank. Associated monitoring wells are left of the structure.



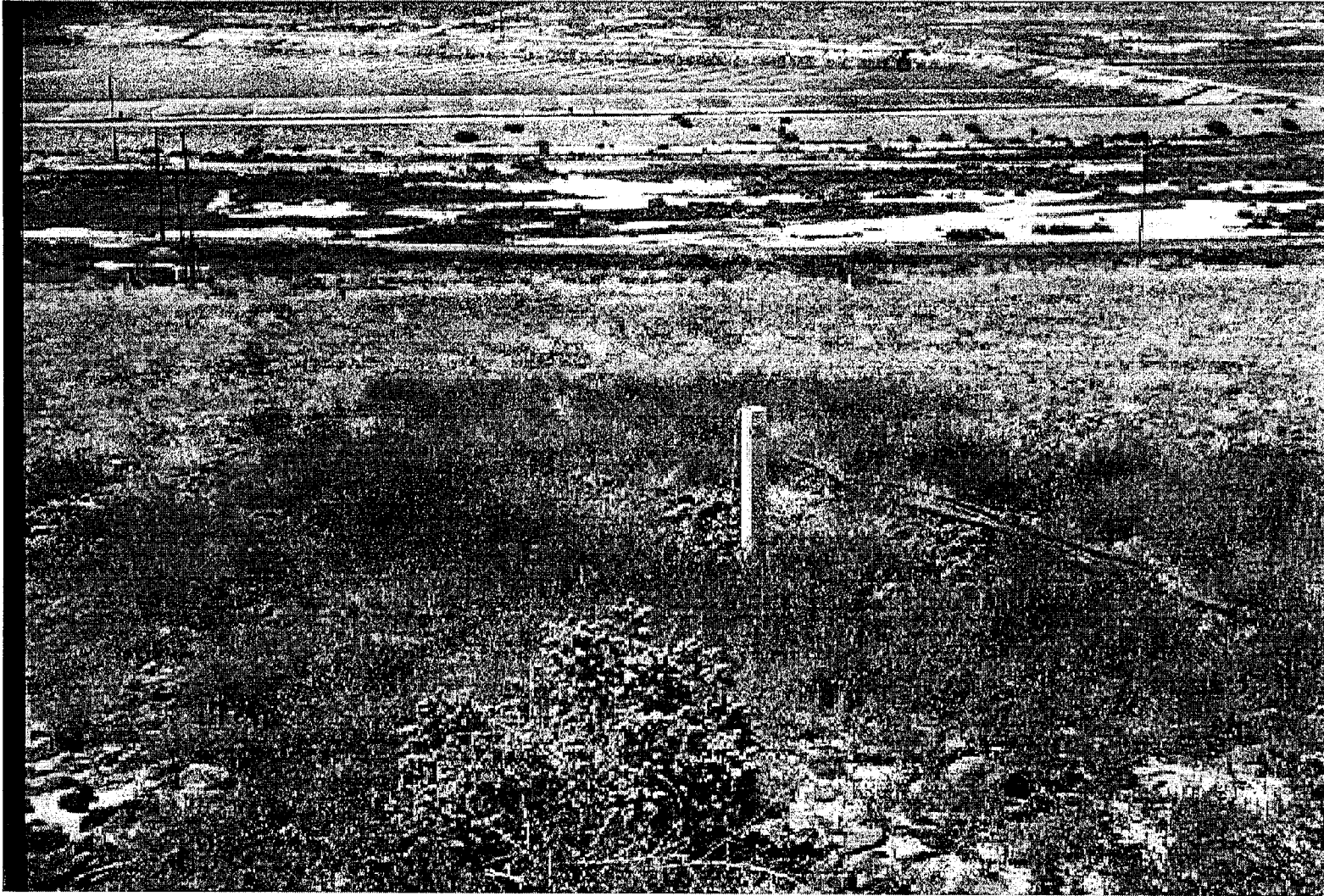
Bioremediation experiment station on top of large tailings pile, slightly south of previous view. Note evaporation ponds and residential community visible in background.

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Photograph 21 of 55



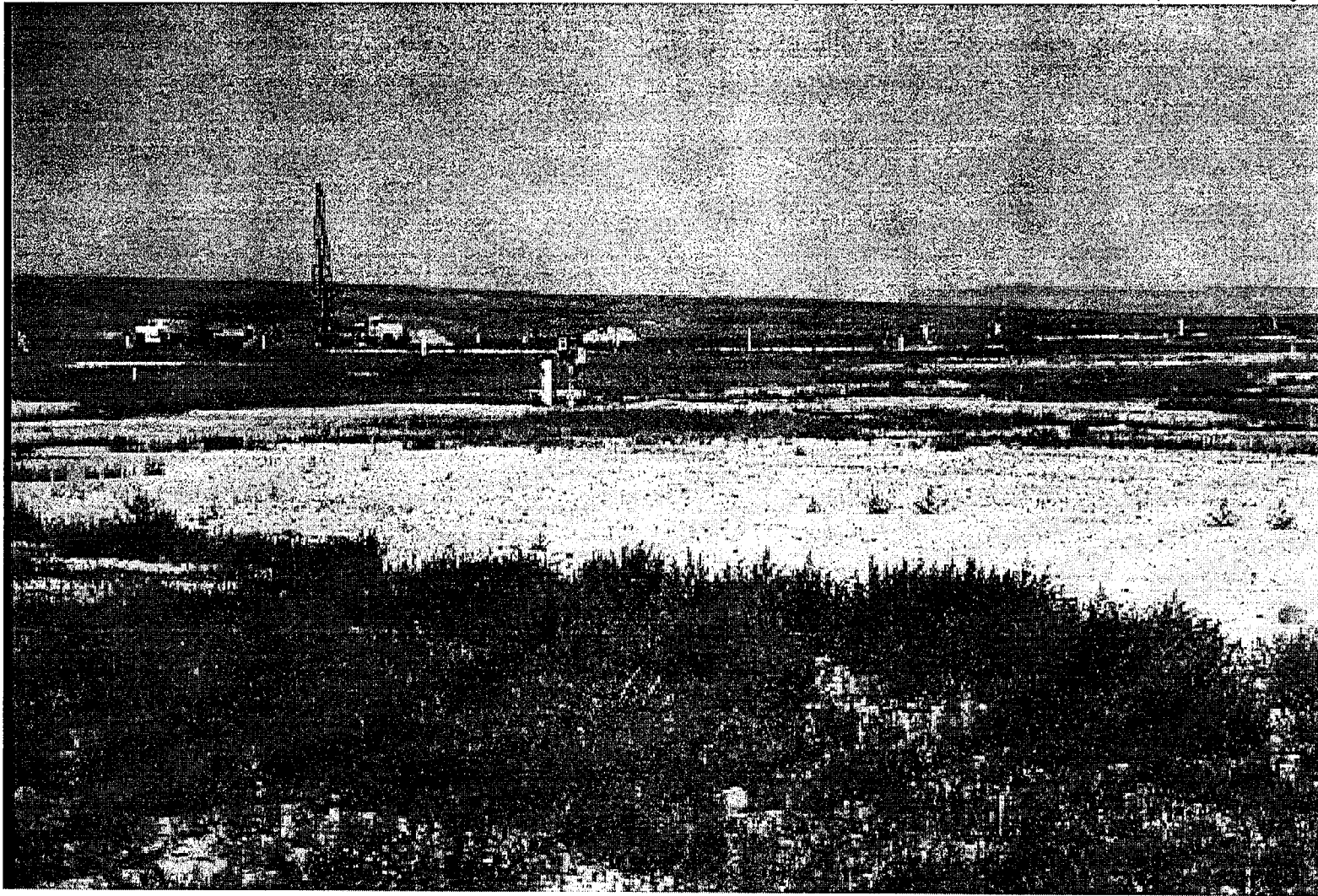
Monitoring wells associated with bioremediation experiment station, facing north-northwest.



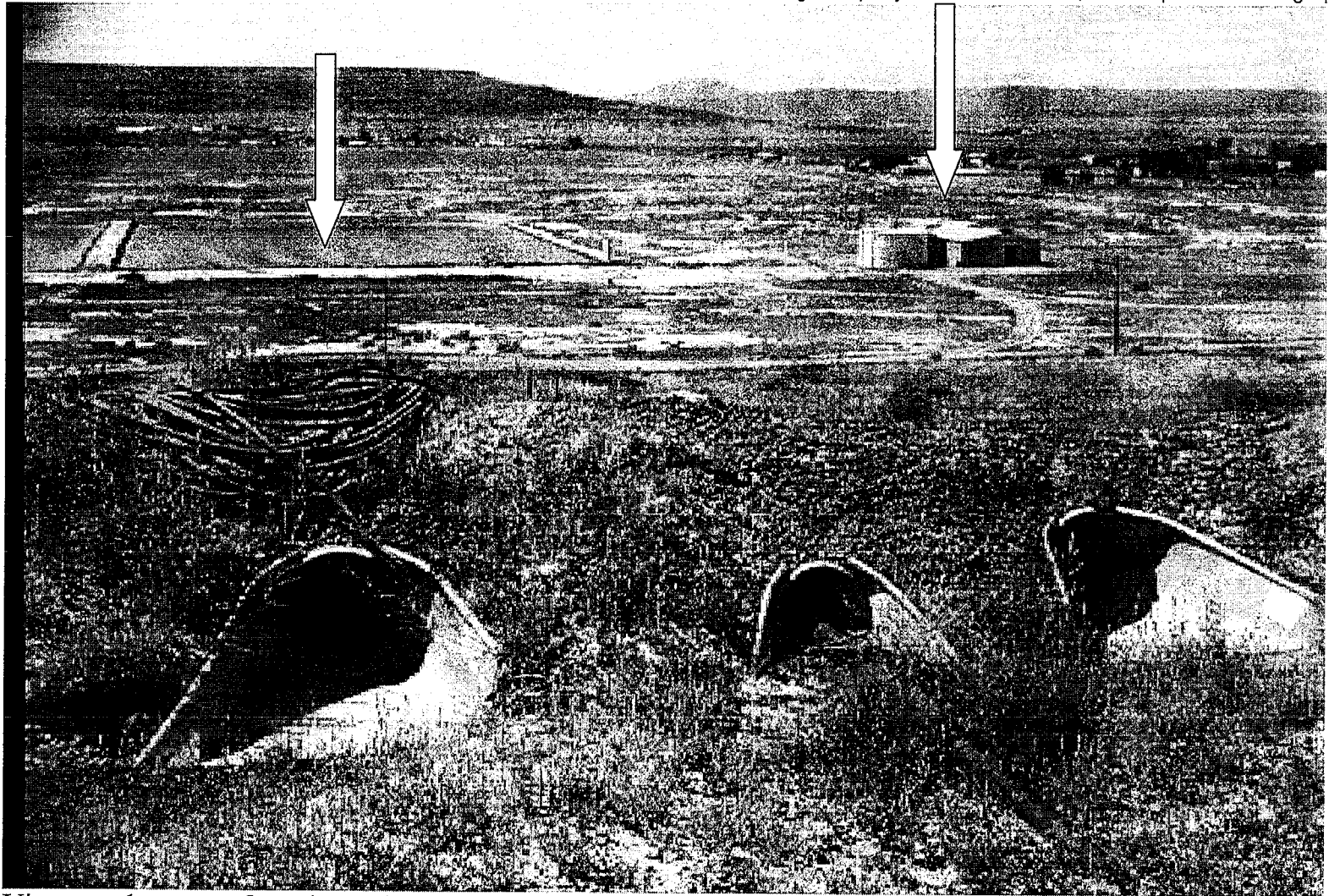
Facing opposite to previous view toward small lined evaporation pond.



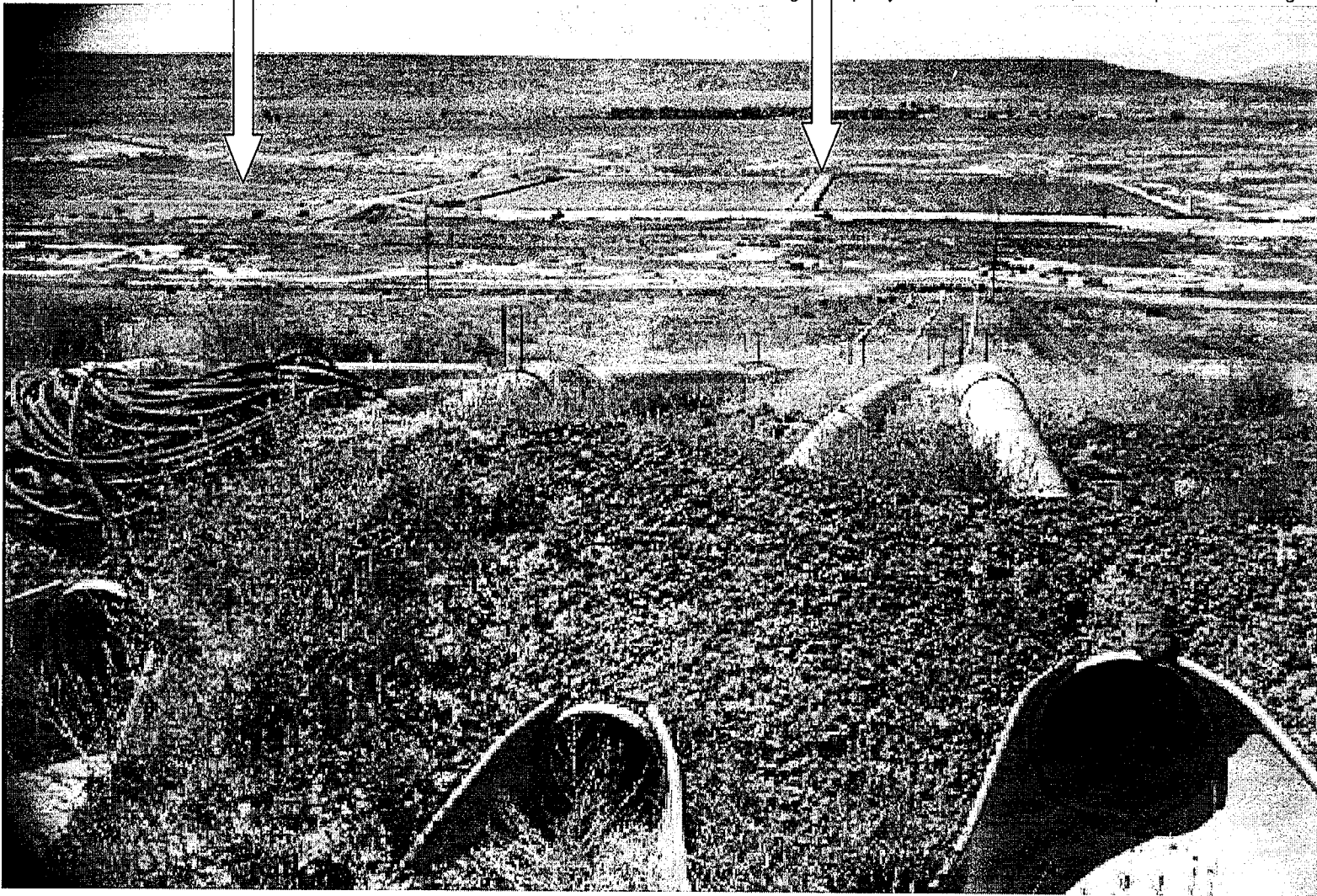
View north across top of large tailing pile temporary cover.



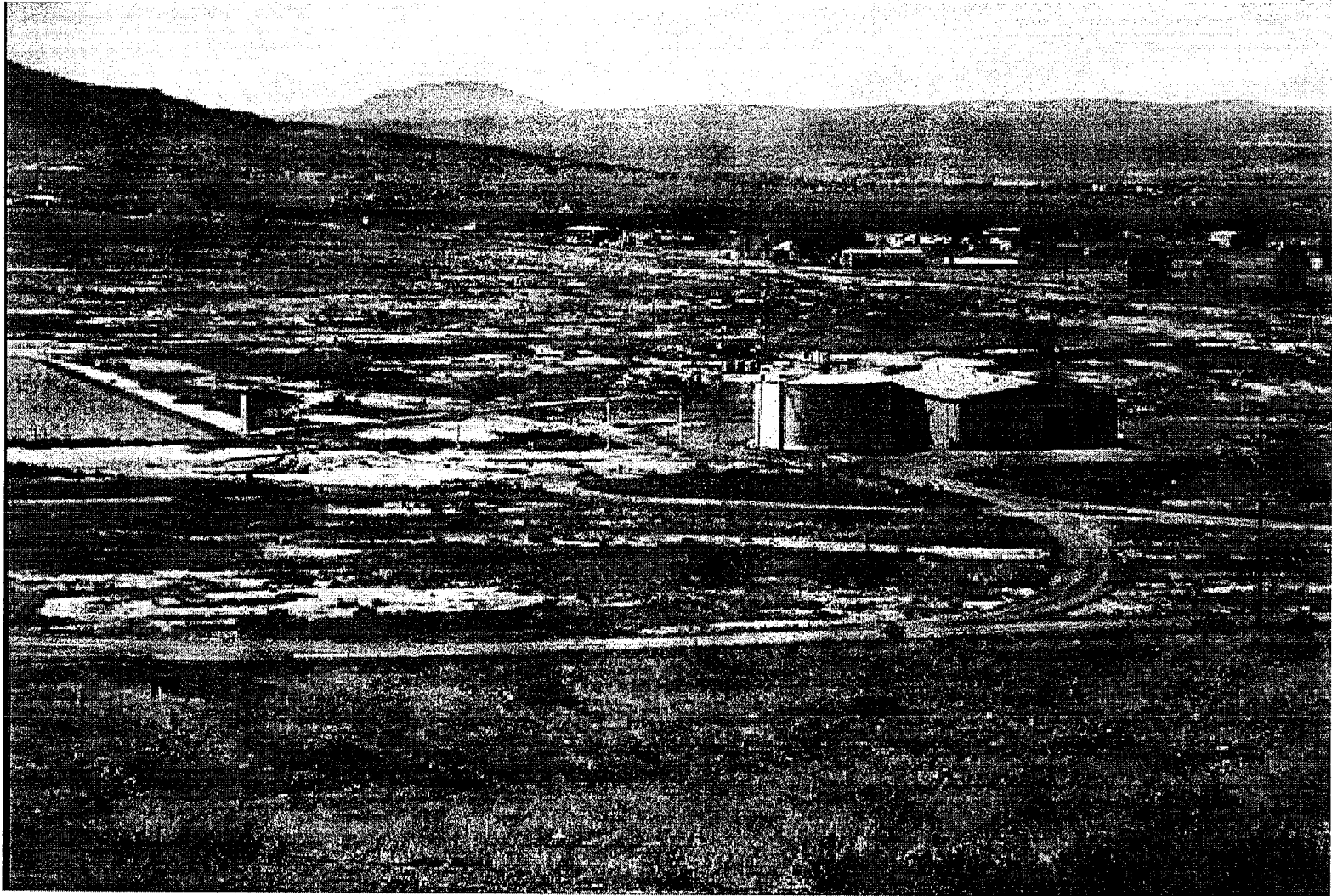
View west-northwest across top of large tailing pile temporary cover. Note drilling activity in background.



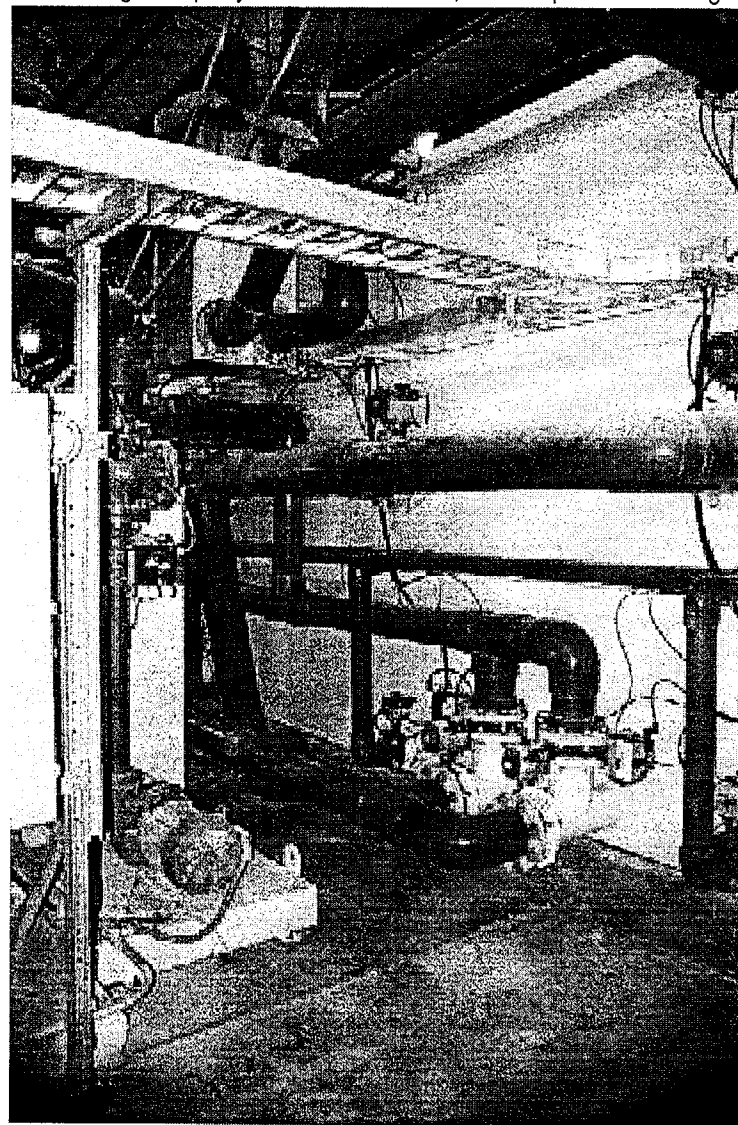
View south at top of southern slope of large tailings pile, showing runoff drainage pipes. Note west collection ponds and reverse osmosis plant (left and right arrows, respectively) Residential community is visible in background.



Slightly left (west) of previous view. Eastern end of small lined evaporation pond and collection ponds visible in background (left and right arrows, respectively).

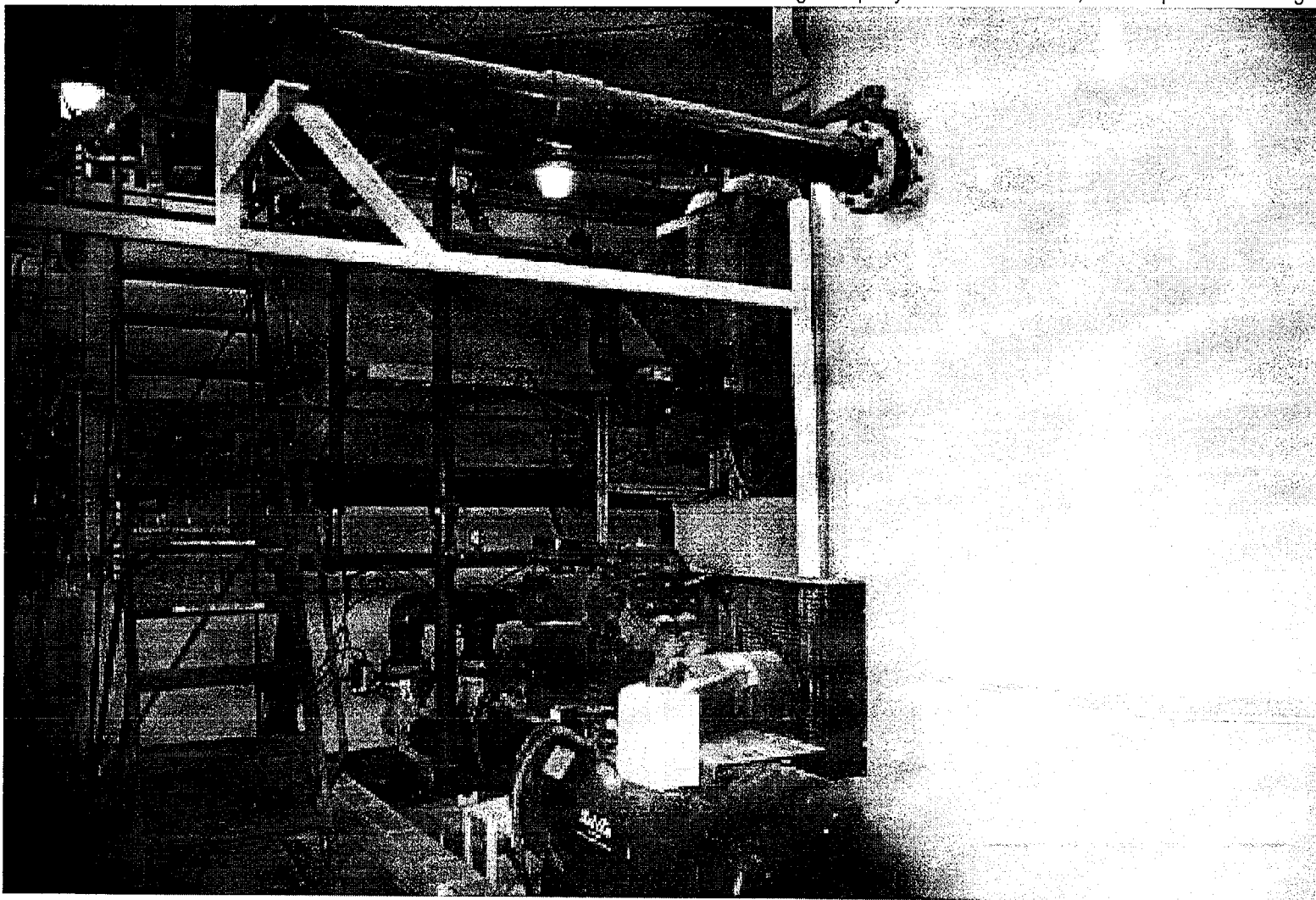


Closer view of reverse osmosis plant, as seen from top of southern slope of large tailings pile.

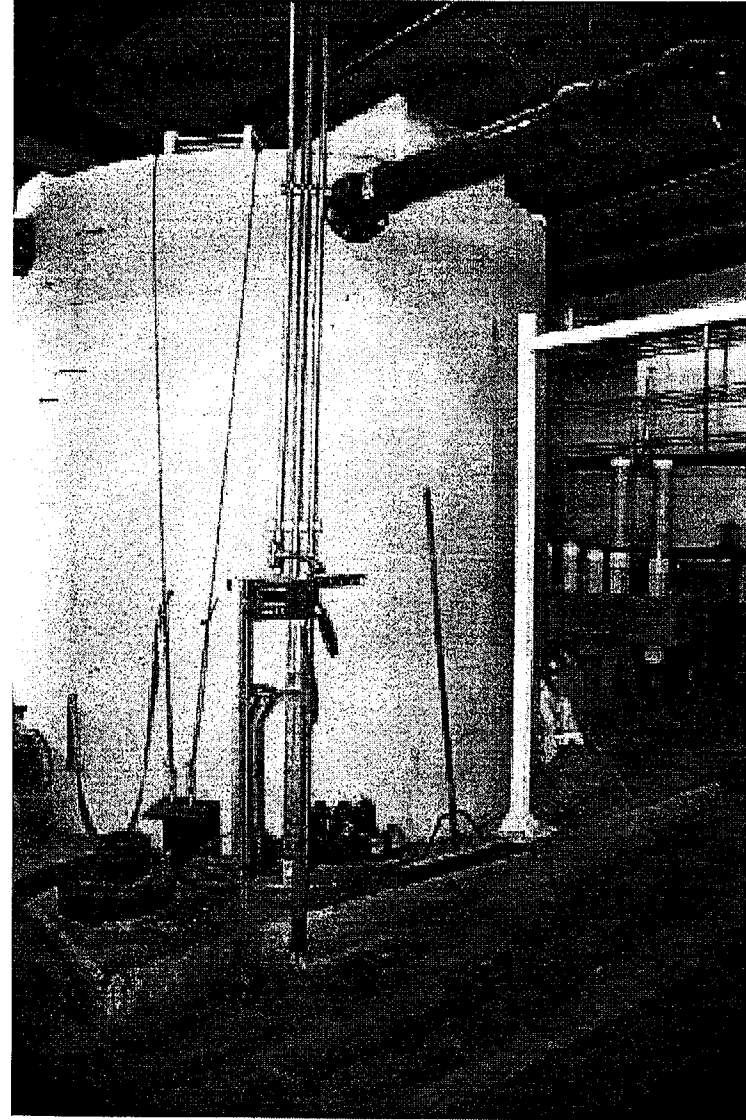


Inside reverse osmosis plant.

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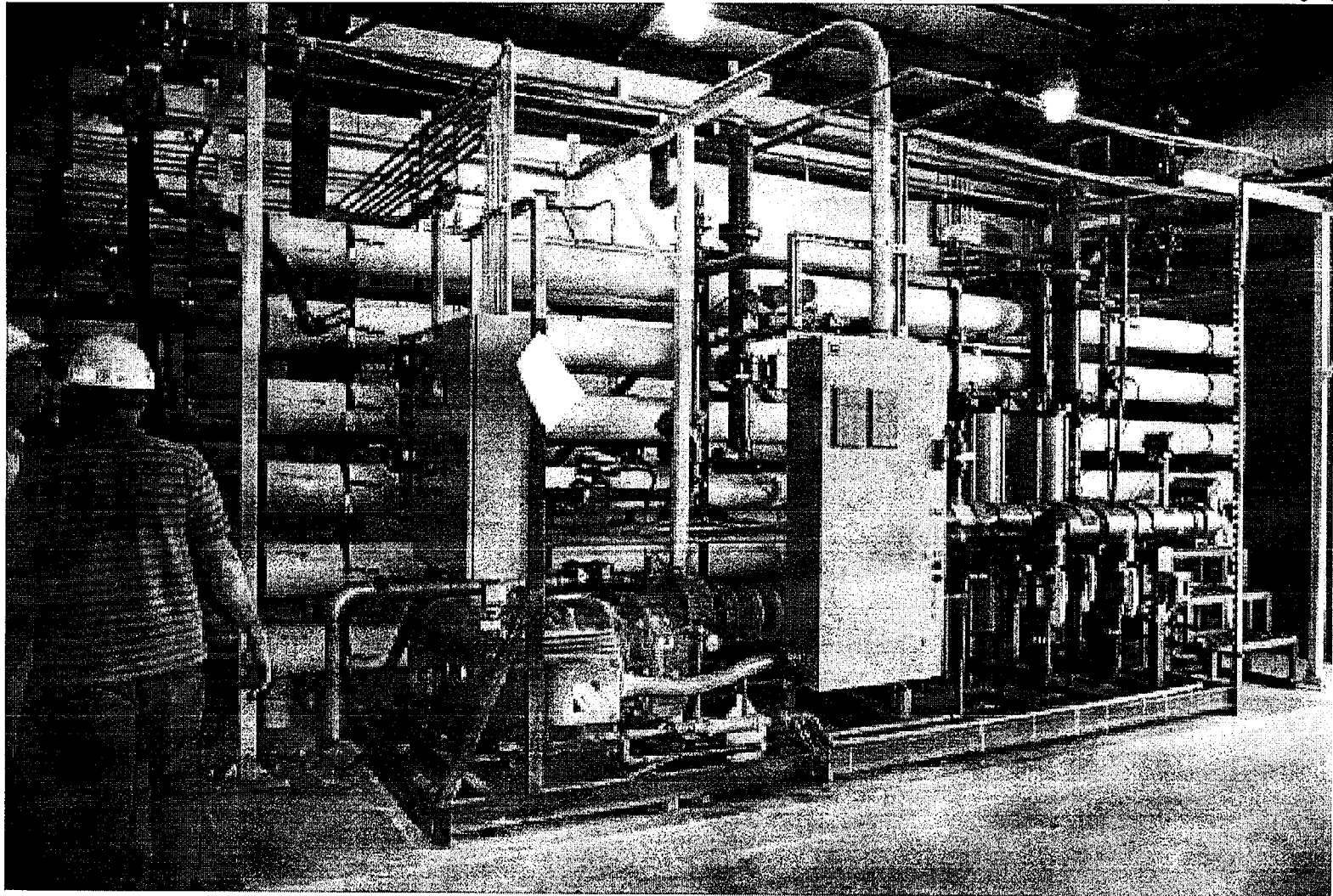


Inside reverse osmosis plant.

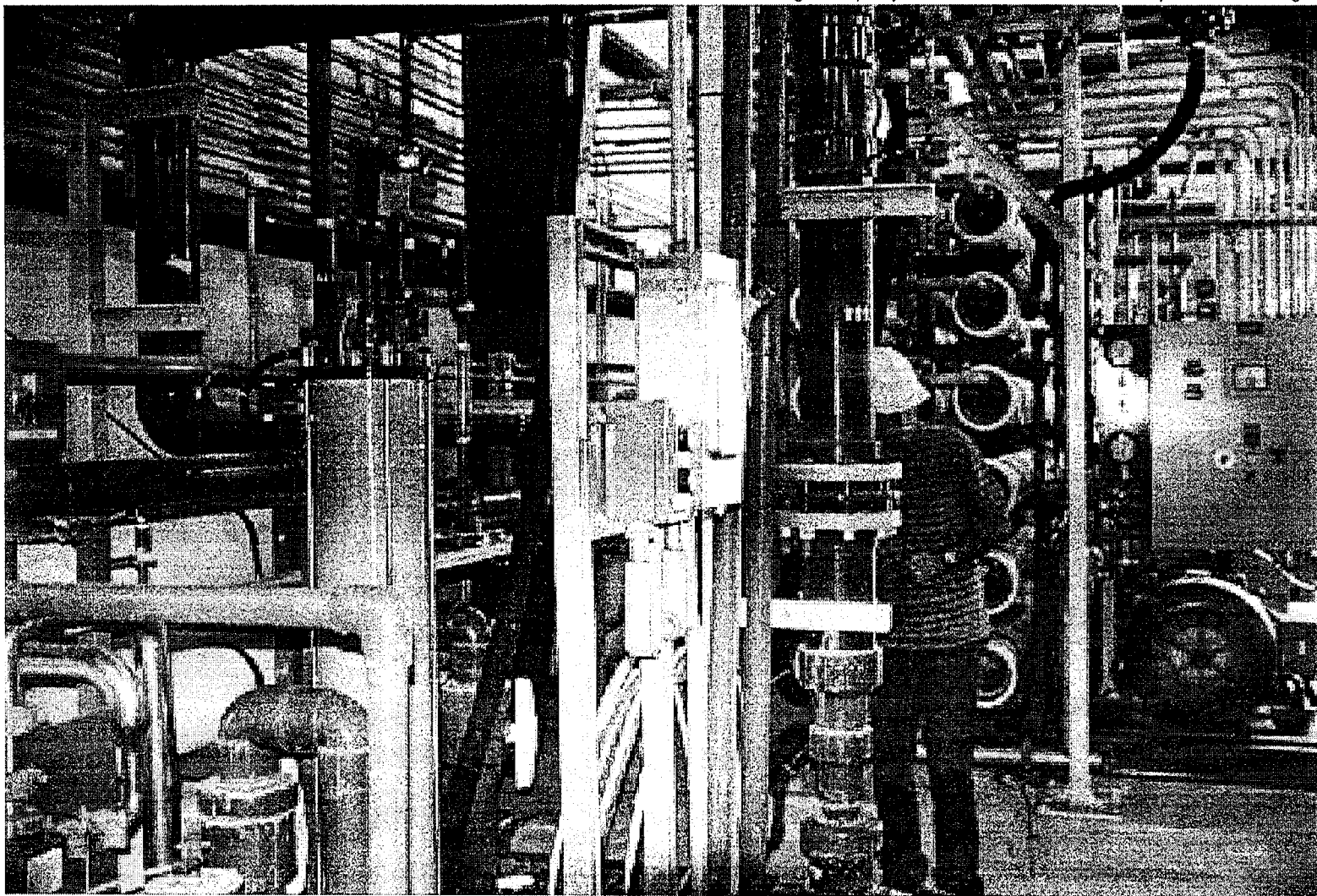


Inside reverse osmosis plant.

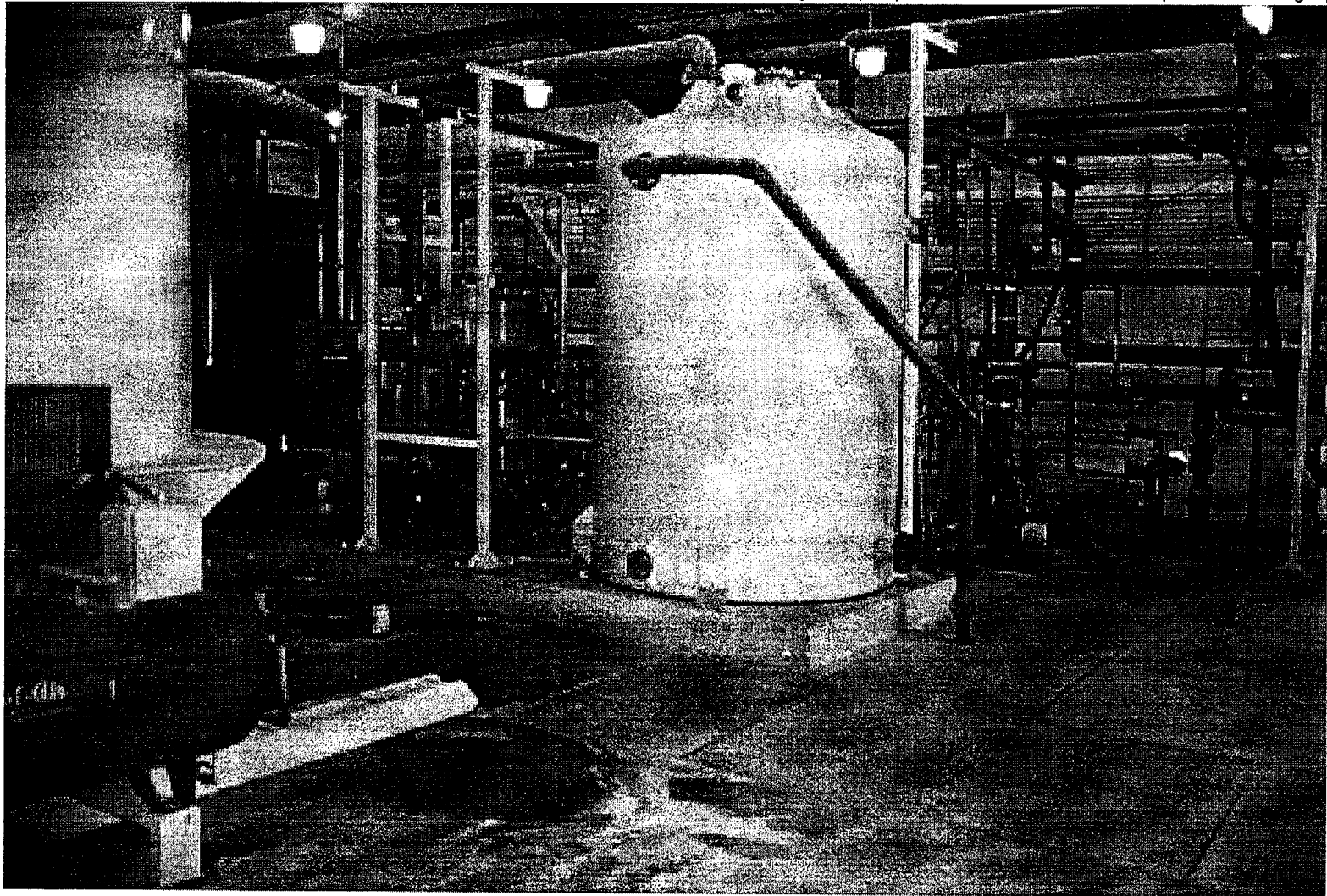
02_021_21.JPG



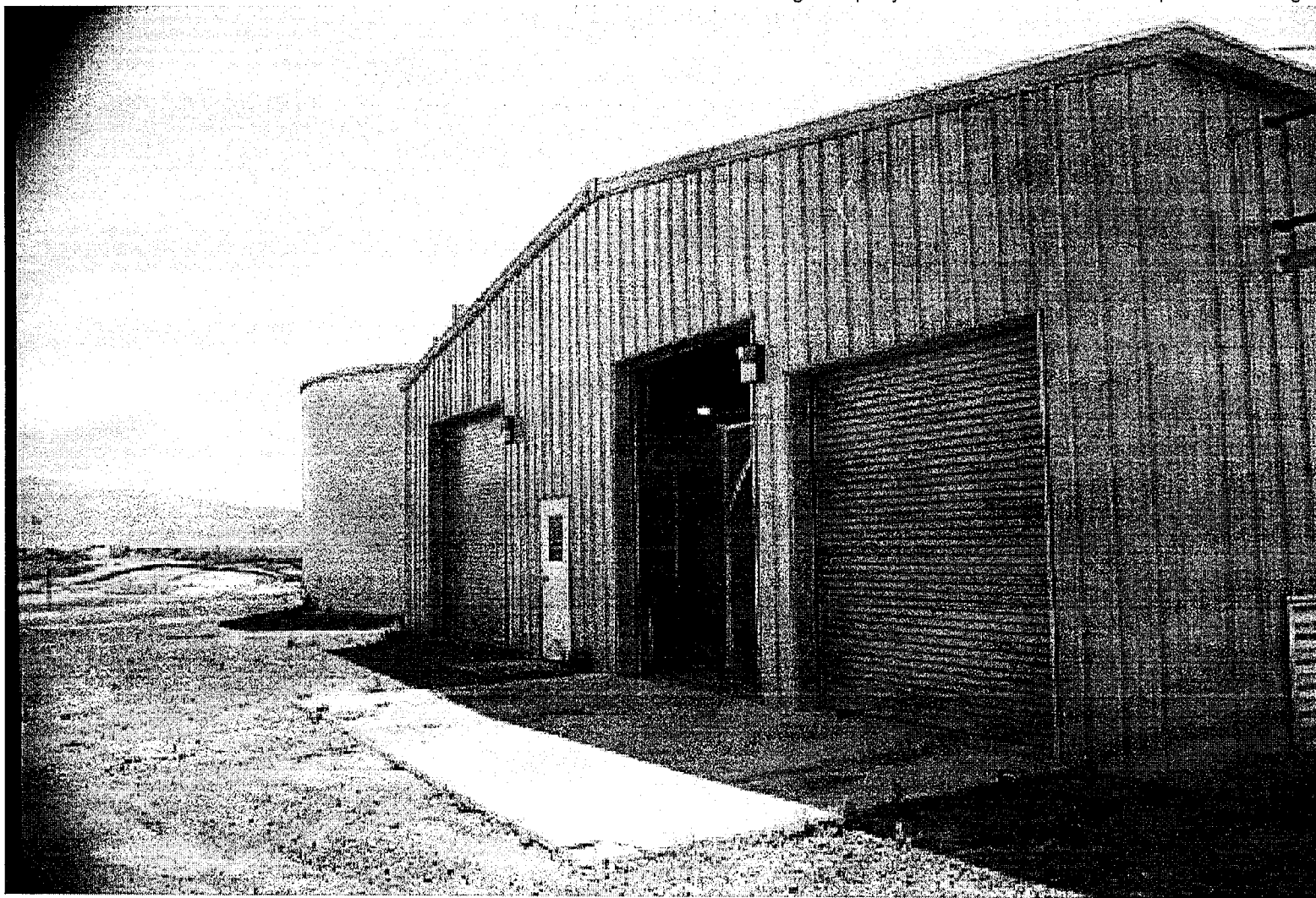
Inside reverse osmosis plant.



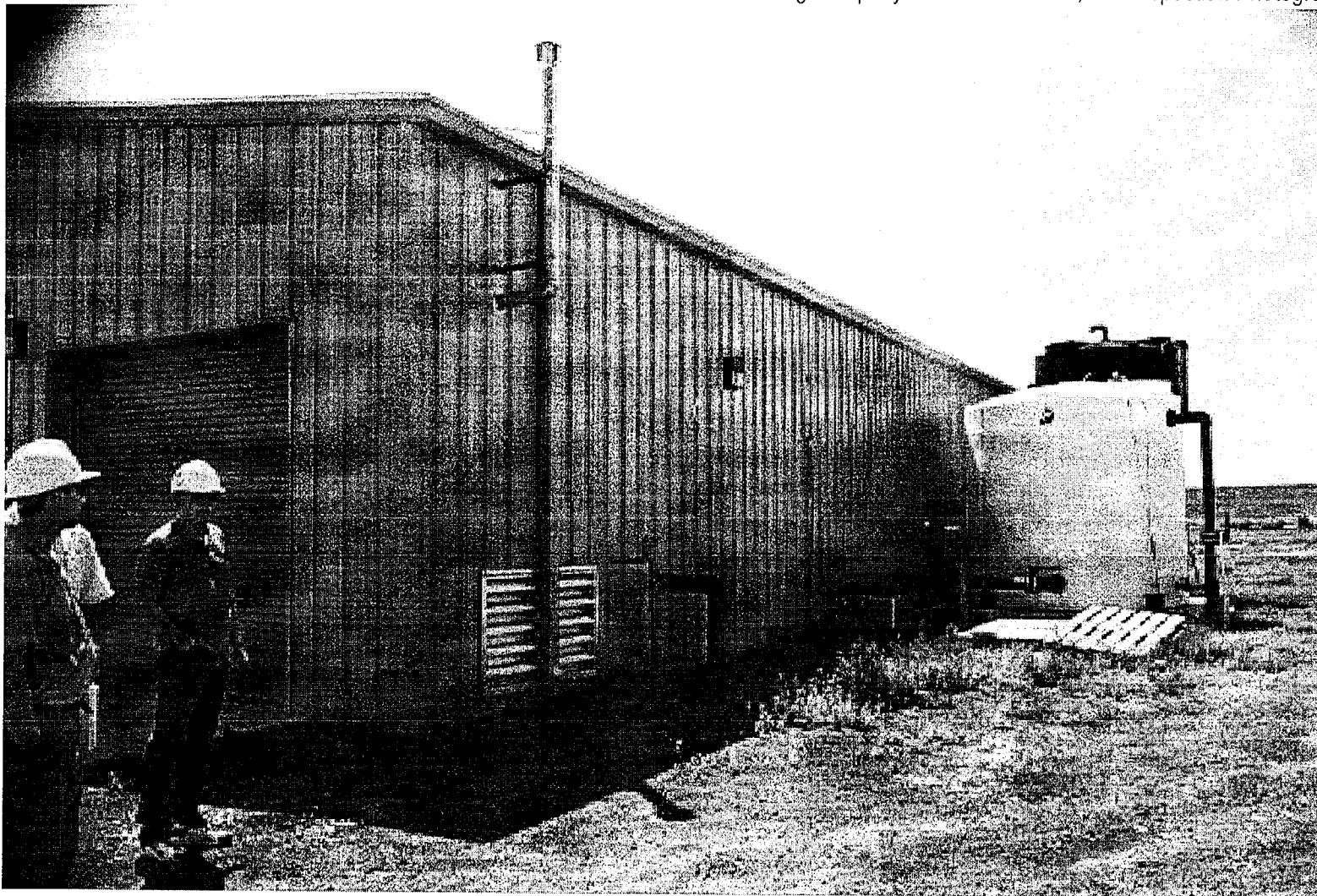
Inside reverse osmosis plant.



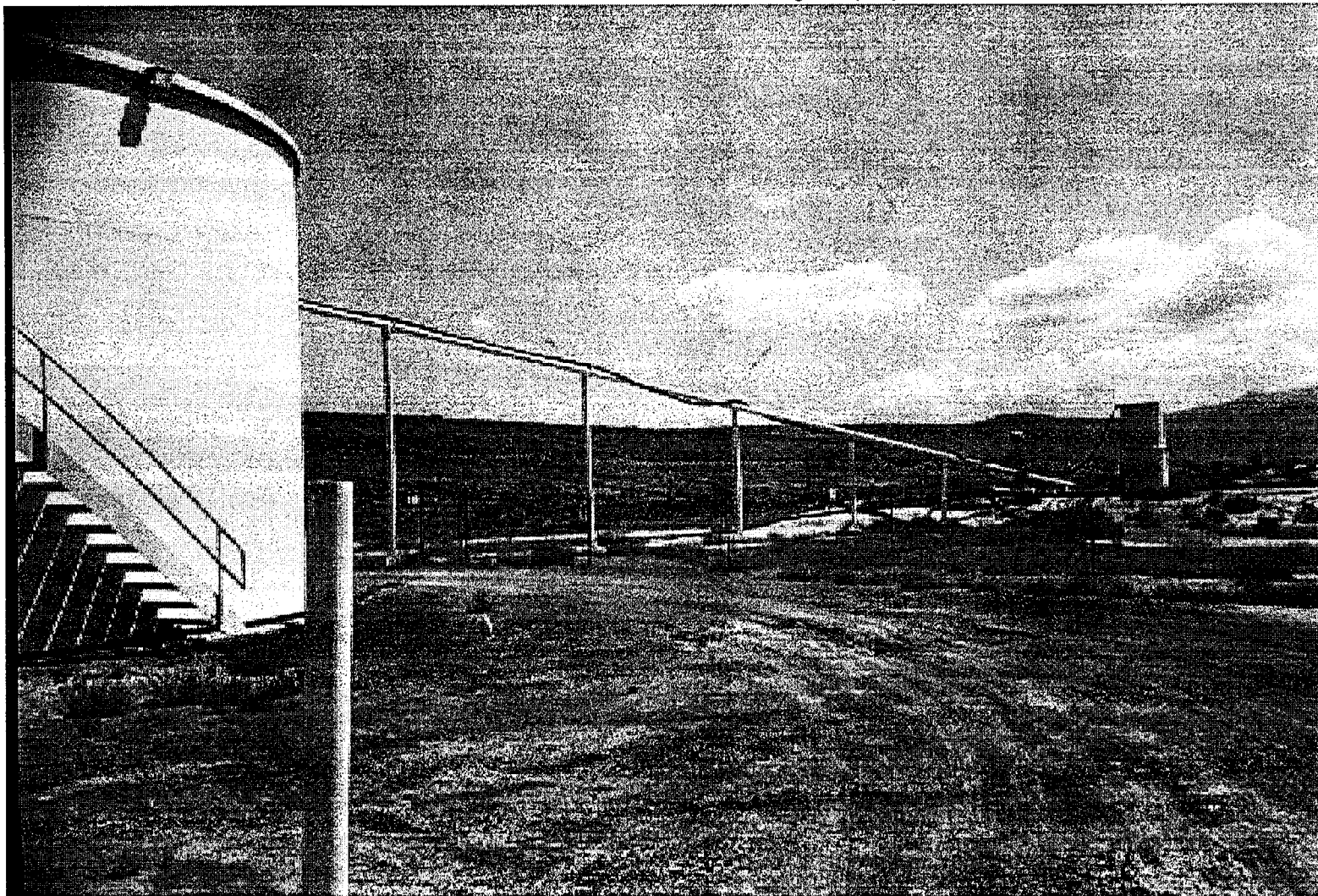
Inside reverse osmosis plant.



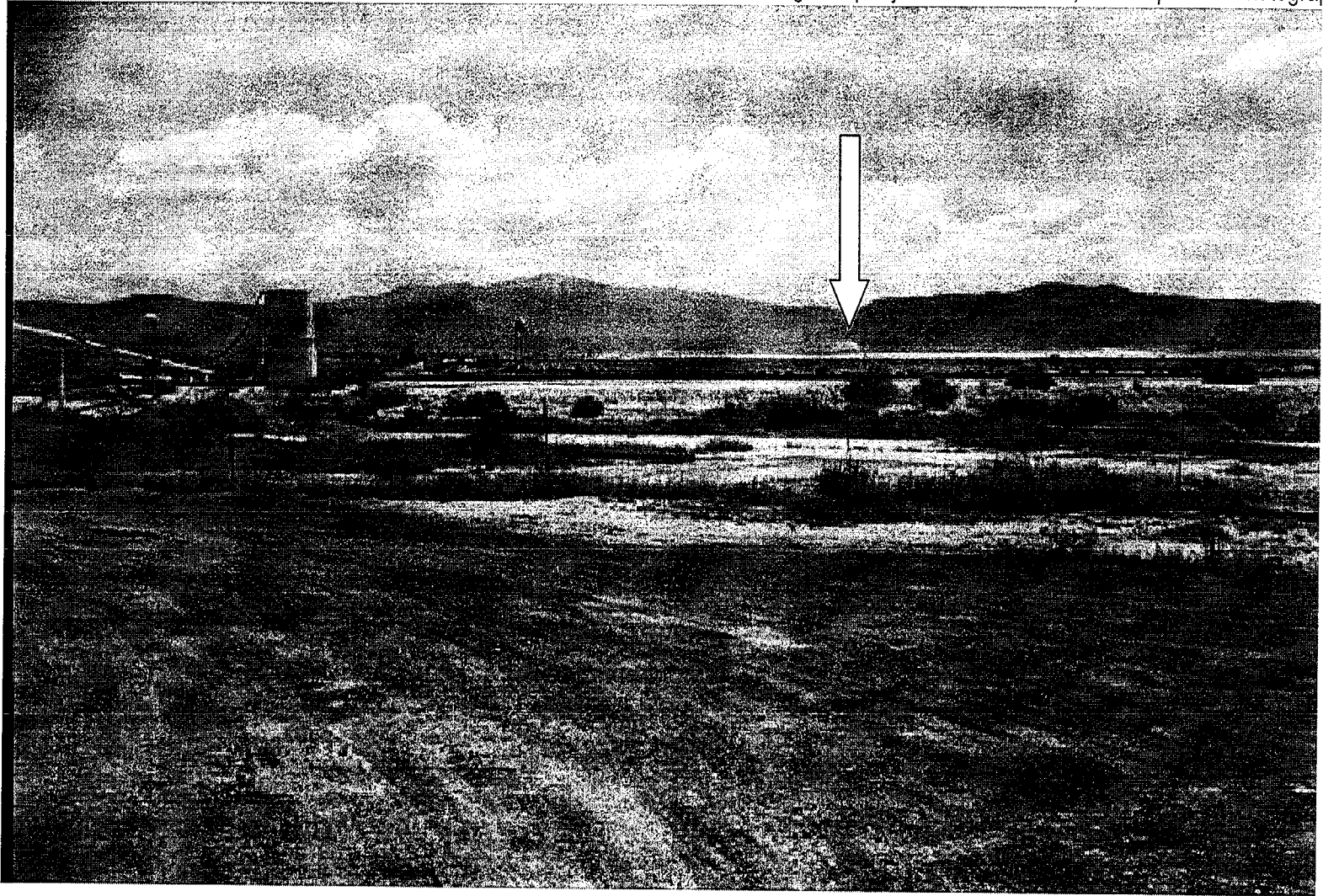
Exterior of reverse osmosis plant, facing east-southeast.



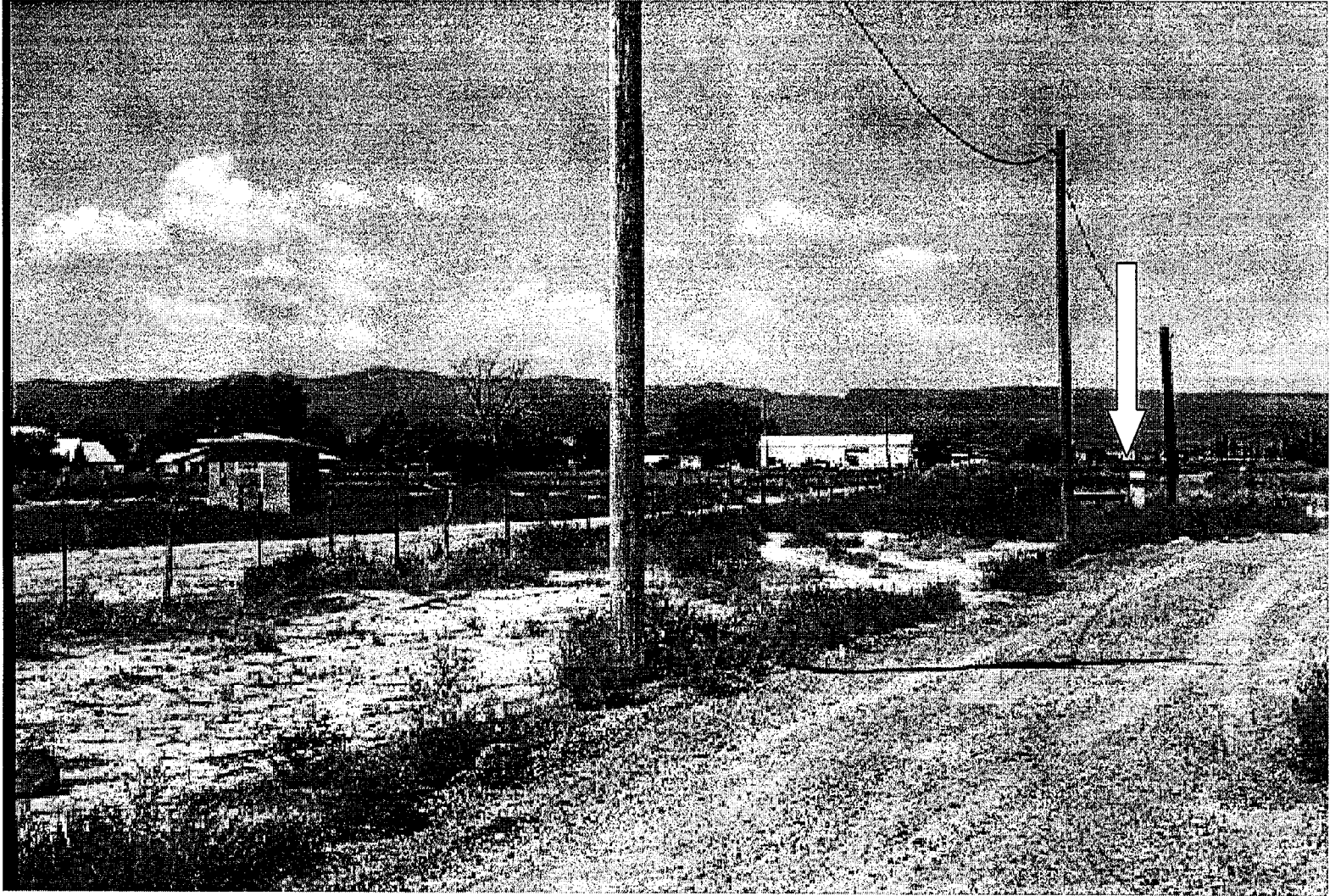
Exterior of reverse osmosis plant, facing south (to right of previous view).



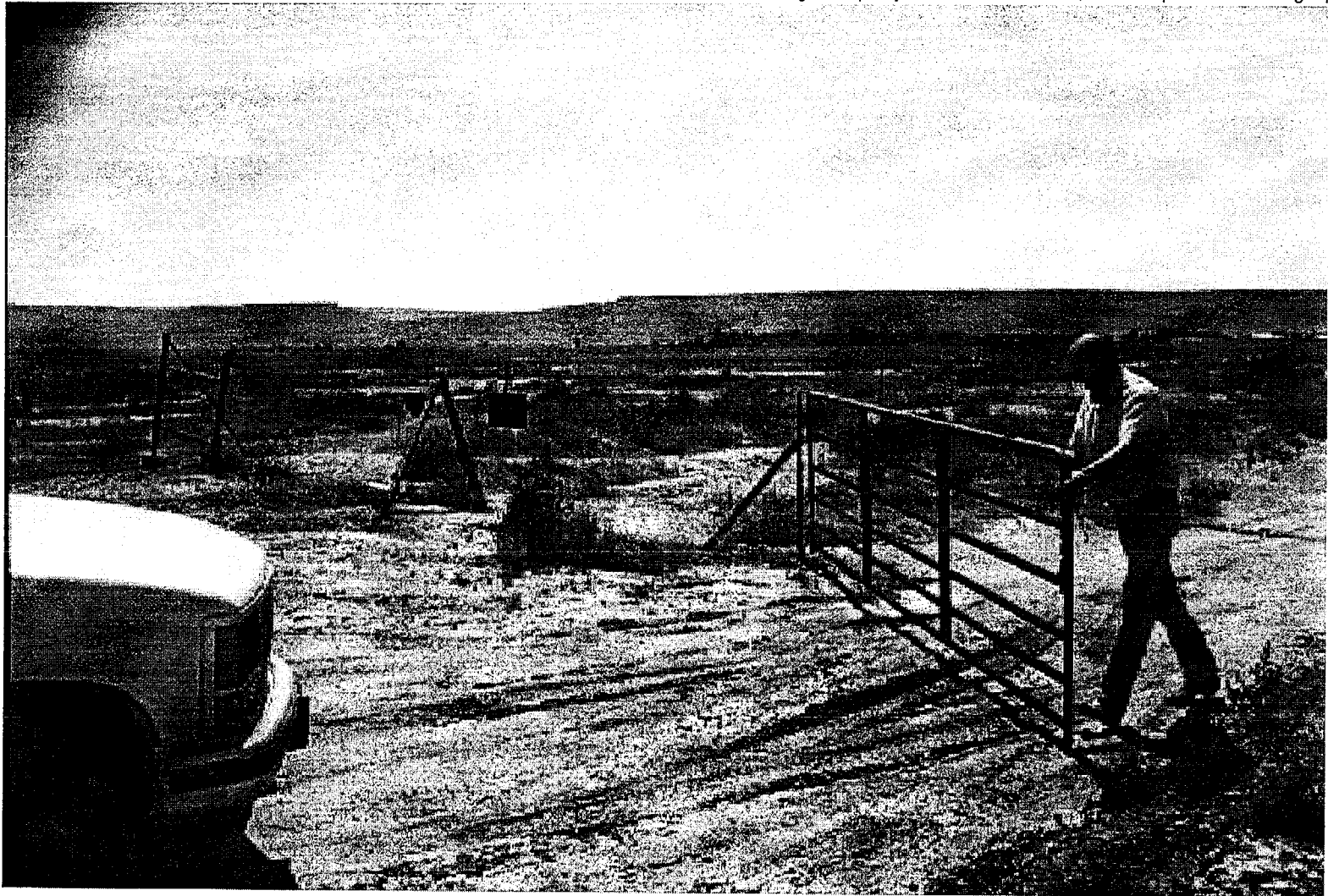
Exterior of reverse osmosis plant, showing conveyance between plant and evaporation ponds to right of view.
Facing north-northwest.



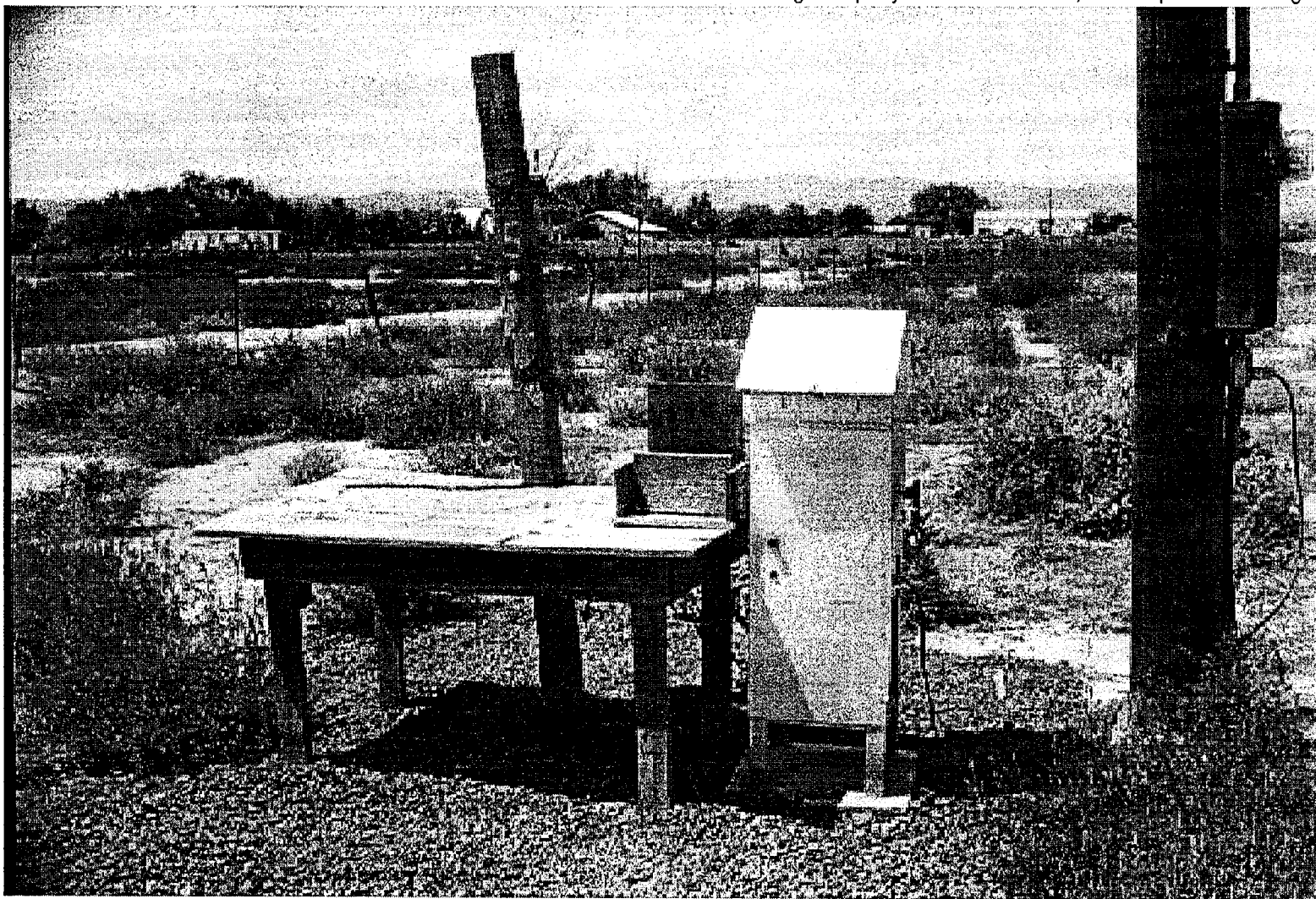
Facing east from south of reverse osmosis plant across evaporation ponds. Note spray blower in far pond at white arrow (the large lined evaporation pond).



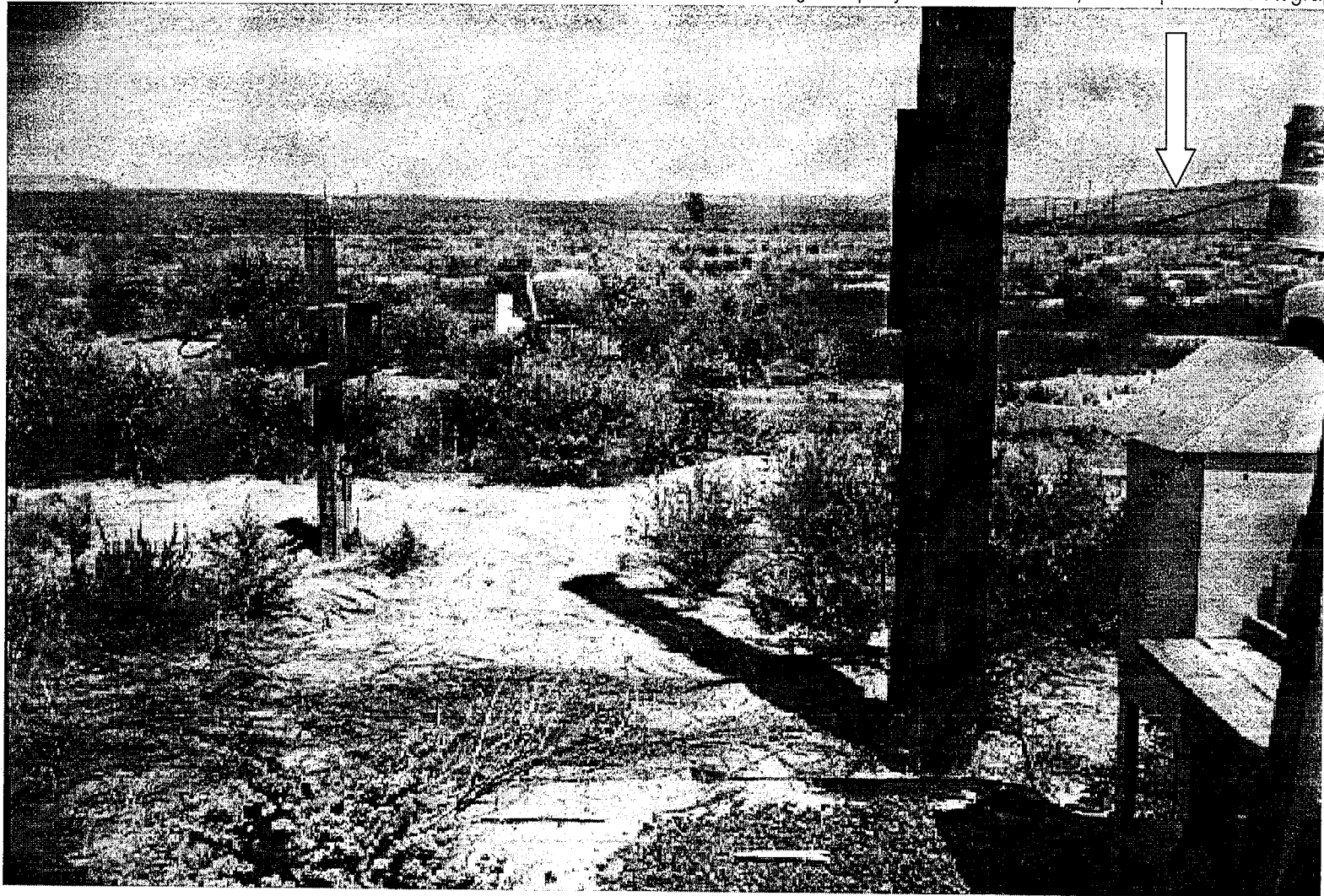
Facing west along site road at southern edge of property, at north end of Murray Acres subdivision.
Note air monitoring station at white arrow.



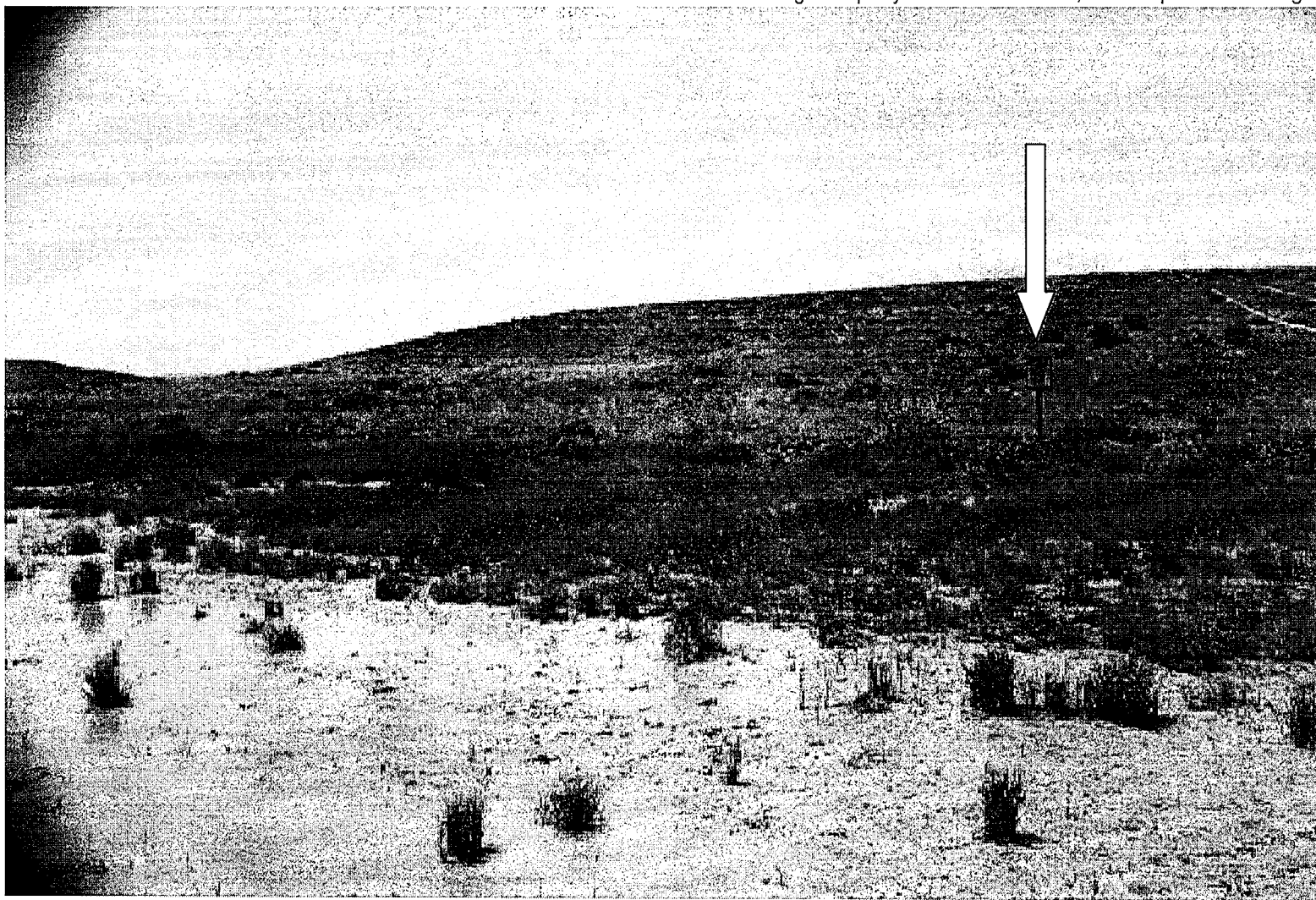
Facing east-southeast at site access gate near northeastern corner of Murray Acres subdivision.



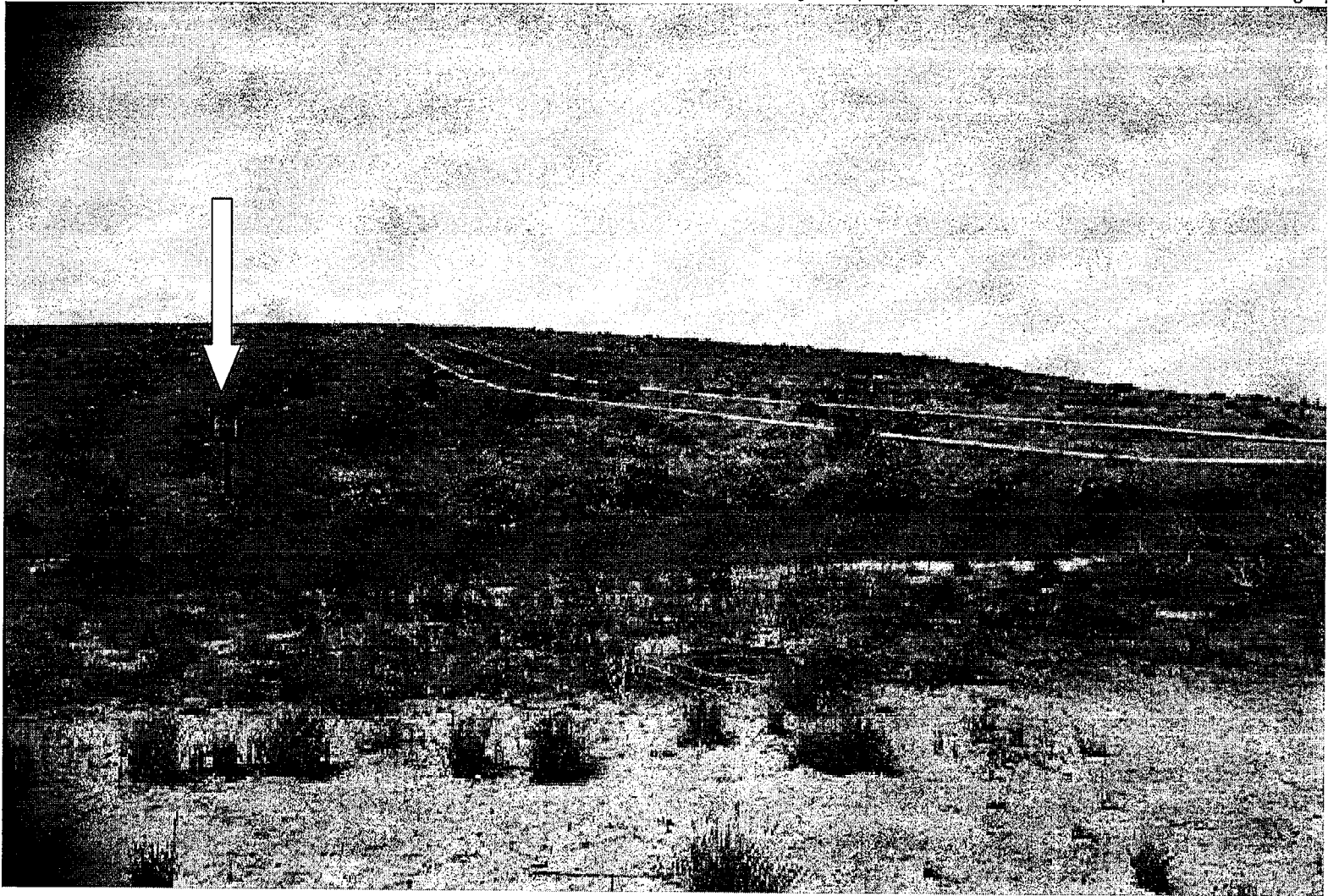
Facing west, air monitoring station near north end of Murray Acres subdivision.



Facing north on west side of air monitoring station shown in previous photographs. Western slope of large tailings pile is visible at white arrow.



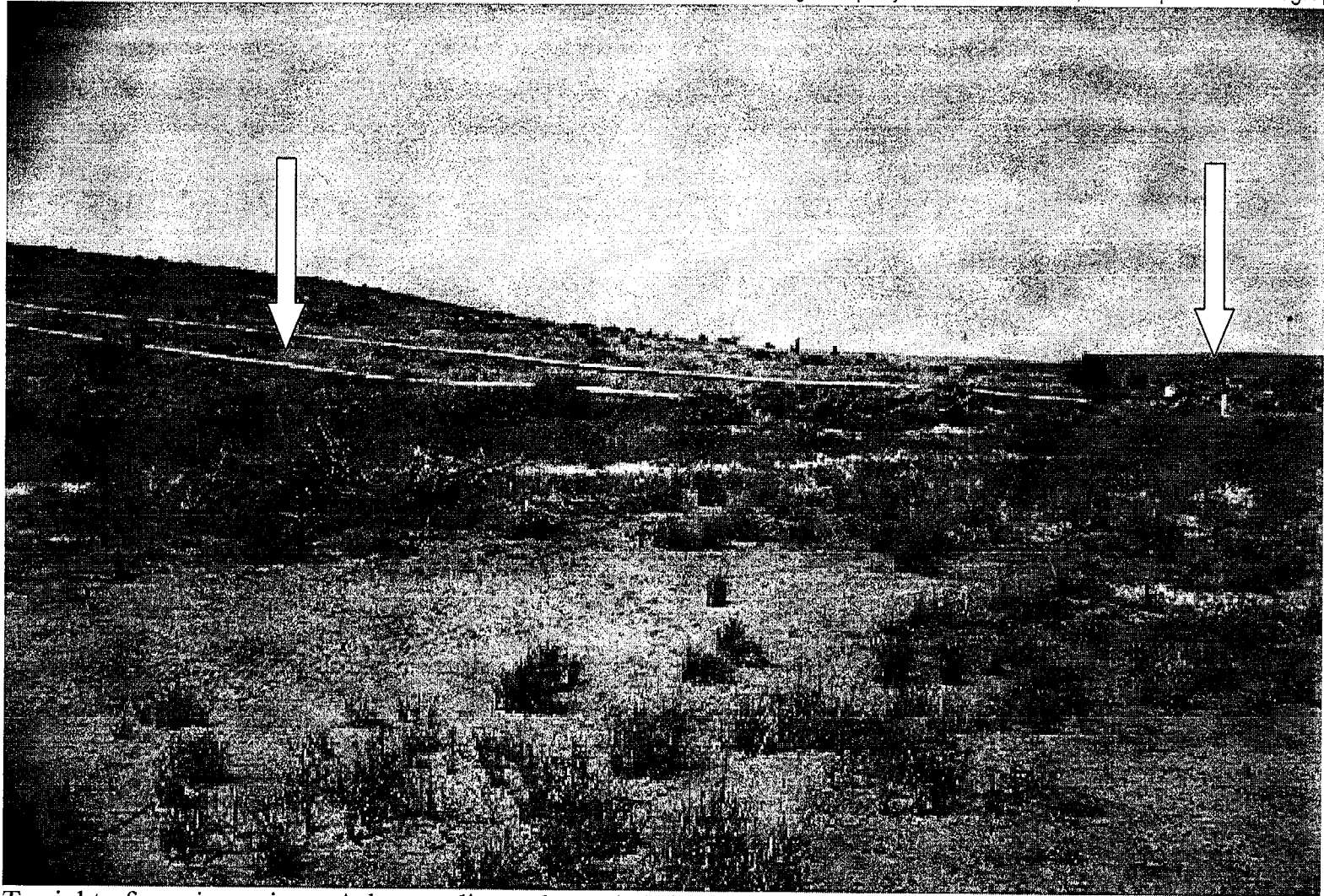
Facing south toward north-eastern slope of large tailings pile, at northeast corner. Note sign at white arrow; signifies presence of an asbestos disposal area.



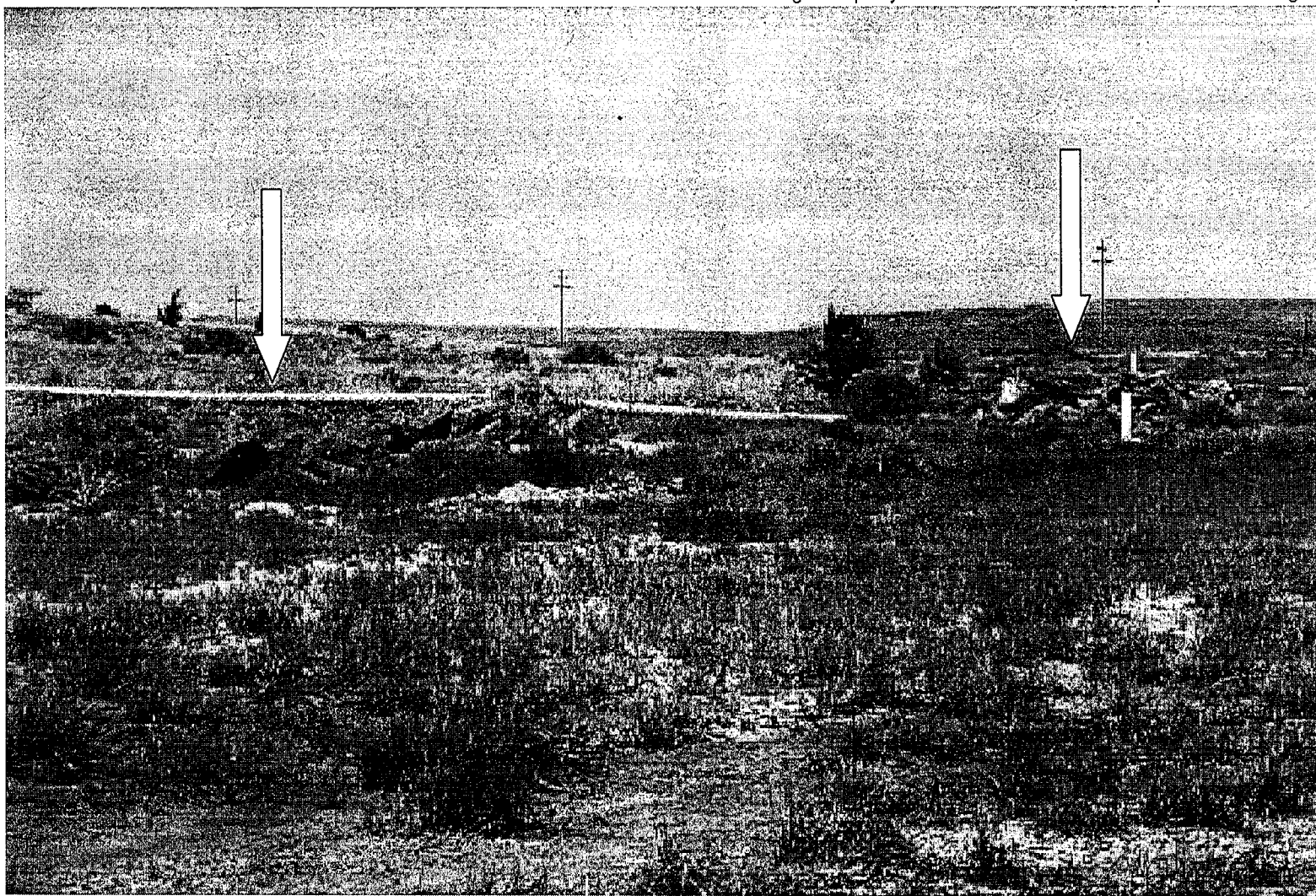
Facing south-southwest toward north-eastern slope of large tailings pile, at northeast corner. Note same sign as visible in previous photograph at white arrow; signifies presence of an asbestos disposal area.



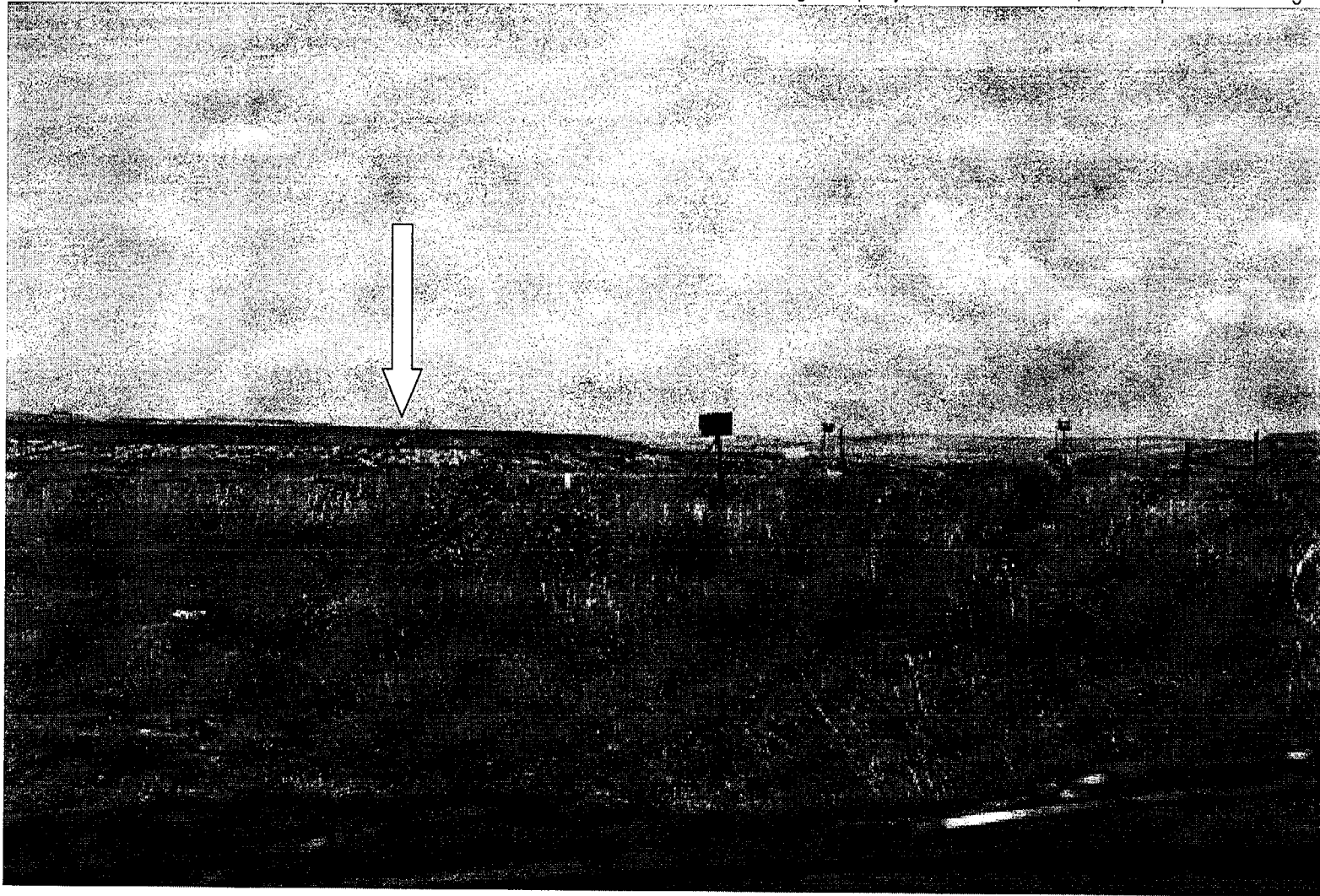
Facing south toward northern slope of large tailings pile, toward eastern end of the pile, closer view of asbestos disposal area seen in previous photographs. Sign states "Danger, Asbestos Waste Disposal Site, Breathing Asbestos Dust May Cause Lung Disease and Cancer".



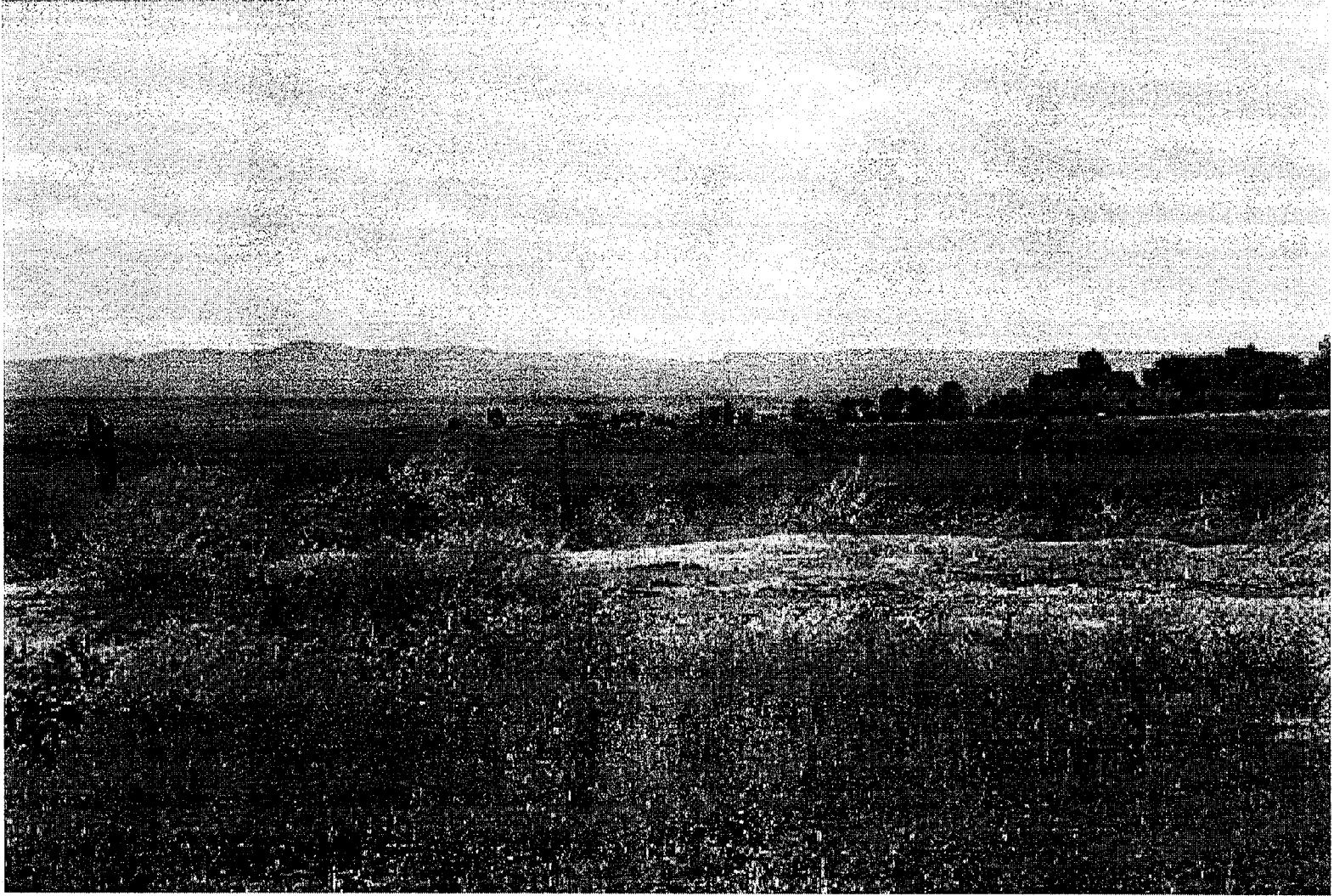
To right of previous view. Asbestos disposal area is left of view; runoff conveyance from top of large tailings pile is visible at left white arrow. Right white arrow shows runoff discharge point, which uses boulders to break flow.



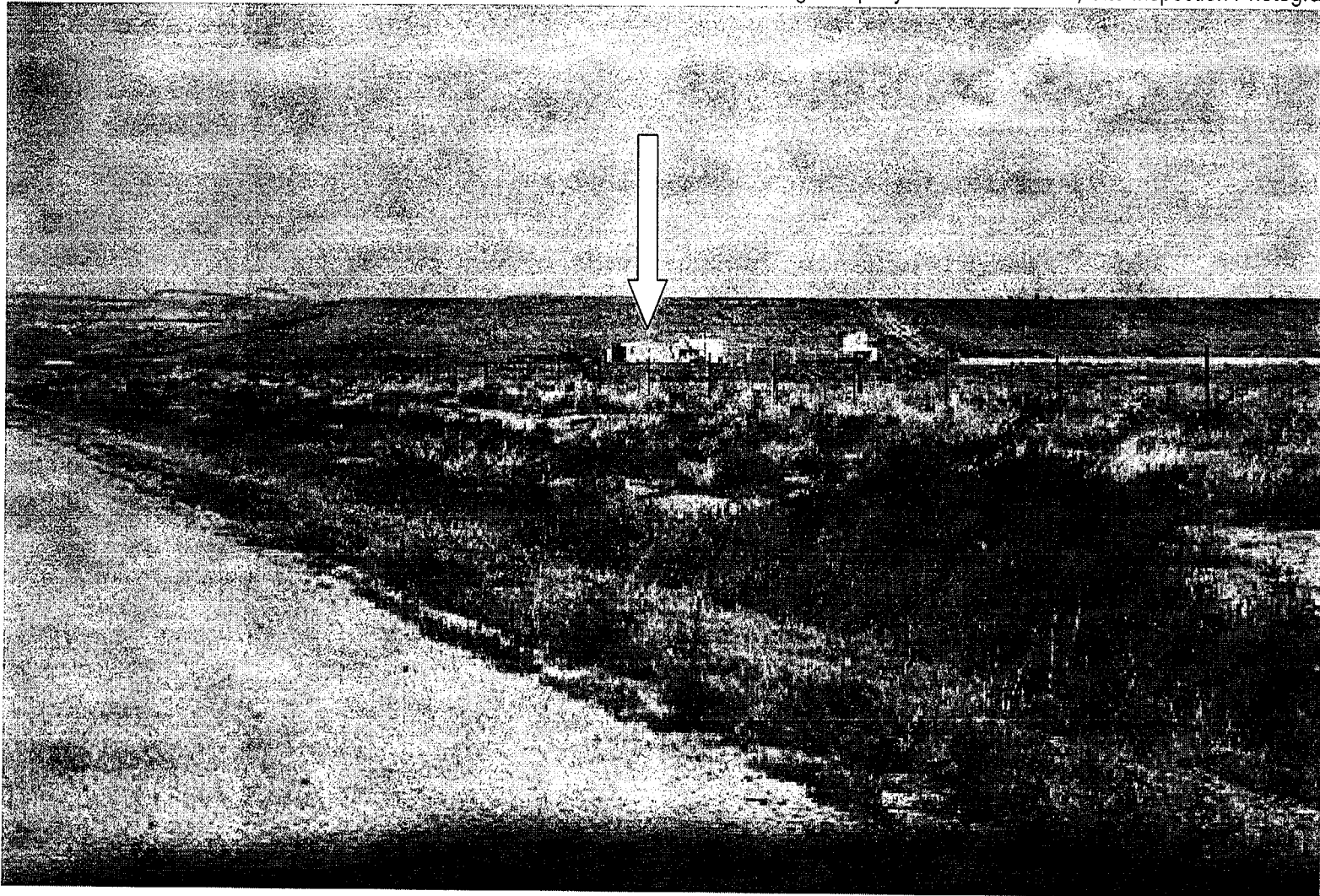
Closer view of previous photograph. Asbestos disposal area is left of view; runoff conveyance from top of large tailings pile is visible at left white arrow. Right white arrow shows runoff discharge point, which uses boulders to break flow.



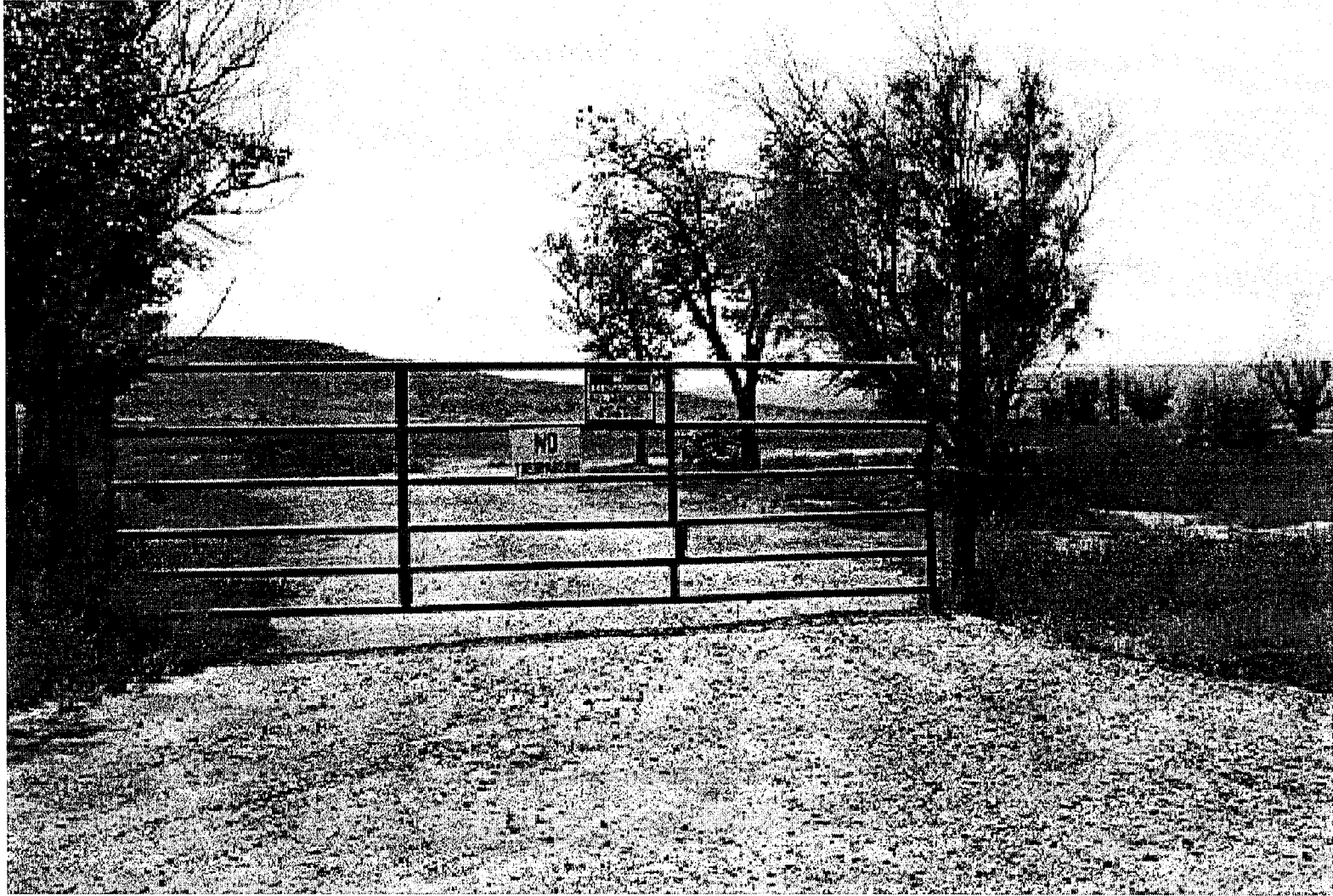
View from Highway 605 offsite, toward fresh water towers and large evaporation pond (note location of spray blower at white arrow. Facing west-southwest.



Facing west across irrigation area south of Murray Acres; photograph taken from Thunderbird Lane.



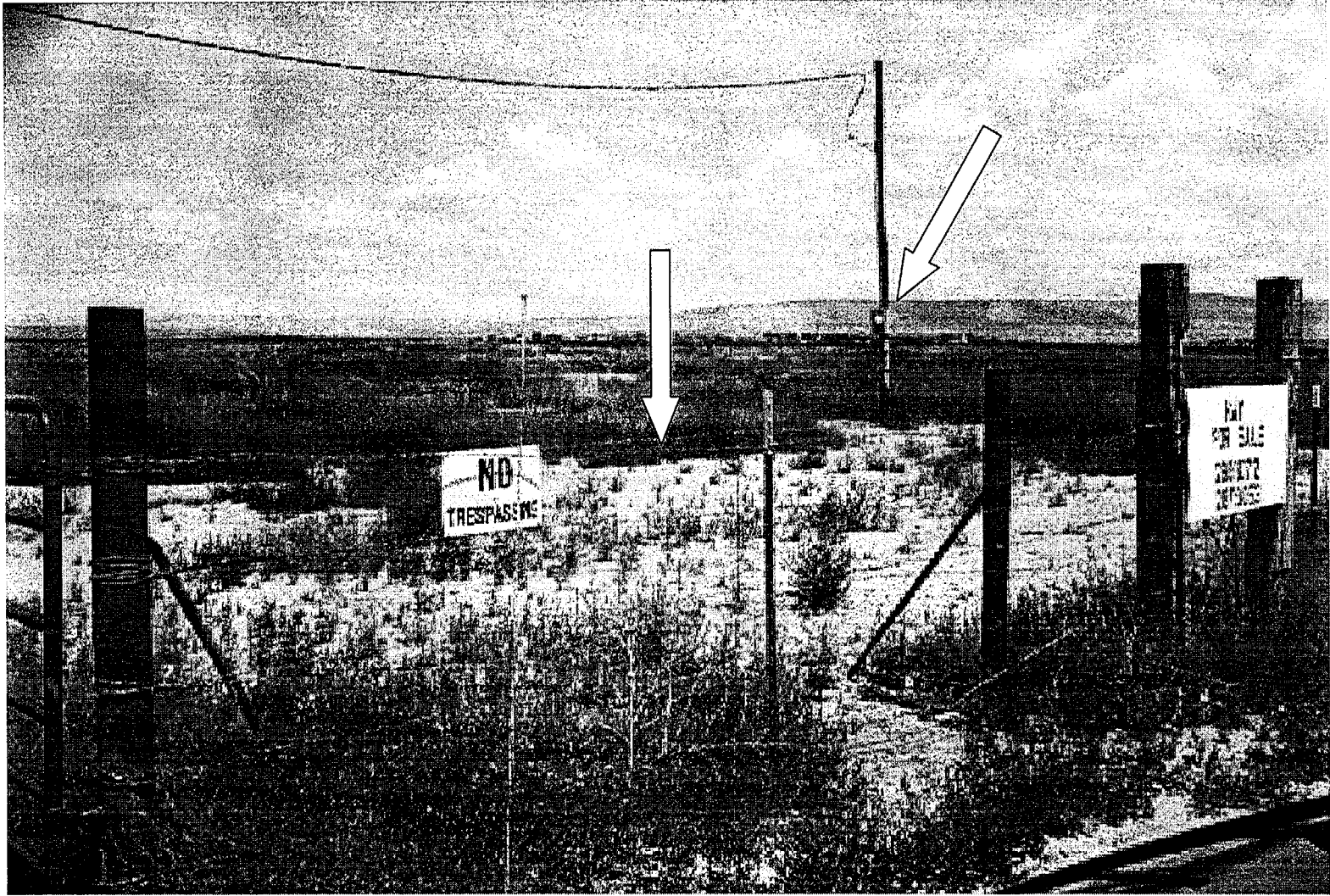
Facing north toward site from Thunderbird Lane east of Murray Acres. Note location of reverse osmosis plant at white arrow. Large tailings pile is visible in background.



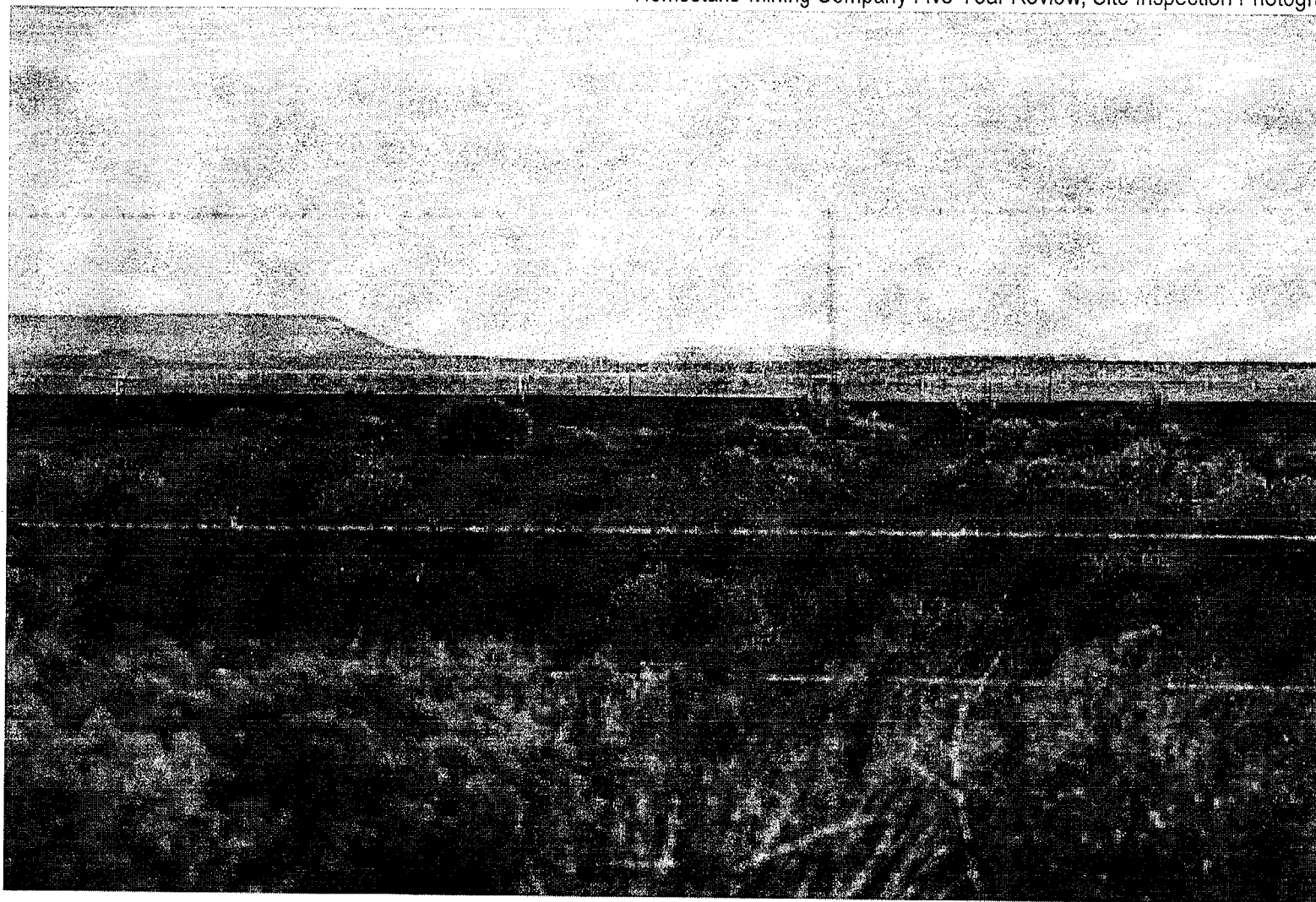
Facing south at entrance gate to irrigation area south of Murray Acres; photograph taken from road south of Murray Acres.



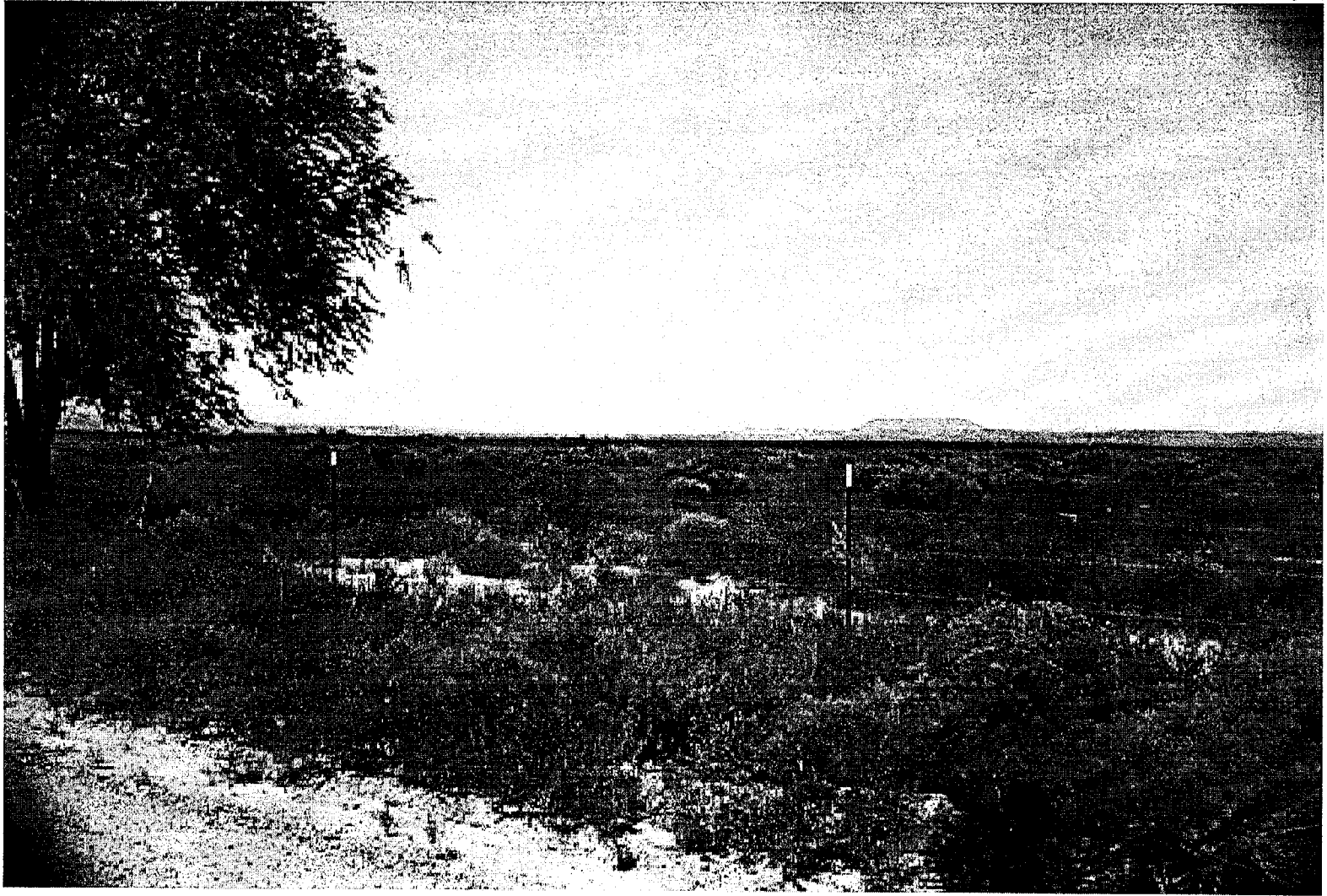
Facing east across irrigation area south of Murray Acres.



Facing north toward irrigation area west of Pleasant Valley Estates, at southwest corner of the irrigation area property. Note water conveyance pipe and power pole with electrical box (left and right arrows, respectively).



Facing north across irrigation area west of Pleasant Valley Estates.



Facing north-northwest across irrigation area west of Pleasant Valley Estates.

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